Knowledge society: vision and social construction of reality in Germany and Singapore

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Veröffentlichungsversion / Published Version
Monographie / phd thesis

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Knowledge Society

Vision & Social Construction of Reality in Germany & Singapore

ZEF Development Studies

Edited by
Solvay Gerke and Hans-Dieter Evers

Volume 3

Center for Development Research (ZEF)
University of Bonn
www.zef.de

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Münster
LIT Verlag
2007

To David and Oscar

This book was printed with the financial support of the Center for Development Research in Bonn, Germany.

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

ISBN 978-3-8258-0316-2
Zugl.: Technische Universität Berlin (D 83), Diss., Verteidigt am 08. 03. 2007, Berichter: Prof. Dr. Hubert Knoblauch, TU Berlin & Prof. Dr. Tong Chee Kiong, National University of Singapore.

A catalogue record for this book is available from the British Library

Auslieferung/Verlagskontakt:
Fresnostr. 2 48159 Münster
Tel. +49 (0)251–62 03 20 Fax +49 (0)251–23 19 72
e-Mail: lit@lit-verlag.de http://www.lit-verlag.de

Distributed in the UK by: Global Book Marketing, 99B Wallis Rd, London, E9 5LN
Phone: +44 (0) 20 8533 5800 – Fax: +44 (0) 1600 775 663
http://www.centralbooks.co.uk/acatalog/search.html

Distributed in North America by:

Transaction Publishers
New Brunswick (U.S.A.) and London (U.K.)

Transaction Publishers
Rutgers University
35 Berrue Circle
Piscataway, NJ 08854

Phone: +1 (732) 445 - 2280
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for orders (U. S. only):
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Abbreviations

A*GA	A*STAR Graduate Academy
A*STAR	Agency for Science, Technology and Research
AA	Auswärtiges Amt
ACCA	Advisory Council on Culture and the Arts
AFP	Agence France Press
AMIC	Asian Media Information & Communication Centre
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
ATM	Asynchron Transfer Mode
BDA	Bundesvereinigung der Deutschen Arbeitgeberverbände (Confederation of German Employers Associations)
BDI	Bundesverband der Deutschen Industrie e.V. (Federation of German Industries)
BDZV	Bundesverband Deutscher Zeitungsverleger e.V. (Federal Association of German Newspaper Publishers
BMBF	Bundesministerium für Bildung und Forschung (Federal Ministry of Education and Research)
BMBW	Bundesministerium für Bildung und Wissenschaft (Federal Ministry of Education and Science)
BMF	Bundesministerium der Finanzen (Federal Ministry of Finance)
BMFSFJ	Bundesministerium für Familie, Senioren, Frauen und Jugend (Federal Ministry for Families, Seniors, Women and Youth)
BMFT	Bundesministerium für Forschung und Technologie (Federal Ministry of Research and Technology)
BMGS	Bundesministerium für Gesundheit und Soziale Sicherung (Federal Ministry of Health and Social Security)
BMI	Bundesministerium des Innern (Federal Ministry of the Interior)
BMJ	Bundesministerium der Justiz (Federal Ministry of Justice)
BMRC	Biomedical Research Council
BMU	Bundesministerium für Umwelt (Federal Ministry of Environment)
BMVBW	Bundesministerium für Verkehr, Bau- und Wohnungswesen (Federal Ministry of Transport, Construction and Housing)
BMVEL	Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft (Federal Ministry of Consumer Protection, Food and Agriculture)

BMVg	Bundesministerium für Verteidigung (Federal Ministry of Defence)
BMWA	Bundesministerium für Wirtschaft und Arbeit (Federal Ministry of Economy and Labour)
BMWi	Bundesministerium für Wirtschaft und Technologie (Federal Ministry of Economy and Technology)
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry of Economic Cooperation and Development)
BPV	Bundesverband der Phonographischen Wirtschaft e.V. (Federation of the Phonographic Industry)
BSI	Bundesamt für Sicherheit in der Informationstechnik (Federal Office for Information Security)
CamTech	Centre for Advanced Media Technology
CDU	Christlich Demokratische Union (Christian Democratic Union)
CEO	Chief Executive Officer
CERN	European Organisation for Nuclear Research
CIDS	Creative Industries Development Strategy
CNC	Committee on National Computerisation
CPAD	Corporate Planning and Administration Division
CSCG	Civil Service Computerisation Group
CSCP	Civil Service Computerisation Program
CSU	Christlich Soziale Union (Christian Social Union)
D21	Deutschland 21 (Germany 21)
DBr	Deutscher Bundesrat (German Upper House)
DBt	Deutscher Bundestag (German Lower House)
	DELTA Developing European Learning through Technology Advance
DFG	Deutsche Forschungsgesellschaft (German Research Foundation)
DIKW	Data Information Knowledge Wisdom
DRIVE	Dedicated Road Infrastructure for Vehicle Safety in Europe
dpa	Deutsche Presse-Agentur (German Press Agency)
EDB	Economic Development Board
EDI	Electronic Data Interchange
ERC	Economic Review Committee
ESPRIT	European Strategic Program on Research in Information Technology
ETPL	Exploit Technologies Pte Ltd
EU	European Union
FAZ	Frankfurter Allgemeine Zeitung
FDI	Foreign Direct Investment

FDP	Freie Demokratische Partei (Free Democratic Party)
G2B	Government to Businesses
G2C	Government to Citizens
G2E	Government to Employees
GAP	Group d'Analyse et de Prévision
ICT	Information and Communication Technologies
IDA	Infocomm Development Authority
IE	International Enterprises
IITF	Information Infrastructure Task Force
iLIUP	Infocomm Local Industry Upgrading Program
IME	Institute for Microelectronics
IN2015	Intelligent Nation 2015
Inf.Soc.	Information Society
ISA	Internal Security Act
ISDN	Integrated Services Digital Network
ISEAS	Institute of Southeast Asian Studies
ISP	Internet Service Provider
ISPO	Information Society Project Office
ISS	Institute of Systems Science
IT	Information Technology
ITSC	Information Technology Standards Committee
ITU	International Telecommunication Union
KBE	Knowledge-based Economy
KS	Knowledge Society
KtK	Kommission für den Ausbau des technischen Kommunikationssystems (Commission for the Extension of the Technical Communication System)
L2000	Library 2000
L2010	Library 2010
MCYS	Ministry of Community Development, Youth and Sports
MDA	Media Development Agency
METI	Ministry of Economy, Trade and Industry
MEWR	Ministry of the Environment and Water Resources
MFA	Ministry of Foreign Affairs
MHA	Ministry of Home Affairs
MICA	Ministry of Information, Communications and the Arts
MINDEF	Ministry of Defence
MITA	Ministry of Information and the Arts
MITI	Ministry for Industry and Trade
MND	Ministry of National Development
MOE	Ministry of Education
MOF	Ministry of Finance
MOH	Ministry of Health
MOM	Ministry of Manpower

MoP	Member of Parliament
MOT	Ministry of Transport
MTI	Ministry of Trade and Industry
NAC	National Arts Council
NCB	National Computer Board
NHB	National Heritage Board
NIAC	National Internet Advisory Committee
NII	National Information Infrastructure
NLA	National Library Act
NLB	National Library Board
NLBA	National Library Board Act
NPC	National Productivity Centre
NSTB	National Science and Technology Board
NTIA	National Telecommunications and Information Administration
NTU	Nanyang Technological University
NUS	National University of Singapore
OECD	Organisation of Economic Cooperation and Development
ONE	One Network for Everyone
PAP	People's Action Party
PDS	Partei des Demokratischen Sozialismus (Party of Democratic Socialism)
PISA	Program of International Student Assessment
PMO	Prime Minister's Office
PPP	Private-public-partnership
R&D	Research and Development
RACE	Research and Development in Advanced Communications Technologies for Europe
RSEs	Research Scientists and Engineers
SBA	Singapore Broadcasting Authority
SDA	Singapore Democratic Alliance
SERC	Science and Engineering Research Council
SME	Small and Medium Enterprises
SMU	Singapore Management University
SOGT	Senior Officials Group on Telecommunications
SPD	Sozialdemokratische Partei Deutschlands (Socialdemocratic Party of Germany)
SPH	Singapore Press Holdings Limited
SPRING	Standards, Productivity and Innovation Board SPRING Singapore
STPB	Singapore Tourist Promotion Board
TAS	Telecommunication Authority of Singapore
TCP	Transfer Control Protocol

TU	Technische Universität (Technical University)
TV	Television
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VCI	Verband der chemischen Industrie (Association of the Chemical Industry)
VLSI	Very Large Scale Integration
VPRT	Verband Privater Rundfunk und Telekommunikation (Association of Private Radio and Telecommunication)
WASG	Wahlalternative Arbeit und soziale Gerechtigkeit (Vote-alternative Labour and social Justice)
WIPO	World Intellectual Property Organisation
WISP	Wireless Internet Service Provider
WP	Worker's Party
WSIS	World Summit on the Information Society
WTO	World Trade Organisation
WW II	World War II

Abstract

At a time of knowledge becoming increasingly relevant to social and economic development, governments worldwide aim at the creation of country-specific types of k-society, i.e. 'information societies', 'knowledge societies' or 'knowledge-based economies'.[1] This book redraws the processes of constructing k-societies in Germany and Singapore and offers an empirically based definition of k-society which has been missing until now. Based on the conducted research, I argue that k-societies are created by collective actors in society and are not – as often assumed – merely the result or logical consequence of the technological developments in the information and communication sector, the growth of the service industry and the high profit margin of knowledge intensive goods. I empirically focus on the activities of the state as collective actor who massively pursues the creation of k-societies in Germany and Singapore. The remaining subsystems engaged in the construction process – economy, scientific community, civil society and the media – are merely assessed with regard to their influence on state activities.

The process of constructing k-societies can be divided into (a) the development of the theoretical, categorically defined concepts of k-society; (b) the construction of a vision of self-emerging k-societies; and (c) the creation of country-specific k-societies as stages of social and economic development. At the beginning of the construction process stands the development of the idea of k-society by the international scientific community. Multiple, categorically-defined concepts of k-society as well as a manifold terminology were developed. The interchangeable use of terms to label the many k-society definitions nevertheless resulted in a rather blurry picture of k-society. Accelerated by the common assumption of the rise of k-societies, this created a fertile ground for the construction of a vision of a self-emerging k-society. This thesis outlines the role of the German and Singaporean governments in creating and utilising this vision. Most political programs which aim at the creation of a k-society as a stage of development justify their existence by pointing to the apparent rise of a k-society that should be monitored. Yet in actual terms, it is these programs that call the envisioned k-society into existence. Consequently, these government programs inherently (re-)define country-specific k-societies. By assessing these procedural defini-

[1] The wide range of terms describing societies/economies increasingly based on knowledge, information and information and communication technologies is in this thesis subsumed under the term 'k-society'.

tions of k-society, this thesis offers clarity to what k-societies actually are: they are what they are defined as by the actors creating them. Theoretically this is based on Berger and Luckmann's theory of the social construction of reality (1984), defining knowledge, as what is regarded as knowledge by society.

Germany and Singapore, the countries of investigation, share the commonality of being modern and aiming at developing into k-societies. At the same time, the structural realities of both countries differ markedly which is precondition to the analysis. The wide differences make it possible to show that (a) k-societies are not only created as political idea and stage of development but furthermore (b) the definitions of k-society and the paths taken to create them, highly depend on the structural realities and dominant definitions of knowledge in each country. Consequently, there is not one k-society, but multiple, country-specific k-societies.

Nevertheless, the data also illustrate that k-societies do not only vary in different countries but that k-society as construct was in both countries in the beginning clearly an economic and technological programme. But over time, it became more and acts in Germany and even more in Singapore today as economic and technological programme, as well as a new focal point of collective identity offered by the state in order to reduce felt insecurities. As such, the suggested concept of multiple k-societies has to be interpreted within Eisenstadt's concept of multiple modernities, which leads me to answer the initial question, what k-society actually is by stating: k-society is to the second modernity, the time of multiple modernities what 'industrial society' was for the first, western modernity. K-society is a theoretical concept created by academics and scientists. K-society is a vision that legitimises and accelerates action towards its own realisation. K-society is a stage of development in which knowledge forms the center for social, cultural, economic and technologic development. K-society is a new focal point of identity in the second modernity. And finally, k-society is a social construction of reality that will shape our future to come.

Empirically, this thesis is based on (a) qualitative expert interviews conducted in Germany and Singapore; (b) a quantitative analysis of the participation of subsystems in commissions and boards of directors; (c) a quantitative analysis of the k-society terminology; as well as (d) a qualitative analysis of government programs, action plans and final reports of government commissions contributing to the construction of k-societies.

Acknowledgements

Many people have contributed in various ways to the outcome of this project.

I am especially grateful to my supervisor, Prof. Dr. Hubert Knoblauch. Without his noble commitment, kind, and profound support during the past three years of study, the writing of this dissertation would not have been possible. His enduring encouragement and help espoused me to take paths, never encountered before.

Secondly, I would like to express my deep gratitude to A/P Dr. Tong Chee Kiong whose profound advice guided me through the fieldwork in Singapore and the writing of this book. His critical questions inspired me; his kind help supported and encouraged me to form my own mind.

I would like to thank Prof. Dr. Solvay Gerke and Prof. Dr. Hans-Dieter Evers who originally introduced me to the topic of knowledge governance, as well as my colleagues at the Centre for Development Research of the University of Bonn. Their professional advice and kind support aided me tremendously.

Another acknowledgement goes to all those people who have supported me in the long and difficult process of finding informants and conducting interviews. Every counsel and direction given was highly valued. I especially want to express my deep gratitude to my interview partners in Germany and Singapore. Their ever-lasting patience and openness to answer my questions made this project possible.

Furthermore, I would like to thank my friends who listened when I needed an ear and searched with me in long discussions for the answers to my questions when I could not find them myself. I want to thank my mother-in-law Jenni, as well as Kelvin and Noorman for proof reading what I wrote and inspiring me with their constructive criticism.

Lastly, but certainly not least, I would like to thank my family: My husband David who always ensured with his loving care that I did not stop to believe in this project or my ability to finish it. My son Oscar who brought the most loving joy to our family and – during his long sleeps – granted me the time to work on this thesis. Finally, I would like to thank my parents who have passed on their love, happiness, strength and self-confidence to their four daughters with a never-ending belief in all our endeavours.

"Society is a human product. Society is an objective reality. Man is a social product."
(Peter Berger & Thomas Luckmann)

"Paths are made by walking."
(Franz Kafka)

Chapter 1

The Construction of K-Societies: Introduction

In the past twenty to thirty years, visionary terms such as 'knowledge society', 'information society' and 'knowledge-based economy' – which have been incorporated into public speeches, academic writings, and day-to-day journalism – announced a future in which social and economic development is increasingly based on knowledge. While the concepts 'knowledge society' and 'information society' were mainly developed by academics from Japan, USA and Europe, the concept 'knowledge-based economy' was proposed somewhat later by international organisations such as the OECD. From there – although far from complete – all three concepts entered the national politics of many countries which aimed at the active creation of better futures.[1] This aim, the creation of 'knowledge societies', 'information societies' or 'knowledge-based economies', forms the basis of this book. For reasons of terminological clarity, the wide range of terms describing these better futures based on knowledge, information and information and communication technologies (ICTs) – 'knowledge society', 'information society', 'knowledge-based economy' – is subsumed under the term 'k-society'.[2]

Common to most theoretical concepts of k-society[3] is the belief that the stage of societal development which they describe emerges as a result of

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[1] The activities of the USA, EU and Japan, as countries belonging to the earliest in creating k-societies are outlined in Appendix A.

[2] The term 'k-society' is derived from 'knowledge society'.

[3] As the most renowned scholars working on k-society, the following can be mentioned: Machlup (1962); Umesao (1963); Lane (1966); Drucker (1969, 1993a, 1993b); Touraine (1969); Bell (1973, 1987); Porat (1976); Nora/Minc (1979); Böhme/Stehr (1986); Kreibich (1986); Castells (1989, 2004a, 2004b, 2004c); Gibbons et al (1994);

the rapid technological developments in the information and communication sector, the growth of the service sector and the high profit margin of knowledge intensive goods. Hence, that the stage of development here named k-society is self-emerging.

Objective of Investigation

Contrary to the idea of a self-emerging k-society, this book argues that k-societies are in addition constructed by collective actors in society. Furthermore, these processes of construction are accelerated and legitimised by creating a vision of a self-emerging k-society. The focus lies therefore on the construction of k-societies (a) as theoretical, categorically defined concepts, and (b) as stages of social reality. Both (a) and (b) foster the construction of and are themselves encouraged and legitimised by (c) the vision of a self-emerging k-society. Within the arena of engaged subsystems of society contributing to the construction of a k-society as stage of development, the focus lies on the activities of the state, acting as the main agent of construction. The subsystems economy, scientific community, civil society and media are assessed merely with regard to their influence on the activities of the state. The subsystem scientific community is additionally assessed with regard to its role in creating the theoretical concepts of k-society. This is an empirical restriction, but there is no confinement to the hypothesis that k-societies are constructed by collective actors in society. Naturally, the subsystems economy, scientific community, civil society and media are – besides the state –

Stehr (1994); and Willke (1998). They were later scrutinised and their k-society concepts developed further by Kumar (1978); Gershuny (1978); Collins (1981); Lyon (1988, 1996); Dordick/Wang (1993); Stehr (1994, 1999, 2001a, 2001b); Webster (1995); Willke (1998, 1999); Maasen (1999); Dunning (2000); Evers (2000, 2002a, 2002b, 2003, 2005); Evers et al (2000); Hofmann (2001); Steinbicker (2001); David/Foray (2002); Lloyd/Payne (2002); Evers/Menkhoff (2003); Mattelart (2003); Evers/Gerke (2004); Knoblauch (2004, 2005); Kübler (2005); Tänzler/Knoblauch/Soeffner (2006) and Evers/Hornidge (2007) to name a few.
Few scholars (i.e. Lyon (1988, 1996), Webster (1995), Lloyd/Payne (2002), Mattelart (2003), Evers (2003); Knoblauch (2004, 2005), Tänzler/Knoblauch/Soeffner (2006); Kübler (2006) and Evers/Hornidge (2007)) point to the aspect of k-societies being constructed by social actors. The remaining scholars implicitly subscribe to the notion of k-societies emerging due to the technologic, economic and social developments taking place worldwide. The theoretical concepts developed by these authors will be outlined in detail in chapter 2.

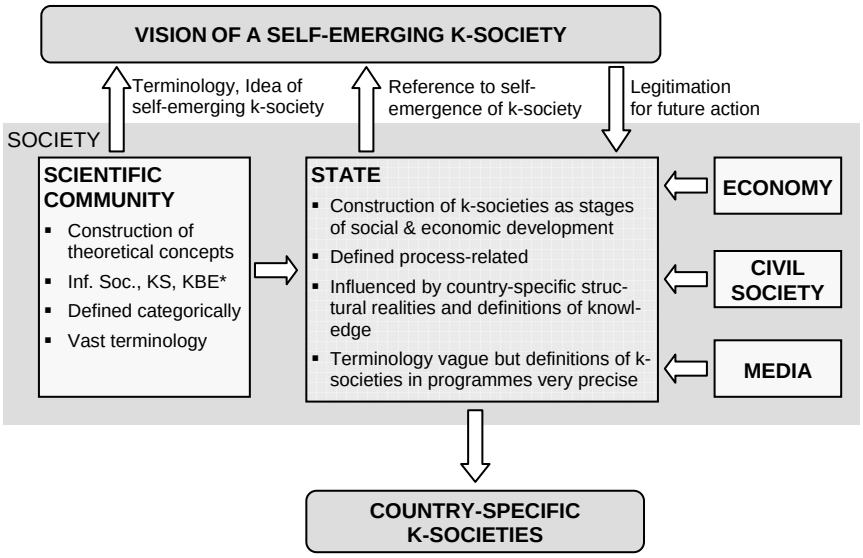
strongly engaged in the construction of social and economic reality and therewith heavily contribute to the construction of k-societies. Yet, an empirical confinement on certain collective actors is – due to space and time limitations – necessary. Consequently, I decided to focus on the subsystem of society which – in many countries – takes action on an enormous scale and massively pursues the construction of k-society as a stage of social and economic development.

Conceptually this book contributes to the existing literature in five areas. First, it offers the empirical data from a Southeast Asian and a European country for k-societies being social constructs of reality that orient and motivate actors. Second, and this contributes to the few works of sociology of knowledge on the phenomenon k-society, the construction process of k-society in both countries is legitimised and accelerated by a vision of a self-emerging k-society. Third, the data on communication and decision-making structures between the state and the remaining subsystems involved in Germany and Singapore illustrate that Luhmann's picture of autopoietical, independently acting subsystems does apply in Germany while it does not apply in Singapore. Hence, his concept has to be considered as rather europeancentric. Fourth, the data clearly showed that k-society definition and construction in each country is highly influenced by the structural realities and dominant definitions of knowledge which then again results in multiple, country-specific k-societies. Consequently in order to identify a general model of how k-society is defined and constructed in each country worldwide, one has to assess the structural realities and their impact on the dominant definition of knowledge (narrow vs. plural). This definition of knowledge then enables us to predict a certain pattern and character of the k-society that is constructed. A simplistic model for enabling these predictions was developed and is discussed at the end of the book. Fifth, the change in function of k-society as first purely economic and technological programme to a new focal point of collective identity which reduces felt insecurities and risks in the age of ongoing globalisation, resorting of the world order and the weakening of the nation state makes it necessary to interpret k-society within the theoretical concept of multiple modernities (Eisenstadt, 1979, 2006). Similarly to the construct 'industrial society' during the first, western modernity, multiple k-societies are offered by state governments as explanations to social and economic changes taking place and as pillars of reassurance during the second modernity (Beck/Giddens/Lash, 1996), an age of multiple modernities.

Diagram 1-1 illustrates the textual focus of this book and the structure of its argumentation. The arrows pointing from the subsystems econ-

omy, civil society and media to the state underline that this book merely assesses their contribution to the construction process with regard to their influences on the constructing activities of the state. The subsystem scientific community is nevertheless additionally assessed with regard to its role as constructor of the theoretical concepts. Germany and Singapore are chosen as countries of investigation. In order to assess structural realities and its effect on the creation of social reality, these countries were selected for a comparative analysis. Due to the wide differences between the two countries, it is possible to show how social reality is (a) constructed and at the same time (b) how this construction is shaped by the existing structural realities and dominant definitions of knowledge in each country.

Diagram 1-1: The Construction of K-Society by the Scientific Community and State Politics



* Inf.Soc. = Information Society; KS = Knowledge Society; KBE = Knowledge-based Economy

In the later half of the 20th century, multiple theoretical concepts of k-society were developed primarily by the scientific communities of Japan, USA and Europe. Although the concepts of k-society were defined in various ways, the mode of defining was always categorical in character, as stated in diagram 1-1. Furthermore, these different concepts were also known through

a variety of new terms. Some examples include 'information economy', 'knowledgeable society', 'knowledge economy', 'information society', 'knowledge society' and 'knowledge-based economy', though the last three terms are most often used. While the academic concepts were quite well defined, this new, manifold terminology lacked a clear distinction and was often used interchangeably. This terminological vagueness – combined with the picture drawn by most of these academic works of a self-emerging k-society that should be monitored, assessed and analysed – contributed to the construction of a k-society-vision. State programmes aiming to construct k-societies later build on this fertile ground and constructed and spread the vision of a self-emerging k-society further. This vision describes a stage of development based predominantly on the increasing relevance of knowledge and information as a future form of social and economic reality – the successor to the industrial age. According to this vision, a k-society is emerging due to technological developments in the information and communication sector as well as economical developments in the service and knowledge intensive sectors.

After the theoretical concepts of k-society had been constructed by members of the scientific community worldwide, and while the vision of a self-emerging k-society was spreading, the national governments of many countries embarked on the creation of k-societies as stages of development. Governments adopted the general idea of k-society as well as the manifold terminology originating from the scientific community. However, the theoretical concepts and definitions of k-society supporting this vision were hardly taken into account. Nevertheless, the vision of a self-arising k-society was – and still is – used by national politics as a form of legitimation for future political action. In other words, it is employed to justify political programmes and activities which construct k-society (see diagram 1-1). Therefore, this vision of a self-emerging k-society is defined in this book – along the lines of Berger and Luckmann (1984: 100ff) – as a legitimating construct that bridges symbolic, institutional and structural differences. This vision acts as a leading idea, which in real terms cannot empirically be grasped. Instead, it acts as symbolic universe, within which all activities that state to guide, guard and monitor this leading idea – the self-emergence of k-society – are legitimised. In real terms, these activities do not merely guide and guard a development that happens to be taking place – in fact they actively construct this k-society. Hence, the collected data suggest that k-societies are indeed socially constructed and – one may add – an example for a self-fulfilling prophecy along the conceptual lines of Merton (1995: 399-413). As outlined in this book, there were first the theoretical concepts attached to multiple, varying terms

created by members of the scientific community, predicting a certain future reality. These predictions, whether true or false remains open for discussion, were taken up by national governments and resulted in enormous political programmes and activities aiming at the construction of k-societies as stages of development. Finally today these activities have resulted in multiple country-specific k-societies that were first predicted to become true by members of the scientific community. Hence, the predictions motivated actions towards the realisation of what was predicted and resulted in the creation of k-societies.

The political programmes conducted by states aiming at the construction of country-specific k-societies redefine the adopted terms without referring to the definitions attached to them or the theoretical concepts developed by the scientific community. The language used by representatives of the state concerning k-societies is rather unspecific, since the different terms are used interchangeably and without a clear-cut differentiation. Nevertheless, the political programmes and activities conducted by the states define very specifically the types of k-society they attempt to create. But the definitions inherent in the political programmes are very different to the definitions given by the scientific community. The mode of definition is procedural in character, rather than categorical-conceptual as framed by the scientific community. The deconstruction of the processes that create k-society and the assessment of the definitions of k-society inherent in these processes (government programmes and activities) offer an empirically based definition of k-society, defining k-society as it is defined by the social actors and inherent in the programmes creating it, has been missing until now. By deconstructing the processes that create k-society, this definition understands and explains k-society as a form of the socially constructed reality, we live in. It is based on Berger and Luckmann's definition of knowledge, as what is regarded as knowledge by the people.[4] Consequently, k-society is defined in this book as

[4] In their theory on the social construction of reality, Berger/Luckmann define knowledge by stating: "We define 'knowledge' as the certainty that phenomena are real and possess specific characteristics" (1984: 1). Further, they regard knowledge as "everything that is regarded as knowledge in and by society" (16). Hence, in each society country-specific definitions of knowledge prevail, which with reference to Singapore and Germany will be discussed in chapter 6. Emphasising the social constructivist character of knowledge, Berger/Luckmann argue that the three moments of relinquishing (*Entäusserung*), objectification (*Vergegenständlichung*) and internalization (*Verinnerlichung*) construct reality. The k-society concepts assessed in this book come

what is regarded as k-society by the social actors creating it. This book identifies the state as collective actor in society, which (until today) launches enormous actions in order to create a k-society. Consequently, I focus on the state, but assess the remaining involved subsystems economy, scientific community, civil society and the media with regard to their influence on state activities. As countries of comparison, I chose Germany and Singapore.

Besides procedurally defining k-society, these political programmes create country-specific k-societies. In both countries of investigation – Germany and Singapore – the political activities aiming at the construction of k-society create – when sorted according to their content – six to seven sub-k-societies, meaning six to seven different types of k-society. The sum of these forms the uniquely German and uniquely Singaporean k-society. Consequently, two widely differing k-societies were constructed. Differing not just in terms of the textual foci of the activities but furthermore with regard to the timing and stress placed on the different foci, which leads me to argue that worldwide multiple, country-specific k-societies are constructed. The political programmes and action plans along with their inherent definitions of k-society are in each country heavily influenced by their respective structural realities. This becomes obvious when comparing two countries which highly differ in most aspects of social, political and economic reality, as in the case of Germany and Singapore. Preconditions to this analysis are their wide structural differences, as well as the fact that both societies are modern and aim to construct k-societies. Due to these differences it is possible to show (a) that k-societies are not only constructed as theoretical concepts, a vision and stage of societal development but also (b) that the definitions of k-society and the paths taken to create them, highly depend on the structural realities and dominant definitions of knowledge in each country, as it is also stated in diagram 1-1. Similar to the non-linear development of multiple forms of modernities worldwide (Arnason, 1993; Eisenstadt, 1979, 1998, 2000a, 2000b; Wagner, 2001), multiple types of k-society are created, depending on the structural realities and definitions of knowledge in each country. The following are identified as most relevant: (a) difference in size of population and land; (b) type of political system, backed by its legal infrastructure; (c) central versus federal structure; (d) historical experiences; (e) maturity level of economy; (f) degree of economic exposure to the world economy; (g) tradition of

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into existence due to various forms of objectifications, meaning activities and statements that point towards their existence (37-42).

research and development (R&D)[5]; (h) tradition of the educational system; (i) level of civil organisation; as well as (j) model of functional differentiation with structures of decision-making between state and remaining subsystems of society. The difference in size of population and land (a) is especially relevant with regard to the building of an ICT infrastructure, i.e. cabling the whole country. The type of the political system, the legal infrastructure (b) and (c) central versus federal structure highly determine the definition of knowledge and information prevalent in each country, i.e. singular defined by the state or plural defined by many different groups in society. Furthermore, the implementation of government programmes is much easier in a small, centralised city-state, than in a large, federal system. The historical experiences of each country (d) determine whether an economy-focused definition of knowledge, meaning knowledge that is regarded as directly leading to economic growth (i.e. results of applied research), or a more plural, open and diversified definition of knowledge prevails which includes knowledge areas which do not or merely indirectly contribute to economic growth, i.e. basic research, the arts, human and social sciences. The maturity level of the economy (e) and the degree of economic exposure to the world economy (f) are responsible for which kind of knowledge is absorbed by and advances the national economy. This is closely related to (g) the tradition of R&D and (h) of the educational system, since a high level of economic maturity generally exists in old nation-states which at the same time look back on old, traditional R&D- and educational systems. Old, traditional R&D- and educational systems usually conduct basic and applied research, as well as teach a wide range

[5] This book adopts the definition of research and development offered by OECD in its Frascati Manual (2002a: 30): "Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. The term R&D covers three activities: basic research, applied research and experimental development. Basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. Applied research is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective. Experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed. R&D covers both formal R&D in R&D units and informal or occasional R&D in other units."

of knowledge areas. Hence, they contribute to a plural definition of knowledge. The level of civil organisation (i), i.e. in civil society groups, non-governmental organisations, clubs and associations determines whether many differing definitions of knowledge are created and spread in society, or whether only very few actors in society define which knowledge is created, disseminated and documented. In a political system which grants the freedom of opinion and speech, an active civil society will offer multiple, sometimes highly opposing definitions of knowledge. Yet, in a political system which restricts the freedom of opinion and speech, the role of the state in defining which knowledge is created and spread is massively strengthened. The model of functional differentiation into subsystems of society with structures of decision-making between the state and the remaining subsystems of society (j) is in each country responsible for the extent up to which (1) each subsystem of society can influence the decision-making processes and activities of the state as well as (2) the state can influence the decision-making processes and activities of the remaining subsystems of society. This mutual influence or complete independency from one another structure the processes of constructing reality, i.e. k-society, by either defining and constructing k-society together with the remaining subsystems of society and their interests, or defining and constructing it by oneself, merely punctually listening to the interests and criticisms of other subsystems. All ten structural realities listed above separately as well as together, mutually interwoven determine the definition and construction of country-specific types of k-societies.

Comparing the definitions of knowledge between the two countries – which influence the definitions of k-society – it can be argued that in Germany the concept of k-society is strongly influenced by a wider and more inclusive definition of knowledge, which in recent times has to battle currents towards knowledge regarded as directly economically profitable. In Singapore, the singular view constructed by the state is vastly adopted by the remaining subsystems. This singular, traditionally economically orientated view increasingly opens up concerning knowledge areas such as the arts and social sciences. Nevertheless, this change in the support of new areas of knowledge production represents no change to the dominant definition of knowledge, but a broadening of the financially supported areas of knowledge production and dissemination. The focus on economically viable knowledge remains but areas such as arts and human sciences are increasingly hoped to ensure long-term, sustainable growth. Consequently, one has to state that while the two k-societies highly differ in terms of certain textual foci, emphasis of one or the other topic and timing of those, k-society nevertheless in both countries was

in the beginning clearly an economic and technological programme. Yet, as will be discussed at the end of the book, over time the purpose of the construction changed and today in a world of increased insecurities and risks, k-society as construct is offered by both governments as new focal point of collective identity, as an explanation of the changes taking place, a vision of a better future channelling communal action towards its realisation and a pillar to hold onto in times of globalisation, a changing world order and a weakening of the nation state.

Interestingly, in both countries, the definitions of k-society and paths towards its construction are hardly influenced by the academic discourse surrounding these concepts. The definitions of k-society concepts given by members of the scientific community incorporate multiple aspects of k-society, such as the technological infrastructure as well as knowledge and information. In contrast to this, the definitions of k-society inherent in the political programmes of Germany and Singapore mainly focus on the technological infrastructure and the application of technology. Aspects such as knowledge production and dissemination are of much lower importance. This once more illustrates that the categorical definitions of k-society offered by the scientific community until now, fail to grasp what k-societies actually are. The categorical definitions of and theories on k-society created by members of the scientific community are hardly at all taken into account by the state actors creating k-societies as stages of development. Instead, merely the idea of the emergence of k-societies and the k-society terminology was adopted by state actors. Yet, these state actors themselves re-defined the adopted terminology, independent from the academic, categorical definitions originally attached to them. Consequently, it is necessary to assess how these state actors define and construct k-societies in order to shed light on what k-societies are. This empirically based definition of k-society is offered in this book.

The fieldwork and further research was guided by the following questions: What exactly are k-societies? In order to answer this, I assessed the process of creation of k-societies. Based on the empirical data collected, I argue that k-societies do not emerge by themselves as the results of certain economical and technological developments, but that they are constructed by social actors. Consequently, I ask, how are k-societies created? Here one has to distinguish between (a) the creation of the theoretical k-society concepts by the scientific community, (b) the vision of a self-emerging k-society by the scientific community and political state programmes, as well as (c) the construction of k-societies as stages of development by state governments.

Hence, *first* the creation of the concepts by the scientific community is discussed; *secondly*, the establishment and spread of the vision of a self-emerging k-society and *thirdly*, the construction processes of country-specific k-societies in Germany and Singapore. The second and third parts are guided by the following questions: How (and why) are k-societies constructed as political visions and as stages of development? Which purpose does the vision of a self-emerging k-society fulfil? How are k-societies defined in each country of investigation and what factors may influence the country-specific definitions of k-society, as well as the processes of construction? Are they shaped by the realities in each country or are k-societies worldwide defined and constructed in the same way? My research will show that the definitions and processes of construction are heavily influenced by the structural realities and dominant definitions of knowledge in each country. Consequently, the part of this book on the creation of k-societies by states begins with an outline of the structural realities and dominant definitions of knowledge and information in Germany and Singapore. What is the character of the structural realities in each country and what are the dominant definitions of knowledge and information? This is followed by an outline of the arena of acting subsystems of society which are involved in the process of construction. What are the subsystems mainly involved in the process and how do the subsystems besides the state influence the activities of the state? Who cooperates with the state and how is the interaction structured? The assessment of this interaction is based on Luhmann's system theory,[6] which regards modern society as comprising of

[6] Niklas Luhmann's theory of social systems pursues the aim to understand social order and its structuring function in modern society (1984). According to Luhmann, this requires the reduction of social complexity by assessing social reality according to the systems constituting it. Overall, he distinguishes three kinds of systems – (a) organic systems; (b) psychical systems; and (c) social systems – but clearly focuses in his system theory on social systems. Social systems can be regarded as the interrelation of elements, the mutual relationships which are quantitatively more intense and qualitatively more productive than their relationships with other elements outside the system. In his later works, Luhmann regards communication as the core element of social systems and emphasises, that systems are not merely the sum of their elements but actually the 'surplus' of social interaction. Hence, social systems are systems of communication and social interaction. Each system is defined by the boundary between itself and its environment (*Umwelt*), which forms the infinitely complex exterior. In opposition to the state of the exterior, the interior of each system is a zone of reduced complexity. The communication within each system functions by selecting only a limited amount of all information and communication available outside in order to reduce complexity inside the system. Luhmann calls this process 'the reduc-

multiple autopoietic, fully self-reliant subsystems that merely interact with each other via forms of structural coupling or interpenetration. Accordingly, it will be discussed via which forms of structural coupling the subsystems influence the state activities. It becomes obvious that Germany and Singapore are societies with highly differing models of functional differentiation and structures of decision-making between the subsystem state and the remaining subsystems of society. While in Germany, the subsystems widely match Luhmann's picture of autopoietic, independently acting subsystems. In Singapore, the boundaries between the subsystem state and the remaining subsystems are far more permeable. Luhmann argues with regard to the functional differentiation of modern societies that "structure follows function", meaning that the aim to be a modern society leads to a functionally differentiated restructuring of it. Pertaining to the construction of k-societies, I therefore ask whether the structural realities in Germany and Singapore are results of the conceptual ideas[7] that they are meant to construct, or are the ideas intrinsically shaped by the structural realities prevalent in each country? Can the divergent structural realities in both countries be held responsible for the

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tion of complexity' (1984: 49-51). The criterion according to which information is selected and processed is meaning (*Sinn*). All systems are environment to each other. Furthermore, each system has a specific identity which depends on what is considered as meaningful and what is not. The elements of each system that form its distinct character are constantly reproduced through communication. This process of self-reproduction and maintenance Luhmann calls 'autopoiesis', referring to the usage of the term in cognitive biology by Humberto Maturana and Francisco Varela (61-67). Yet, if a system fails to reproduce its own elements and therefore to maintain its distinctive identity, it ceases to exist and dissolves back into the environment it emerged from. Luhmann develops the term 'autopoiesis' further by stating that social systems are 'autopoietically closed', meaning that they use and rely on resources from their environment without these resources actually becoming part of the systems' operation (63). Hence, social systems cannot instruct but merely irritate each other. Luhmann describes the mutual influencing of systems with the terms 'structural coupling' (*strukturelle Kopplung*) and 'interpenetration' which enables one system to make the complexity of another system accessible. For Luhmann, the existence of social, autopoietic systems is the result of functional differentiation of society. Each social system fulfills its functions independently and does not rely on the communication with others. All systems are therefore hierarchically on the same level. Hence, Luhmann states that in a modern, functionally differentiated society, there is no system primate to other systems.

[7] By 'conceptual ideas' I in this book understand definitions of k-society, i.e. (a) from members of the scientific community (mode of definition is categorical in character), (b) from the state as social actor (mode of definition is procedural in character).

varying versions of k-societies? In order to address these issues, the process of construction has to be assessed. It is divided into (a) the construction of a vision of a self-emerging k-society and (b) the creation of actual k-societies. Concerning the construction of k-society as a vision, I ask how and why these visionary pictures of k-society are drawn. The research shows that the manifold, interchangeably used k-society terminology supports the construction of k-society as a vision. This difficult-to-grasp vision is used to legitimise economy-focused political activities that actually create k-society. In order to reconsider this development in Germany and Singapore, I ask which terms labelling the different concepts of k-society are mainly used in both countries' political spheres. The multitude of terms – each emphasising different aspects of k-society – illustrates a rather vague language used by politicians and state representatives with regard to k-society. Since Germany and Singapore use divergent terminologies, I ask what k-societies then actually are? In order to answer this, the operational activities conducted in both countries for creating k-societies are assessed with regard to their process-related definitions of k-society, which in comparison to the manifold terminology labelling them, are actually very precise and specific. Which definitions of k-society are inherent in the government programmes? Which topics are addressed and regarded as important to k-society? Here, a map of the differing types of k-society addressed by the government programmes of each country is drawn. Finally, the relationship between the structural realities in both countries, the conceptual ideas and terminology used in the political spheres are assessed. Up to what extent can the structural realities be held responsible for a certain conceptual idea in Singapore and a different one in Germany? How can the involved subsystems of society influence the construction process in the political sphere? And how do the categorically-defined academic k-society concepts, as well as the process-related definitions of k-society inherent in the government programmes compare in the two countries? How is the relationship between the structural realities, theoretical concepts and operational activities in both countries structured? Are the theoretical concepts and operational activities as widely different as the structural realities of both countries? Or do divergent structural realities nevertheless lead to very similar types of k-society?

Comparability of Germany and Singapore

The comparison of these widely differing – yet both modern – societies with governments longing for the creation of k-societies can be mainly explained by three reasons. *First*, the focus on Germany and Singapore in

constructing k-societies faces the quest for a cosmopolitan, 'one-world sociology' increasingly voiced by sociologists worldwide (Archer, 1990; Beck, 2000, Randeria et al, 2004: 10). A sociological theory on k-society that claims universal standing, cannot be based on the empirical analysis of developments in one world region only, but instead has to be enriched by the empirical data collected worldwide. It is the aim of this book to contribute to such a universal sociological theory on k-society. The empirical data offered on the definition and construction of k-societies in a European and a Southeast Asian country allow the possibilities of drawing new empirical as well as theoretical deliberations. *Second*, k-society is a global phenomenon, even though – and this is shown by this book – it does not show a uniform appearance. This was also expressed by the UN-Summit for the Information Society in 2003 and 2005. Hence, a comparative approach focusing on countries of two world regions appears plausible. The *third* reason lies within the content of this book. This book is based on the questions what k-societies are and how they come into existence? Consequently, I assess (a) the definitions of k-society given by the social actors creating k-society and (b) the processes of creating k-society. The empirical focus on Germany and Singapore makes it possible to show that k-societies are not only created by social actors, but furthermore that in each country k-society is defined and created differently. Responsible for these differences in definitions and processes of creation are the structural realities (mentioned earlier) and definitions of knowledge prevalent in each country. They influence and determine what kind of k-society is created and how it is created. Yet, in order to show this, I had to choose two countries with differing structural realities and definitions of knowledge. Only by choosing widely varying countries, the influence of the structural realities and definitions of knowledge on the country-specific definition and construction of k-society can be traced back. If the countries of investigation were similar in character, the influence of the structural realities on the definition and construction of k-society would remain obfuscated.

Due to the influence of the different structural realities and definitions of knowledge on the definition and construction of k-society in each country, multiple, country-specific paths to and types of k-society exist. Here, a parallel can be drawn with the theoretical idea of the existence of multiple paths to modernity (Arnason, 1993; Eisenstadt, 1979, 1998, 2000a, 2000b, 2001, 2006; Wagner, 2001). Classical theories on modernity[8] as well as mod-

[8] The classical, macro sociological theories on modernity by Max Weber, Jürgen Habermas and Talcott Parsons reconstruct the developments that led to the rise of western modernity. Habermas (1985) argues out of the perspective of evolution the-

ernisation theories[9] of the 1950s and 60s identify merely one path towards modernity. The idea that other paths besides the western route to modernity exist was only quite recently developed by Shmuel Eisenstadt in his theory on multiple modernities (1998, 2000a, 2000b). Here Eisenstadt assumes "the

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ory that the modern rationality is the result of learning processes. Parsons (1967) focuses on the increase of the ability of socio-cultural systems to adapt. This is shown by processes of differentiation and functional specification of subsystems, which leads to an increase of system complexity. Weber (1964) analyses social rationalisation as a theoretical and a practical rationalisation. Referring to theoretical rationalisation, he focuses on the rationalisation of religious beliefs and cultural value spheres. With regard to practical rationalisation, he analyses the rationalisation of everyday life and its institutionalisation. This rationalisation of life in the West enabled the rise of modernity. For all three theorists only one path to modernity exists. Nevertheless, Parsons and Haber as also study Soviet modernity. While Haber as distinguishes between Soviet and western modernity as two varying types, Parsons regards Soviet modernity as a strategy of modernisation that developed due to the historical conditions in the Soviet Union. All three theorists regard modernity as a social form qualitatively higher than the forms of social existence before. On the level of everyday life, modernity is characterised by purposeful rationality, demystification and discursive questioning of the world, as well as autonomy and individualisation of the human subject. On the level of the system, modernity is characterised by its high social complexity.

[9] Similar to the classical theories on modernity, the modernisation theories take a macro sociological approach. They focus on the situation in non-western societies and the question whether and how these societies can catch up with the developments in the West. Hence, western modernity clearly acts as orientation guide. Economical growth theories (e.g. Rostow, 1960) regard industrialization as deciding factor on the way to modernity. Theories of social mobilization (e.g. Lerner, 1958) argue that humans have to leave their traditional living conditions and go through a process of individualisation. Indicators for this are urbanization, migration and consumption. On the level of politics, the western modernity is characterised by democracy and participation.

These theories, proposing the western path to modernity as the path that has to be taken by all modernising societies, were for the first time challenged by Immanuel Wallerstein (1974, 1978). He argues in his world system theory in favour of the existence of a historical interdependence between capitalist countries and countries belonging to the semi periphery and periphery. Due to this interdependence and at the expense of nonwestern societies, western societies could modernise. Hence, Wallerstein also regards the western path to modernity as the only one but reasons that modernisation is for some societies blocked by ongoing dependencies from western societies, even though these societies themselves might have the potential to modernise.

existence of culturally specific forms of modernity shaped by distinct cultural heritages and socio-political conditions" (Eisenstadt/Riedel/Sachsenmaier, 2002: 1). He argues that today's modernity can best be understood when seen as a continuous constitution and reconstitution of a multiplicity of cultural programmes. For Eisenstadt (2000b), westernisation and modernisation are not the same. Hence, western modernity is not regarded as the authentic modernity, as elucidated by most theories on modernity. Nevertheless, western modernity, as the modernity that developed previous to all other forms of modernity, acts as a reference modernity for other societies. Furthermore, western modernity developed universal and applicable institutional, cultural and ideological frameworks. These frameworks are continuously changing, heterogeneous and closely interwoven with the specifically cultural programme of Europe. For Eisenstadt (2000b), western modernity is based on internal contradictions and tensions that are a topic of continuous critical discourse in various institutional arenas.[10] Due to varying civilizations facing the problems and tensions of western modernity differently – according to Eisenstadt – multiple modernities developed. By facing these problems, civilizations were challenged to solve them in their own cultural context, which led to the development of varying forms of modernity. This aspect of Eisenstadt's paradigm of multiple modernities, regarding non-western societies being challenged when they face western modernity, was repeatedly criticised (Randeria et al, 2004: 15). Eisenstadt does not consider the possibility of western modernity facing the challenges of other modernities, which then are adopted or solved specifically along the lines of western culture. Instead, western modernity remains to act as a reference point for all other modernities.

[10] As such, he mentions the conception and significance of rationality, the relationship of reflexiveness and active shaping of reality, the relationship of control and autonomy, of freedom and equality as well as of civil society and state power. Above all, Eisenstadt (2000b: 10) defines the deconstruction of a God-ordained worldview as the core of modernity, emphasising that societies which are no longer embedded in transcendental orders, are generally open to continuous transformation and adaptation. Furthermore, he identifies the following features characteristic for modernity: (a) open political arenas; (b) changing collective identities; (c) the autonomy of man in relation to any form of authority; and (d) the multiplicity of often competing visions of the public good. Structural differentiation and openness of society – Eisenstadt emphasises the role of protest and social movements – enhance a dynamic system of development and reformation while at the same time preserving traditions that serve as resources for modernity's perpetual constitution and reconstitution.

Besides Eisenstadt, Arnason and Wagner subscribe to the idea of varying forms of modernity arising and existing in different world regions. Johann Arnason suggests a distinction between a civilizing paradigm and civilizing horizon. He states, "Western expansion imposes the former and in doing so opens up the latter" (1993: 14). In this combination, multiple modernities actually arise as alternatives to western modernity. Peter Wagner (2001) defines modernity as a situation that is characterised by two levels of social imagination. He speaks of a double imaginary significance: the idea of the human autonomy and the idea of the rationality of the world. These ideas mark 'problematiques' that remain open, such as the search for knowledge and truth or for a good political order. These problems develop on the path to and through modernity and cannot be solved. Hence, modernity is characterised by the continuous search for solutions. Every culture and civilization finds different answers to these problems, posed by modernity. Consequently, multiple variations of modernity exist.

Nevertheless, this book does not focus on modernity but on definitions and paths to k-society. Analog to Eisenstadt, Arnason and Wagner, and their concerns with the paths to modernity, this book argues that multiple paths to k-society exist. Yet, this book does not – as done by these three authors – refer to cultural reasons for different paths to and definitions of k-society or consider a western path to k-society as a reference point. Instead, this book focuses on the structural realities and definitions of knowledge and information of Germany and Singapore as reasons for varying types of k-societies and the processes of creating those. I argue that due to the differing structural realities and definitions of knowledge in each country, there is not one definition of k-society but many, widely differing ones. Consequently there is also not one type of and path to k-society but multiple trajectories. Cultural aspects might have further impact on the specific type of k-society, created in each country as well as on the country-specific process of construction. Yet, in my view, cultural aspects that could influence the definition and path to k-society, i.e. valuing of family and kinship ties, respect for authority, advocating consensus decision-making, fostering of a culture of criticism, have shaped and are expressed by the structural realities given in each country. Hence, cultural aspects influence the definition of and paths to k-society through the structural realities in the respective country, which rest on the cultural foundations of each nation. For example, the culture of criticism that has been advocated after WWII and is today very pervasive in Germany's society is also expressed and at the same time fostered by the federal structure with education and research under the rights of the states rather than the

federal government. Furthermore, the freedom of opinion and speech, granted by the German constitution, lays the foundation for, but at the same time communicates this culture of criticism. In Singapore, the valuing of family and kinship ties as well as of consensus decision-making is expressed and at the same time fostered by a one-party democracy which does not advocate critical culture but instead restricts the freedom of opinion and speech. Consequently it has to be argued that the cultural and structural realities in each country determine the country-specific definition of and path to k-society. Yet, this book focuses on the effect of the structural realities and the definitions of knowledge and information prevalent in each country on the construction of country-specific k-societies. This is based on the belief that cultural aspects which influence the construction processes of k-societies are expressed by and influence these processes through the structural realities prevalent in each country.

Methodologies Applied

This research is empirically based on (a) qualitative expert interviews conducted in Germany and Singapore; (b) a quantitative and qualitative analysis of the R&D expenditures and the prevalent definitions of knowledge and information in both countries; (c) a quantitative analysis concerning the participation of certain subsystems in commissions and boards of directors; (d) a quantitative analysis of the k-society terminology used; as well as (e) a qualitative analysis of government programmes, action plans and final reports of government commissions concerning the definitions of k-society inherent in them and their constructive role in creating k-society as a vision and as a form of reality.

First, (a) the conducted interviews are qualitative, semi-structured in character with room for focal deviations based on the expertise and interests of each interviewee. All interview partners are experts in their fields, working in the upper management or as professional staff. Based on the new institutionalism approach (neo-institutionalism), these interview partners are in this book regarded as embedded in institutions which – as actors influencing politics – are part of certain subsystems of society (Schimank, 2000: 248-251). Therefore, the individuals interviewed for this book are regarded in the following as representing the institutions they are embedded in. The institutions then again are regarded as actors that are part of certain subsystems of society and as such shape social reality (Dziewas, 1992; Luhmann, 1984).

In Germany, the biggest group interviewed consisted of representatives of the federal government and its administration. The second biggest group – although far smaller than the first, forms the civil society – meaning representatives of non-governmental organisations and foundations engaged with the rights and interests of society, closely followed by representatives of the scientific community, economy and media. The selection of interview partners illustrates the focus of the empirical part of this book: After reconfiguring the construction of the concepts of k-societies by the scientific community, the empirical part focuses on the construction of k-societies by the state and in cooperation with the subsystems 'economy', 'scientific community', 'civil society' and 'media'.

In Singapore, the two biggest groups consist of representatives of the state and its administration as well as representatives of the scientific community, since several representatives of publicly-financed research institutes were interviewed. Far less representatives of the civil society, the economy and the media were interviewed. Quantity and institutional embeddedness of the experts interviewed for this book are illustrated in Appendix B and Appendix C.

Besides these qualitative interviews, secondary data analyses were additionally carried out – both quantitative and qualitative in character. As such, (b), an analysis concerning the research and development funding in both countries was conducted. The quantitative data used for this analysis were taken from the statistical offices of both governments. The data on the financial support of certain R&D-areas, combined with qualitative interview statements collected during the research, are discussed as indicators for certain prevalent definitions of knowledge and information and which kinds of knowledge and information are regarded as most valuable and worthy of support. This is outlined and the data illustrated in chapter 4. Third, (c), a quantitative analysis was conducted concerning the number of representatives of each involved subsystem – state, economy, scientific community, civil society and media – in government commissions and committees conceptualising action plans in both countries as well as in the board of directors of statutory boards in Singapore. The data collected concerning the representation of each subsystem in these channels of influencing policy-making are discussed with reference to Luhmann's system theory and the adaptations made to it by Dziewas in chapter 5.

Fourth, (d), a quantitative analysis concerning the used k-society-terminologies in Singapore and Germany by the media as well as by the government ministries was conducted. The terminology used by the media was

assessed via a search of all Singaporean and German newspapers registered with Factiva on 08 August 2005 from the period beginning 01 January 1985 until the date of conducting the search. In Germany and Singapore the first hits were counted in 1992 and 1988 respectively. In other words, within these two years the searched terms were first used in one of the Singaporean and German newspapers registered with Factiva. Data on the terminology used by the government ministries in Germany and Singapore were collected by conducting searches on the ministries websites in both countries on 25 May 2005. The data collected here are discussed in chapter 7.

Fifth, (e), the government programmes, initiatives, action plans as well as final reports of government commissions were assessed qualitatively. Of main interest was (a) how they construct k-society as a political vision and (b) how they attempt to call k-society actually into reality. Here, the focus lies on the definitions of k-society inherent in the German and Singaporean programmes. The government programme's contribution to the construction of a vision of a self-emerging k-society while at the same time actually creating this apparently self-emerging k-society is discussed in chapter 6.

The creation of a country-specific k-society as a development stage is discussed with a strong focus on how k-society is defined in the government programmes. The definition of the German k-society inherent in the assessed activities comprises six different types of k-society, each focusing on different aspects of the overall concept of k-society. As outlined in chapter 8, these six types of k-society which together form the German k-society as defined in the German government programmes are in this book labeled 'ICT-economy', 'ICT-society', 'Science Society', 'Knowledge Economy', 'Knowledge Society' and 'Global K-society'. Additionally, the recommendations formulated in the final reports of commissions are counted and grouped according to the addressed construction of which type of k-society. The analysis of these recommendations of German government commissions is therefore qualitative and quantitative in character. The purpose of the quantitative analysis is the illustration of a thematic shift taking place over the years, from first addressing the creation of a type of k-society that focuses on the technological and legal infrastructure to later types of k-society that increasingly focuses on knowledge production and economic exploitation.

The definition of the Singaporean k-society inherent in the assessed activities combines seven varying types of k-societies, each addressing different aspects of it (chapter 9). Six of these seven types can be compared to the six types of k-society definitions addressed in the German government activities: 'ICT-economy', 'ICT-society', 'Science Society', 'Knowledge Economy',

'Knowledge Society' and 'Global K-society'. Yet, the Singaporean k-society definition differs from the German one in its focus on the development and fostering of creativity. Hence, the seventh type of k-society is here labelled as 'Creative Economy'.

Besides these definitions of k-society, definitions of what shall be constructed, inherent in the government programmes, action plans and final reports of commissions, these government activities offer further insight into the arena of subsystems involved in the construction processes (discussed in chapter 5). Hence, the primary texts of the programmes, action plans and final reports of commissions acted – besides the interviews – as the main basis for analysing the processes of defining and constructing k-societies in the political spheres of Germany and Singapore.

The qualitative analyses in this book – the interview data and the primary texts of government programmes and final reports of commissions – were conducted based on the grounded theory approach. The grounded theory – a qualitative research approach – was originally developed by Barney G. Glaser and Anselm L. Strauss (Glaser/Strauss, 1967).[11] As indicated by its name, the theory aims to enable qualitative researchers to formulate theory from data. The precondition is a rather broad research question that leaves space for the collected data to speak for themselves. Through coding procedures – according to Strauss open coding, axial coding and selective coding (Strauss, 1987: 58-74) – the data are analysed and based on this, theory is generated.

Analytical Structure and Outline

The analysis of constructing k-societies is structured by (1) outlining the creation of the concepts by the scientific community, as well as (2) assessing the realisation of these concepts in the form of various types of k-societies by the national governments of Germany and Singapore. By doing so, this book aims to illustrate that k-societies are constructed first as conceptual ideas by the scientific community and second as forms of reality by social actors embedded in subsystems of society. It will be shown that the conceptual ideas developed by the scientific community have very limited influenced

[11] During the research for this book, the further development of the theory by Strauss, rather than Glaser was used as methodology (Strauss/Corbin, 1990; Strauss, 1987).

the definitions of k-society realised as a societal development stage in the political spheres. The process of creating k-societies as social reality is divided into (2.1) the construction of a vision of a self-emerging k-society, legitimising future political action and (2.2) the creation of actual k-societies.

Consequently, the introductory chapter of this book is followed by an outline of the construction of k-society concepts by the scientific community (chapter 2). This is structured into a primary and secondary phase. The mode of defining k-society in these academic works is categorical in character. Hence, the identified characteristics of k-society are grouped into categories and differently weighted.

During the primary phase few academics developed the idea of knowledge, information, as well as information and communication technologies becoming increasingly important for economic and social development which leads to a new stage of development, following the industrial society. These theorists originally developed the theoretical concepts. Here, theorists such as Umesao (1963), Nora/Minc (1979) and Castells (1989, 2004a, 2004b, 2004c) can be named as contributors to the concept of a technology determined society, often called 'information society'. Lane (1966), Bell (1973, 1987), Touraine (1969), Kreibich (1986), Böhme/Stehr (1986), Willke (1998) and Gibbons et al (1994) worked on a concept of a knowledge-driven society, generally labeled 'knowledge society', while Machlup (1962), Porat (1976) and Drucker (1969, 1993a, 1993b) can be listed together with international organisations such as OECD (1996a, b) and APEC (1998, 2000) as theorists constructing the concept of a 'knowledge-based economy'. The conceptual thoughts of these theorists as well as their contribution to the construction of k-society concepts shall be assessed, disregarding slight terminological deviations. Lane (1966), for example, spoke of a 'knowledgeable society', not a 'knowledge society'. Yet, he clearly describes what is called 'knowledge society' by many others. These works constitute the primary phase of constructing the concepts of k-society since they offer the initial conceptual theories on the subject. The conceptual ideas leading to the concepts 'knowledge society' and 'information society' were mainly developed in the 1960s to 1980s, while the conceptual basis of the 'knowledge-based economy' was formed mainly in the 1990s. Additionally, several popular scientists contributed to the construction of k-society concepts, especially 'information society' by convincing the masses of an emergence of k-societies and spreading the concepts (e.g. Toffler, 1970, 1980, 1990; Naisbitt, 1982).

The secondary phase of construction is characterised by the further development of the conceptual ideas, increasing their empirical base, depth

and the theorising of these empirical data. Contributors to this secondary phase of construction include Kumar (1978); Gershuny (1978); Collins (1981); Lyon (1988, 1996); Dordick/Wang (1993); Stehr (1994, 1999, 2001a, 2001b); Webster (1995); Willke (1998, 1999); Maasen (1999); Dunning (2000); Evers (2000, 2002a, 2002b, 2003, 2005); Evers et al (2000); Hofmann (2001); Steinbicker (2001); David/Foray (2002); Lloyd/Payne (2002); Evers/Menkhoff (2003); Mattelart (2003); Evers/Gerke (2004); Knoblauch (2004, 2005); Kübler (2005); Tänzler/Knoblauch/Soeffner (2006) and Evers/Hornidge (2007).

The development of k-society concepts by the scientific community is followed by the analysis of the creation of k-societies as development stages in Germany and Singapore. First an introduction into the structural realities of both countries is given (chapter 3), followed by an assessment of the definitions of knowledge and information dominant in each country (chapter 4). The analysis of the actual process of construction is divided into the construction of a vision of a self-emerging k-society and the attempt to actually bring k-society into existence. It begins with an outline of the arena of acting subsystems involved in the process of construction (chapter 5). Here, the empirical focus rests on the state as the main constructor. The remaining subsystems involved – economy, scientific community, civil society and media – are assessed merely with regard to their influence on the activities of the state. Chapter 6 outlines the construction of a k-society-vision based on the government programmes constructing k-society. The analysis shows that the construction of k-society as a vision is strongly supported by the terminological lack of clarity resulting from the manifold k-society-terms used without distinctly differentiating the existing k-society concepts from one another. This vague language supports the construction of the k-society-vision. The interchangeably-used terminology is outlined in chapter 7. The government activities aiming at the creation of actual k-societies are assessed with regard to the definitions of k-society inherent in them. This is based on Berger/Luckmann's definition of knowledge as what is regarded as such by the people, meaning if one member of society regards a certain knowledge area as knowledge, it consequently is knowledge. Hence, this book defines k-society as what is regarded as k-society by the actors creating it. The constructive activities of Germany and Singapore are based on definitions of k-society and how they aim to create them. Hence, these definitions can be regarded as what k-society actually is. This will be discussed in chapters 8 and 9 for the cases of Germany and Singapore respectively. Chapter 10 discusses the find-

ings of the book. The chapter discusses (a) the influence of the academic discourse regarding k-society concepts on the creation of k-societies by social actors of society; (b) the degree to which one can hold the structural realities and dominant definitions of knowledge responsible for country-specific definitions and construction processes of k-society; (c) the comparison of the definitions of k-society and construction processes in Germany and Singapore; as well as (d) the relationship between the used k-society terminology and the actually created k-societies. The analysis shows that the definitions of k-society as well as the processes of construction in both countries are hardly at all influenced by the development of the k-society concepts by the scientific community. Instead, they are highly influenced by the structural realities and dominant definitions of knowledge in each country. This is further supported by comparing the processes of construction in Germany and Singapore. The structural realities and definitions of knowledge are reflected in each process of construction. The used k-society terminology nevertheless does not reflect the defining content of the k-societies that are created. Hence, k-societies are constructed by certain actors in society as illustrated by the processes of construction. Nevertheless, these processes are highly influenced by the structural realities and the dominant definitions of knowledge and information in each country. Consequently, multiple, varying paths to k-society exist. The main commonality of all paths to k-society is nevertheless the search for economic growth.

Chapter 2

Theoretical Origin and Development of K-Society Concepts

This chapter shall first give an insight into the existent literature pertaining to knowledge and information. This is followed by an outline of the construction of 'knowledge society', 'information society' and 'knowledge-based economy' as theoretical concepts. The outline is structured into a primary and a secondary phase of categorically defining and therewith constructing the conceptual ideas.

Defining the Elements

Since information and knowledge and their increasing role in society are responsible for the development of multiple differing k-society concepts, their definitions and mutual differences are of relevance to this book. The most frequently pointed out difference between information and knowledge was summarised by Albert Einstein who stated that "information is not knowledge", but "knowledge is experience. Everything else is information." Further differences in definition will be outlined in the following.

Definitions of Knowledge

From the mid 16th century onwards, thoughts on the critical role of ideologies in society by scholars such as Francis Bacon (1561-1626), Auguste Comte (1798-1857), Karl Marx (1818-1883), Sigmund Freud (1856-1939) and Vilfredo Pareto (1848-1923) lay the foundation for the rise of the sociology of knowledge. These scholars underlined the importance of knowledge for social reproduction. They emphasised the possibility of knowledge being influenced by ideology, religious beliefs or traditional hierarchical orders and were determined to develop methods of clearing knowledge on social reality from this influence through education and enlightenment (Maasen, 1999: 12). This awareness of knowledge being socially determined as well as its role in reproducing society laid the basis for the sociology of knowledge that developed in the beginning of the 20th century in Germany and France and is mainly represented by several prominent scholars. Max Scheler (1960) under-

stands knowledge as an existential phenomenon (*Seinsverhältnis*) and identifies three forms of knowledge: (a) knowledge of salvation (*Erlösungswissen*); (b) cultural knowledge, or knowledge of pure essences (*Bildungswissen*); and (c) knowledge that produces effects (*Herrschaftswissen*). In contrast to Comte (1915) and the positivism, Scheler does not regard scientific and positivistic knowledge as the only or most important knowledge in society. Alfred Schütz (1932) focuses on the social distribution and integration of knowledge by mechanisms of typologising and idealization (*Mechanismen der Typisierung und Idealisierung*) i.e. the genesis and passing on (*Tradierung*) of knowledge in its life world (*Lebenswelt*). Due to Schütz, knowledge of everyone, not just scientific knowledge, is observed and regarded as being based on the typologising, idealizing constructs of everyday life. This assumption also forms the basis of Berger and Luckmann's theory on the social construction of reality, published in 1966 (Berger/Luckmann, 1984). Here, the authors assess the role of socially constructed knowledge in shaping reality and social reproduction. Emphasising the social constructivist character of knowledge, they argue that the three moments of relinquishing (*Entäusserung*), objectification (*Vergegenständlichung*) and internalization (*Verinnerlichung*) construct reality. This book subscribes to this theoretical tradition and argues that k-societies are called into existence by social actors, which refer to certain subsystems of society. The vision of an arising k-society legitimises political activities that actually create this k-society. K-societies do not simply emerge as result of the technological development in the ICT industry or the expansion of the service sector and the knowledge-based industries, but they are consciously constructed by social actors. This book focuses on the subsystem state as a collective actor (discussed in chapters 8 and 9) which is in cooperation with the societal subsystems economy, scientific community, civil society and media (discussed in chapter 5). The mantle of creating k-societies enables states to implement, nearly unquestioned, economic as well as social policies, as will be discussed in chapter 6. Berger and Luckmann focus in their analysis on knowledge that structures the conduct of the everyday world (*Alltagswelt*). Of minor interest is how reality is reflected in the theoretical knowledge produced by intellectuals and academics (1984: 21). Consequently, they choose a rather broad working definition of knowledge by referring to it "as the certainty that phenomena are real and that they possess specific characteristics" (1984: 1). Further on in the book, knowledge is defined as everything that is regarded as knowledge in and by society (1984: 16). This book adopts this definition of knowledge in order to find an answer to the question: what are k-societies? Consequently, I assess the k-society definitions inherent in the programmes and action plans of the Singaporean and the German govern-

ments aiming at the construction of k-societies (discussed in chapters 8 and 9). Along Berger/Luckmann's definition of knowledge, this book states: k-society is what is regarded as k-society by the actors aiming to create it.

The more recent sociology of knowledge builds on Berger/Luckmann. Soeffner (1989: 12ff), for example, points out that the space of interaction in everyday life is our milieu, our social environment, of which we are part of and contribute to its construction. The structures and potential for action in our everyday life and life world (*Lebenswelt*) determine our manifest and latent knowledge. The structures of interaction in our everyday life organise our experiences and at the same time, our experiences and actions constitute the structures of our everyday life.

Various scholars aimed to specify which forms of knowledge and information constitute the different types of k-society. Lane, the "father" of the concept 'knowledge society', refers to the various definitions given by the sociology of knowledge and concludes: "'Knowledge', of course is a broad term and I mean to use it broadly. It includes both 'the known' and 'the state of knowing'. Thus a knowledgeable society would be one where there is much knowledge, and where many people go about the business of knowing in a proper fashion" (1966: 649). Stehr (1994: 92) distinguishes two dominant forms of knowledge (a) scientific and non-scientific knowledge; and (b) specialised and everyday knowledge. Furthermore, he classifies objectified knowledge as today's dominant form of knowledge. He defines it as follows: "Objectified knowledge is the highly differentiated stock of intellectually appropriated nature and society which may also be seen to constitute the cultural resource of a society. Knowing is, then, gross modo participation in the cultural resources of society" (1994: 93). Stehr points out, that knowledge as a resource has the special characteristic of not leaving its original owner when being sold. This characteristic of knowledge as a product is crucial to the economy in k-society and has to be guarded by intellectual property rights. While Stehr emphasises the outstanding role of scientific knowledge in k-society, he argues, that social functions of scientific knowledge expand and do not eliminate or reduce the earlier functions of scientific knowledge in society. He groups these functions of scientific knowledge in society into: (a) meaningful knowledge – knowledge that affects the (social) consciousness of members of society (*Deutungswissen* or *Orientierungswissen*); (b) productive knowledge – mainly produced by the traditional disciplines in the natural sciences. It can be used to appropriate natural phenomena (*Produktivwissen*); (c) action knowledge – a direct form of social action (*Handlungswissen*). It is

the immediate capacity for action and the capacity to generate more knowledge (Stehr, 1994: 100). Evers et al argue that knowledge work characterises the knowledge society. Yet, knowledge work requires the constant production of new knowledge, which "needs to be systematically organised and institutionalised to be productive" (2000: 6). Focusing on the production of new knowledge, Willke as well as Gibbons et al argue, that a k-society comes into existence when every sector of society reproduces itself by producing its own knowledge (Willke, 1998; Gibbons et al, 1994).

Despite this multitude of varying definitions and categorisations of knowledge, this book adopts the definition of Berger and Luckmann, which define knowledge as what is regarded as worth knowing by society. knowledge when people regard it as worth knowing. It is not the aim of this book to develop a theoretical definition of knowledge. Instead, the local definitions of knowledge in Singapore and Germany are of interest (discussed in chapter 4). The dominant definitions of knowledge in both countries heavily influence how k-society is defined in the government programmes and hence which types of k-society are constructed by the two governments (discussed in chapters 8 and 9).

Definitions of Information

Information[1] is commonly defined by stating its relation to data, knowledge and wisdom. Scholars such as Luft (1994), Davis/McCormack (1979), Bellinger et al (2004), speak of a 'DIKW-chain' (Data, Information, Knowledge, Wisdom-Chain) and generally agree to data being the main ingredient of information, information of knowledge and knowledge of wisdom. Hence, data, information, knowledge and wisdom stand in a hierarchical order to each other (Kuhlen, 2004: 9). Farradane (1979), for example, defines information as "the written or spoken surrogate of knowledge". He reasons that knowledge is an internal cognitive structure of the human being that is not directly accessible; it is information that has been processed by the human brain. Zeleny outlines this DIKW chain by referring to the process of baking bread and states: "There is a clear difference between a bread-making cookbook and baking bread. Baking bread and milking cows is not information but knowledge itself. Knowing the cookbook by heart is not knowledge

[1] Similarly to the number of knowledge definitions, there are nearly as many definitions of the term 'information' as scholars working on it, as pointed out by Wersig (1972: 28).

but only knowledge of information. The difference is fundamental" (2005: 26). Zeleny extends the DIKW-chain by adding enlightenment, as shown in table 2-1. He calls this table "the taxonomy of knowledge".

Table 2-1: Taxonomy of Knowledge

	Analogy (Baking Bread)	Effect	Purpose
Data	Elements: H2O, yeast, bacteria, starch, molecules	Muddling through	Know-nothing
Information	Ingredients: flour, water, sugar, spices + recipe	Efficiency	Know-how
Knowledge	Coordination of baking process → result, product	Effectiveness	Know-what
Wisdom	Why bread? Why this way?	Explicability	Know-why
Enlightenment	Bread, clearly	Truth	Know-for-sure

Source: Zeleny, 2005: 27, adapted by the author.

Zeleny (2005: 27-29) characterises this progression as irreversible. Once data is turned into information or information into knowledge, it is difficult to deconstruct it back into its elements.

The information theory by Shannon and Weaver (1963) originally concentrated on the transmission of information via technical channels. As such it chose to disregard aspects of information involving interpretation (meaning) by the receiver as well as intention of the sender. Nevertheless, Umstätter (1992) argues that the information theory of Shannon and Weaver should form the theoretical foundation for the information sciences of today. Kuhlen (2004) disagrees, stating that it might be a very successful theory focusing on the transmission of information in technical channels but cannot be regarded as a fundamental definition of information. According to Kuhlen, a definition of 'information' has to respect the aspect of movement,

action, and interaction experienced by information. Kuhlen therefore defines information as knowledge in action.[2]

Despite the differences between information and knowledge mentioned above, Machlup, a scholar working on the statistical measurability of the 'knowledge sector' in the US-American economy of the 1960s and an important contributor to the theoretical k-society concepts, chooses to neglect the difference between information and knowledge in his work: "I propose that we get rid of the duplication 'knowledge and information'. (…) Webster's Dictionary defines 'information' as 'knowledge communicated by others or obtained by personal study and investigation', or alternatively as 'knowledge of a special event, situation or the like'. Hence, in these ordinary uses of the word, all information is knowledge" (1962: 12). Neglecting to acknowledge the difference between information and knowledge, while developing a theory on how to measure the 'knowledge sector' for the US-American economy, might explain why many scholars until today use the concepts 'information society', 'knowledge society' and 'knowledge-based economy' interchangeably and without clear cut definitions of each concept, as also pointed out by Wersig (1973: 16). The lack of accuracy in terminology concerning the nuclei of societal and economical transformation – information and knowledge – transmits the same lack of accuracy into the use of the concepts 'information society', 'knowledge society' as well as 'knowledge-based economy' in the academic and political debate until today. In order to clarify the differences of the three concepts, their academic origin and development will be described as well as the definitions attached to them in political programmes of Germany and Singapore in chapters 8 and 9. It is up to the reader to bear in mind that the thoughts of one concept also influenced the thoughts of the other two. Nevertheless, it can be stated that the concept of the 'knowledge society' has its origin clearly in the academic field, while the

[2] In an interview with the author, Kuhlen regards information as the part of knowledge that can be made explicit. He states: "Information is the subset of traded knowledge. My team and I have coined the slogan 'information is knowledge in action'. Knowledge exists in society and it becomes increasingly relevant to process this knowledge in order to make it accessible for everyone. Hence, information is not merely the quantitative object of the communication engineering but information is knowledge, relevant to action" (R. Kuhlen, 26.11.04, interview with & translation by the author). Similarly, an executive advisor, Cisco Systems GmbH, Berlin/Germany stresses in an interview with the author that knowledge should be regarded "as processed information" emphasising the "human component in making knowledge out of information" (W. Kaczorowski, 22.11.04, interview with & translation by the author).

concepts of the 'information society' as well as especially the concept of the 'knowledge-based economy' have some roots in the academic field but were strongly further developed and used in the political sphere. Generally, it can be said that the term 'information society' in the political sphere was often seen as a term emphasising the need of building information and communication infrastructures and fostering the use of these new technologies. Hence, technological determinism was often connected to the term. The term 'knowledge-based economy' was generally chosen by national governments and international organisations when emphasising the potential for economic growth and prosperity due to knowledge and the use of information and communication technologies. The term 'knowledge society' stands out since it was clearly developed by members of the scientific community concerned with the consequences of increased knowledge production and education on societal change.

Primary Phase: Constructing the Concepts

The following outline on the theoretical development of the concepts 'knowledge society', 'information society' and 'knowledge-based economy' will illustrate that not one singular comprehensive and widely accepted theoretical definition of each concept exists. Consequently, this book adopts Berger/Luckmann's definition of knowledge, stating everything as knowledge that is regarded as such by society and assesses the definitions of k-society given by the social actors creating a German and a Singaporean k-society in order to define it (chapters 8 and 9). The assessment of the political programmes creating k-societies in Germany and Singapore, outlined in this book, illustrates that multiple paths to k-society exist, depending on the structural realities (chapter 3), definitions of knowledge and information (chapter 4) and arena of engaged subsystems (chapter 5) in each country. Before doing so, the categorically defined, theoretical concepts of k-society as well as their conceptual construction shall be outlined.

A Knowledge-driven Society – 'Knowledge Society'

The concept of knowledge and its importance to society is very old. While, for instance, the philosopher Plato (428-347 BC) rated intelligence as the most important quality of a political leader, the philosopher and economist Mill argued, in 1863, that intellectual and moral education even surpasses

industry and wealth in its effects on societal development (Mill, 1974). But if one wants to identify a founder of the term and concept 'knowledge society', it should be the American sociologist Robert E. Lane. In 1966, Lane develops – with regard to the US-American society – the concept of a 'knowledgeable society', assuming that knowledge – mainly referring to scientific, philosophical and cultural knowledge – replaces industrial organisation and production as the major source of productivity. Lane states as "a first approximation to a definition", that "the knowledgeable society is one in which, more than in other societies, its members: (a) inquire into the basis of their beliefs about man, nature, and society; (b) are guided (perhaps unconsciously) by objective standards of veridical truth, and, at the upper levels of education, follow scientific rules of evidence and inference in inquiry; (c) devote considerable resources to this inquiry and thus have a large store of knowledge; (d) collect, organise, and interpret their knowledge in a constant effort to extract further meaning from it for the purposes at hand; (e) employ this knowledge to illuminate (and perhaps modify) their values and goals as well as to advance them." Lane describes further: "Just as the 'democratic society' has a foundation in governmental and interpersonal relations and the 'affluent society' a foundation in economics, so the knowledgeable society has its roots in epistemology and the logic of inquiry" (1966: 650). The common criticism towards the concept of the 'knowledgeable society', that knowledge is present and always has been present in all kinds of human societies, Lane answers by mentioning that the elements of knowledge creation, consumption and furthering are present in some degree in every society; but "in the knowledgeable society they are present to the greatest degree" (1966: 650).

Analysing the consequences of an increasing importance of knowledge on politics, Lane argues "if leaders and other legislators are less bound by the domain of pure politics, (…) then they are freer to be guided by the promptings of scientists and findings from the domain of knowledge." As the main four points supporting this statement, he identifies: "(a) the rising influence of the bureaucracy is based in large part on bureaucratic command over the sources of knowledge; (b) state and national legislators respond to the growing importance of technical knowledge both with increased standards for their own mastery of subject-matter fields and with demands for greater staff resources to help them meet the challenge; (c) there is an increased reliance on the kind of professional help enlisted by the executive; and (d) the power of the lobby is less likely to be based on electoral sanctions than upon specialised information helpful (however self-interested) in formulating policy change" (1966: 658). Directly referring to policy-formulation, he argues, that

"if professional problem-oriented scientists rather than laymen come to have more to say about social policy, the shift in perspective is likely to occasion some differences in policy itself" (1966: 659). His expectation of a closer cooperation between scientific knowledge, mainly understood as positivistic knowledge, rational decision-making and societal development, did not become reality, as we can observe in political decision-making in many countries. Rational decision-making, based on scientific knowledge and not the interests of certain lobby groups are rather rare in most countries even if the scientific community takes part in expert commissions influencing these processes of decision-making, as outlined in chapter 5 with regard to Germany and Singapore. Lane's focus on the increasing role of scientific knowledge in political decision-making in a 'knowledgeable society' did not enter the commonly used definitions of a 'knowledge society' in the political sphere. Instead, politicians today mainly emphasise the importance of knowledge for economic growth. Societal development generally enjoys a lower priority. Despite this difference in definitions, Lane's article in 1966 can be regarded as the origin of today's concept(s) of 'knowledge society'.

Yet, it was the American sociologist Daniel Bell who actually popularised the concept with his book "The Coming of Post-Industrial Society", which was published in 1973. Bell focuses on the transformation from industrial to post-industrial society and emphasises the centrality of theoretical knowledge as the axis around which new technology, economic growth and the stratification of society would be organised. Historically, Bell distinguishes between the pre-industrial phase (agriculture, mining, and fishing), the industrial phase (mechanical technology) and the post-industrial phase (intellectual technology).[3] Although Bell uses the term 'post-industrial society', he does not conceal its closeness to the conceptual idea of a 'knowledge society'. He states: "The post-industrial society, it is clear, is a knowledge society" (1973: 212). Further advanced in the book, Bell actually speaks of a 'knowledge society' and reasons: (a) "the sources of innovation are increasingly derivative

[3] In order to define the term 'post-industrial society', Bell identifies the following five dimensions or components (1973: 14):

1. Economic sector: the change from a goods-producing to a service economy;
2. Occupational distribution: the pre-eminence of the professional and technical class;
3. Axial principle: the centrality of theoretical knowledge as the source of innovation and policy formulation for society;
4. Future orientation: the control of technology and technological assessment;
5. Decision-making: the creation of a new 'intellectual technology'.

from research and development (and more directly, there is a new relation between science and technology because of the centrality of theoretical knowledge)", and (b) "the weight of the society – measured by a larger proportion of Gross National Product and a larger share of employment – is increasingly in the knowledge field" (1973: 212). According to Bell, theoretical knowledge becomes the axial principle, the central, economic growth enhancing power in post-industrial society. The knowledge class which existed rudimentarily in industrial society gains economic, social and political influence. Its main knowledge base is technological intelligence. The growth of the service sector demands and fosters a change in labour. Parting the society into economic sectors, he argues that the post-industrial sector is vastly developing and changing due to telecommunication and computer technology. He is convinced that technological innovation becomes the main driving force for any kind of societal change. In the 1980s, Bell interprets the development and distribution of ICTs as a third technological revolution, the mechanisation as first, and the electrification and chemification as second technological revolution (Kübler, 2005: 26). Increasingly taking this technological approach, Bell continues to develop his concept of the 'post-industrial society' further and even begins to make use of the term 'information society' rather than 'knowledge society', as mentioned by Mattelart (2003: 74/75). The technological determinism, supported by Bell in the 1980s, can also be found in the literature on the concept 'information society'.

The concept of the 'post-industrial society' has been criticised in several ways. Mainly scrutinised has been the question whether the tendencies described by Bell – the growth of the service sector and the increasing importance of knowledge – actually describe and are the cause for a distinct cut between the industrial and the post-industrial society, although the two tendencies exist since the beginning of the industrial society. Gershuny and Webster argue that the growth of the service sector cannot be interpreted as a consequence of increasing wealth flowing from a goods producing sector to a service sector, since a substantial part of the service sector is engaged in the production of services for the production of goods, not private services (Gershuny, 1978: 25-36; Webster, 1995: 50). Kumar states, that the socio-economic dynamic leading to the growth of the service sector is closely connected to the formation process of the industrial society (Kumar, 1976: 446-450, 460-463). Steinbicker (2001: 71) points out that the growth of the service sector does not simply originate from an increase in productivity and mass consumption but from far more complex developments, including the expansion of social security networks and political factors.

Concerning Bells assumption that theoretical knowledge advances as the central element for societal as well as economical development, one also has to scrutinise his empirical data. Today, three decades after the publishing of Bells book, universities and research institutions are far from being the central, axial institutions guiding societal development that Bell envisioned. Several authors state that the university and research sector have long lost their dominant position in society (Evers, 2000; Heidenreich, 2003; Knorr-Cetina, 1999, Willke, 1999). Looking at Bells data, which refer to the increasing research budget of the United States, one has to mention that the US-American budget for research in the 1960s and 70s (when Bell wrote his book) was exceptionally high due to the Cold War, but decreased from the 1980s onwards (Steinbicker, 2001: 72). Taking a historical perspective, Giddens (1981) asks up to what extent theoretical knowledge became so much more important than before. He states that "there is nothing which is specifically new in the application of 'theoretical knowledge' to productive technique. Indeed, as Weber stressed above all, rationality of technique (…) is the primary factor which from the beginning has distinguished industrialism from all preceding forms of social order" (1981: 262). Connected to this, Webster (1995: 48-50) criticises Bell's vagueness concerning theoretical knowledge and his definition of the same. Furthermore, there is little evidence for Bell's assumption that scientists, technologists and academics will form the ruling class in the future (Gershuny, 1978: 37) and Bell neglects to specify how these knowledge workers should gain central power positions in society. Bell's hypothesis of a knowledge-based social class structure has to be reconsidered, since Bell misses to see that education and educational certificates are also used by existing elites in order to reproduce themselves. Education, in Bell's book, is regarded as the transfer of abilities. Yet in reality, education is often used as a way to identify status groups (Collins, 1981: 307).

Overall, it is important to mention, that Bell's book on the emergence and rise of post-industrial society hails as the first detailed study on the change-enhancing aspect of increasing knowledge production and dissemination in society. As described by Bell, "the post-industrial society (…) is primarily a change in the character of social structure – in a dimension, not the total configuration of society. It is an 'ideal type', a construct, put together by the social analyst, of diverse changes in the society which, when assembled, becomes more or less coherent when contrasted with other conceptual constructs" (1987: 73). Despite the above outlined criticism, the importance of his study to the research on societal change due to an explosion of knowledge production and transmittance via ICTs cannot be ignored.

Before the concept of k-societies came to Europe in the beginning of the 1980s, only very few European scientists took part in the discussion, led by mainly US-American and Japanese academics. One exception is the French sociologist Alain Touraine (1969). He published his thoughts on an evolving 'societé postindustrielle' in opposition to Bell's book (which had been published since the 1950s in several journal articles and conference statements). Instead of attributing to the mythologizing writings of later authors, Touraine takes a more critical stand and discusses the possibly arising conflict between knowledge 'have' and knowledge 'have-nots'. He offers a rather general description of structural change which he mainly locates in the economy. Here, the institutionalisation of conflict between capital and labour as well as the decreasing importance of the labour movement as a change-enhancing social actor can be mentioned as examples. Instead, he identifies the environmental as well as the emancipative women movement as potential carriers of societal innovation. In 1984, nevertheless, Touraine states that his hopes have not been fulfilled and hence his concept of 'la societé postindustrielle' could no longer be maintained.

In 1986, Stehr and Böhme published their book "The Knowledge Society" to contribute to a new approach towards formulating "a theory of society which captures the dynamics of science, technology and society" (Böhme/Stehr, 1986: 7). They agreed with the assertion of theorists such as Bell that knowledge arises as an 'axial principle' in highly developed societies. Yet, they criticise mainly three aspects of his book: (a) a missing sociology of knowledge in the existing theories on knowledge societies that defines the core element of knowledge societies - knowledge (1986: 16); (b) the usage of the term 'post-industrial society' rather than 'knowledge society' (Stehr, 1994: 12); and (c) the internalism of the new sociology of science, neglecting the impacts of scientific knowledge on societal development (Böhme/Stehr, 1986: 4). Concerning the definition of knowledge (a) used by most theorists until now, Stehr (1994: 9) states that they appear too narrow, technical-scientific or formal.

Trying to rectify this, he defines knowledge as the capacity for social action, which – according to him – emphasises the aspect of value added due to knowledge (1994: 95). Regarding the term 'knowledge society' (b), Stehr argues in favour of it and turns against terms such as 'science society' (Kreibich, 1986), 'informatisation society' (Nora and Minc, 1979), or 'post-industrial society' (Bell, 1973). He argues in favour of the term 'knowledge society' by stating that 'industry' or manufacturing does not vanish and hence, the term 'post-industrial' is inappropriate (1994: 12). Turning against the term

'science society', Stehr and Böhme point out (Böhme/Stehr, 1986: 8-9): "The focus is not merely science but the relationships between scientific knowledge and everyday knowledge, declarative and procedural knowledge, knowledge and non-knowledge". Furthermore, Stehr disagrees with using the term 'information society' by mentioning that every kind of information needs to be transmitted in order to be usable. As he contends: "Information is merely the resource from which knowledge is made. Yet, it is knowledge that furthers contemporary societies, not merely information" (Stehr, 1994: 12).

Regarding the stated lack of analysis of the role of scientific knowledge for societal transformation, Böhme and Stehr identify it as the new defining characteristic of transforming industrial society into a knowledge society. They state that "the historical emergence of 'knowledge societies' does not occur suddenly, (…) but is rather a gradual process during which the defining characteristic of society changes and a new one emerges" (1986: 7). Thus, they identify science, not just knowledge, as a constitutive mechanism of society which challenges the constituting principles property and labour in modern society. By drawing a picture of an *emerging* k-society, the two authors contribute to the construction of the vision of a self-emerging k-society, discussed in chapter 6.

Stehr and Böhme conclude that "contemporary society may be described as 'knowledge society' based on the penetration of all its spheres of life by scientific knowledge" (1986: 8).[4] Stehr attempts to develop his socio-

[4] This advances in the following terms (1986: 8):

1. penetration of most spheres of social action by scientific knowledge ('scientification');
2. replacement of forms of knowledge by scientific knowledge (e.g. professionalisation). The role of experts and consultants is further discussed by Stehr in 1992 (Stehr/Ericson, 1992);
3. emergence of science as an immediately productive force;
4. differentiation of forms of political action (e.g. science and educational policy);
5. development of a new sector of production (the production of knowledge);
6. change of power structures (technocracy debate);
7. emergence of intellectuals as a new social class.

In 1994, Stehr completes this list by replacing point 7 with point 8 and adding point 9 and 10 (1994: 10/11):

8. emergence of knowledge as the basis for social inequality and social solidarity;
9. trend to base authority and expertise;
10. shift in the nature of societal conflict from struggles about the allocation of income and divisions in property relations to claims and conflicts about generalised human needs.

logical concept of knowledge further in his books "The Fragility of Modern Societies" (*Die Zerbrechlichkeit moderner Gesellschaften*), published in 2000 and "Knowledge and Economic Conduct" (*Wissen und Wirtschaften*), published in 2001. Nevertheless, the works published in 1986 and 1994 are Stehr's and Böhme's main contribution to the concept 'knowledge society'. Both works contain aspects contributing to the primary as well as others contributing to the secondary phase of constructing the concepts of k-society. This is further outlined in section 2.3.1.

Kreibich (1986: 9) emphasises – in accordance with Stehr – the importance of the production and dissemination of specifically scientific knowledge and scientific technology as basis of all highly developed societies. Based on this assumption, he concludes differently to Stehr and contends that this future society should be named 'science society'. He further argues that science and technology will overtake the traditional factors of production, labour and capital. Due to this, he concludes that the ownership of the basis of scientific knowledge production and use of technology will structure power allocation in society (1986: 10). His research is based on two assumptions: (1) that not single inventions, scientific theories or methods lifted science and technology into their central position but the innovations of the basic approach, i.e. the methods of producing and implementing innovations; (2) that every new development phase of knowledge production and dissemination is characterised by the change in methodological approach, which includes the old approach but is extended further (1986: 11/12). Hence, Kreibich is mainly concerned with the further development of the system of scientific knowledge production and dissemination, arguing that it is this system that will assure the further development of the 'science society' and its economy. This is based on the idea that the system enables scientific innovations and their implementation. Looking at the historical development of the scientific knowledge production in developed countries, Kreibich (1986: 353) argues that World War II as well as the Cold War with their R&D investments in the weapon industry supported the further development of the systems of scientific knowledge production and are responsible for USA's rise as world power.

In 1998, the sociologist Helmut Willke states that a 'knowledge society' has emerged when all functional areas of society rely on knowledge and the independent production of new knowledge. This is – according to Willke – the case for differentiated and highly technological societies of the West. In these countries, the structures and processes of the material and symbolic reproduction of society are penetrated by knowledge-based operations up to

a degree that the importance of information processing, symbolic analysis and expert systems decreases compared to other factors of reproduction (1998: 162). While Stehr and Böhme heavily emphasise the importance of scientific knowledge for the emergence of a 'knowledge society', Willke, as well as Michael Gibbons et al argue that science loses its former monopoly-status. According to Willke and Gibbons et al, every sector of society, including the cultural, judiciary, economic and health systems, reproduces itself by producing its own knowledge independently (Willke, 1998; Gibbons et al, 1994). This aspect that all main sectors in society depend on knowledge and on their own independent knowledge production, Willke (1999) regards as the defining factor of a 'knowledge society'.

The varying emphasis put on the role of science and the production of scientific knowledge in k-society states the main disagreement between Stehr and Willke. It determines the construction or further development of two divergent concepts of k-society, although both label it as 'knowledge society'. For Stehr, scientific knowledge, which is mainly produced in academic centres like universities and research institutes, forms the basis of societal transformation. In contrast to this, Willke and Gibbons et al argue that the academic centres loose their monopoly-status. Knowledge is produced in all sectors of society, and hence it is very decentralised. This knowledge then again reproduces society, economy and the distinct sector it is referring to. Analysing the production of this knowledge, Gibbons et al state that the increasing diversification and specialisation of the localities of knowledge production results in new forms of production. The scholars identify the following by developing a 2-mode-concept: Mode 1 is the traditional way of producing knowledge. It is characterised by its homogeneity and disciplinary focus. Research problems are solved within academic institutions that are hierarchically organised. Mode 2 is the new form of producing knowledge. It is characterised as reflexive, multi- and trans-disciplinary and therefore dynamic and heterogeneous. Mode 2 knowledge is produced in a multiplicity of different organisations and institutions and is carried out in a context of application. It is generally a very problem-oriented form of knowledge production. In their work, Gibbons et al prognosticate that Mode 1 is – in k-society – slowly replaced by or integrated into Mode 2. This results in a socially distributed knowledge production system which enables most members of society to take part in knowledge production as well as in the consumption of new knowledge (Gibbons, et al, 1994: 1-16).

Although this book does not aim to subscribe to one theoretical definition of k-society, but instead focuses on how k-societies are defined and

constructed by the governments of Singapore and Germany, it is the definitions of 'knowledge society' offered by Willke and Gibbons et al that appear most valid to this study. Only when the systems of knowledge production and consumption ensure that every interested member of society can participate in them one can talk of a 'knowledge society'. Nevertheless, the academic literature has not yet agreed on one complete concept. Consequently, a rather incomplete concept of a 'knowledge society', together with the concepts 'information society' and 'knowledge-based economy' described below, entered the political spheres of several countries in the mid 1970s, while the academic debate over the concepts nearly ceased until the beginning of the 1990s. From the early 1990s onwards, the increased usage of the academic k-society-terms by national governments as well as possibly the inconsistencies of all three concepts used in the political sphere, spurred a revival of the academic research in this field.

A Technology-determined Society – 'Information Society'

In 1963, the Japanese economist Tadao Umesao publishes his thoughts on the development of human society. He bases his thoughts on the statistical findings that employment in agriculture and the production of material goods decreased, while there was an increase in the production of intellectual goods. Umesao draws an analogy between these findings and biological evolution. He argues that the agricultural sector can be regarded as an organism simply digesting the production of material goods, while he regards the production of intellectual goods as analogous to organisms using their nerve systems for planning their actions and controlling their environment. This analogy between evolution and the three economic sectors in society lead Umesao to his argument that society concentrates on the production of intellectual goods once it reaches the highest level of societal development. He names this level *'joho shakai'*, which can be translated into 'information society' (Umesao, 1963). The development of *'joho shakai'* becomes the aim of industrial development and shapes the economic and research politics of Japan until today (Dordick/Wang, 1993: 37). Although Umesao's thoughts are recognised outside of Japan only much later, Japan can be regarded – due to Umesao's work – as the country of origin of the concept 'information society'. Furthermore, the Japanese government was one of the earliest that

embarked on the construction of an 'information society' in the 1960s (Steinbicker, 2001: 18).[5]

In 1974 in Europe, Simon Nora and Alain Mink publish a report on the "informatisation of French society" (Nora/Minc, 1979). The two authors – taking a very technological approach – argue that the development of ICTs will act as an economic growth enhancing factor. Firstly, a new sector of production specialised on the required hard and software emerges. Secondly, the technology enables a productivity push in the whole industry. Finally, ICTs diffuse all sectors of society and materialize as central factor in the social infrastructure of a nation. Hence, an 'information society', a society based on ICTs arises. The process leading to this new state of society is called 'informatisation'. The combination of telecommunications and automatic data processing that is seen as the main drivers of this development is named "télématique" (Minc, 1987: 134). Similar to the thoughts of Umesao in Japan, the report heavily shapes the politics of France in the field of ICT development (Nora/Minc, 1979: 7).

In 1989, Manuel Castells, for the first time, publishes his thoughts on the relationship between the development of ICTs and urban as well as regional processes (Castells, 1989, 2004; Castells/Laserna, 1989). He is guided by McLuhans idea of the global village (1962). McLuhan assumes that ICTs relativate space and hence lead to a restructuring of spatial orders which determines a decreasing importance of cities. Critically inspired by this, Castells searched for the transformation of spatial orders due to ICTs as manifestations of interaction between the restructuring of capitalism as a social system and informationalism as a new form of socio-technical organisation. As a consequence of this transformation, Castells sees the development of a new spatial order, with the informational city in its centre. In his trilogy "The Information Age" (Castells, 2004a, 2004b, 2004c), Castells draws the picture of an informational capitalism, which is based on a new development cycle. In the first volume, "The Rise of the Network Society" (1996), Castells outlines the informational society: the revolution of the information technology, the global informational economy, the network cooperation, the transformation from labour and occupational structure and the evolution of a culture of real virtuality with its final culmination in the network society. The second volume, "The Power of Identity" (1997), discusses new social movements that oppose the instrumental and universal order of the networks. The third volume, "The End of Millennium" (1998), assembles analyses of the break down

[5] This is outlined in more detail in Appendix A.

of socialism and the second world, the downfall of the fourth world (referring to development countries as well as to peripheries in the metropols), the rise of the tiger states in the Asia-Pacific-Rim, as well as the unification process of Europe. In the first volume, Castells develops his concept of an 'informational society'. At the end of the first volume, Castells concludes that the central functions and processes of society are increasingly organised in instrumental networks that structure society along their "networking logic". As driving forces of the fundamental change into an 'informational society', Castells identifies the interaction of three independent developments since the end of the 1960s. *First*, the revolution of ICTs leads to the evolution of informationalism as the new material basis of society. The creation of value, the exercising of power and the production of cultural codes are increasingly dependent on these new technological capacities. *Second*, ICTs lead to a restructuring of capitalism in the 1980s. The reactions and policies of governments and corporations towards the crisis of the 1970s led, together with these new technologies, to the development of a new form of capitalism, the global informational capitalism. *Third*, the evolution of new cultural – value oriented – social movements support and further the development of individual and decentralised applications of ICTs. Most central to Castells theoretical approach is his distinction between the capitalist mode of production and the informational mode of development. While the capitalist mode of production is a way of organising a social system, the mode of development is presented as a means of generating a given level of production. According to Castells, different societies operate with different modes of development, such as today ICTs announce "the rise of a new technological paradigm, which heralds a new mode of development" (1989: 12). The informational mode of development is regarded as a new 'socio-technical paradigm', which influences the effectiveness and productivity of all processes of production, distribution, consumption, and management (1989: 17). Parallel to Bell, Castells views the changes in techniques of production and development – due to ICTs – as well as the increasing importance of information and knowledge as central, but analytically independent axes of societal change. Thus, Castells regards the revolution of ICTs as main driver to all major structural transformations (Webster, 1995: 196).

Castells prefers the term 'network' in order to characterise society in the information age. He reasons that networks form the new social morphology in society and the expansion of the network logic changes the functions and results of production processes, experiences, power and culture (2004a: 528). Castells identifies the international financial flows as the densest, most

flexible and efficient global network. This electronic economy is based on knowledge and information that continuously flow – via ICTs – around the globe. Information and knowledge cannot be controlled by national or democratic institutions, but can and usually have immense impact on economy and social life (2004a: 530).

Besides these academic works, the popular sciences spread the conceptual idea of k-societies, especially the idea of the technologically-determined society. An 'information society' is rapidly popularised by mainly American authors such as Alvin Toffler and John Naisbitt. In 1970, Toffler publishes his "Future Shock". Focusing on the "roaring current of change" that hits contemporary societies, "overturns institutions, shifts our values and shrivels our roots" (1970: 3), Toffler stresses the importance for persons to be able to control the rate of change invading in society. As he puts it: "I coined the term 'future shock' to describe the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time" (1970: 4). In his second book, "The Third Wave" (1980), Toffler again emphasises change that hits most industrial countries, by depicting it as a wave. According to him, the past waves of agriculture and industry are overtaken by the third wave which originates in the development of ICTs. ICTs will end the phase of mass production, mass communication, mass education and mass politics. Instead, the labour market becomes more heterogeneous, the society becomes more decentralised. Similarly, the consultant John Naisbitt (1982) identifies in his book "Megatrends" ten trends of which he calls the first one "from the industrial to the information society". Naisbitt states that the mass production of cars will be replaced by the mass production of information. In 1990, Toffler continues his analysis of the future with his book "The Powershift", in which he describes a shift in power taking place and restructuring world society "like the shifting and grinding of techtonic plates in advance of an earthquake". Toffler argues that this power shift will lead to a "revolution in the very nature of power" (1990: 4).

In Germany – while comprehensive reports from members of the scientific community on k-society concepts are still missing – futurologists shape the beginning of the discussion by predicting various technical developments. In 1968, Frederic Vester describes the multiple uses of multichannel communication systems. In 1970, Buchholz mentions the idea of sending letters and newspapers immaterially from the producer to private homes by transmitting the messages within seconds and copying them onto photo paper in the house of the recipient. Robert Jungk mentions in 1973 the

parallel development of a strong infrastructure for transport and one for electronic communication as a necessary supplement for the post-industrial city (Vester, 1968; Buchholz, 1970; Jungk, 1973 qtd. in Klumpp, 2003: 28).

Authors like Toffler, Naisbitt, Vester, Buchholz and Jungk clearly acted as constructors of the concept 'information society'. Yet, at the same time, they contributed to the fact that the concepts 'information society' as well as 'knowledge society' gradually lost the little substance they had, left the academic field and entered political and popular culture. Here they nourished the hopes and dreams towards a better future.

A 'Knowledge-based Economy' – KBE

The idea that knowledge in economy is an "endogenous variable dependent on input, on the allocation of resources" (Machlup, 1962: 5), is rather old. In 1776, Adam Smith wrote that "man educated at the expense of much labour and time (…) may be compared to one of those expensive machines" (Smith, 1910 qtd. in Machlup, 1962: 5). Nevertheless, it was not until the mid 20th century that knowledge and information were analysed statistically as factors of production.

In 1962, the US-American economist Fritz Machlup assesses the size, growth and contribution of the "information industry" to the gross national product (GNP) in statistical terms. Due to his book "The Production and Distribution of Knowledge in the United States" (1962), Machlup can be regarded as the founder of the economics of knowledge. Here, he argues that a fourth economic sector can be added to the traditional three, namely agriculture, industry, services. He labels this fourth sector 'knowledge industry'. Machlup uses two methods for the empirical analysis of this fourth sector: (a) the industry approach and (b) the occupational approach (1962: 44-50). In both approaches, he ascribes an economic value to the industry and occupational groups and calculates their contribution to the US-American GNP. Due to a proportionate contribution of the fourth sector, Machlup argues that a 'knowledge economy' is emerging.

The industry approach groups information goods and services that are not produced by information workers under the fourth sector. As an example, Machlup mentions the process of paper manufacturing. Within this fourth sector he distinguishes the following five industry groups (split into fifty sub-branches): (a) education (e.g. schools, libraries, and universities); (b) media of communication (e.g. radio and television, advertising); (c) informa-

tion machines (e.g. computer equipment, musical instruments); (d) information services (e.g. law, insurance, and medicine); as well as (e) other information activities (e.g. research and development, and non-profit activities). However, Machlup points out that the industry approach does not take into account preparatory works and semi-finished goods. These are included in the calculations based on the occupational approach. Here, all occupations concerned with the production and use of knowledge and information are listed. Yet, the disadvantage of the occupational approach is according to Machlup, that *firstly*, a connection between using information and knowledge at the work place and the production of information goods does not necessarily exist. *Secondly*, the occupational approach disrespects qualitative differences in the use of information/knowledge. Here, Machlup names the example of a professor and his secretary. Both are listed as information workers without emphasising the qualitative difference in using information and knowledge. Due to these disadvantages of both approaches, Machlup argues to use both approaches parallel to each other in order to calculate the size of the fourth sector and its contribution to GNP correctly. He states: "We conclude that both industry analyses and occupation analyses are needed in order to find out about the past development and present role of knowledge-production" (1962: 48).[6] Being the first economist attempting to statistically assess the knowledge sector, his ideas were later on developed further by Porat. Nevertheless, it became obvious, that it is not possible to statistically calculate the size of the knowledge/information sector exactly.[7]

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[6] Machlup was aware of the difficulties arising from a statistical calculation of the knowledge sector. He especially mentioned the following four:

1. Due to the immaterial character of knowledge and information, it might not always be possible to measure a physical output in economic terms;
2. Many information goods and services are not traded on an established market with market prices. Yet, national accounting is based on market prices or the ability to estimate those;
3. The heterogeneity of the information sector. Information goods and services exist in widely varying forms and packaging but have to be subsumed under one sector. Machlup refers to the publishing sector that sells information in widely differing forms and to differing prices;
4. A rise in expenditure on information goods and services does not necessarily go in hand with a rise in the offered and consumed information.

[7] The following criticism shall be born in mind (Hensel, 1990: 90/91):

1. Machlup's assumption that information goods and services can be economically calculated was proven wrong by the fact that often no market prices exist for

In 1976, the American economist Marc Porat, academically influenced by Fritz Machlup, publishes his book "The Information Economy". Here, he offers a calculation of the size and expansion of what he calls the 'information economy'. Porat identifies a list of occupations that he terms 'information workers' and calculates the contribution of these 'information workers' and the 'information economy' to the overall GNP of the USA. Yet, the definition of certain occupations as part of the 'information economy' while others are left out, offers ground for criticism and short-comings. Porat, for example, counts judges as well as rent collectors as 'information workers', but not doctors. Obviously, these definitions of the 'information sector' and its 'information workers' heavily determines the size and contribution of the sector to the overall economic growth of a country. Today, Porat's calculations are mainly conjoined with Machlup's founding work. The criticism mentioned above concerning Machlup's work is also applicable to Porat's calculations. Nevertheless, both calculations certainly contributed to an easier-to-grasp definition of k-society, which later contributed to the fact that the terms 'information society' and 'knowledge-based economy', much less 'knowledge society', heavily entered the political sphere.

In contrast to Machlup and Porat, the US-American economist Peter F. Drucker does not aim to statistically assess the 'knowledge economy' but instead formulates a highly economy-focused theory on it. In 1958, Peter F. Drucker speaks in his book "The Landmarks of Tomorrow" of an 'education society'. He develops this thought further and publishes a book, entitled "The Age of Discontinuity" in 1969. Here, Drucker states that knowledge "has become the foundation of the modern economy" as we have shifted from an 'economy of goods' to a 'knowledge economy' (1969: 249, 247). In his work, Drucker uses the terms 'knowledge society' as well as 'knowledge economy'. Due to his strong focus on knowledge in economic development and the fact that his approach is based on a management perspective, I nevertheless shall discuss his theory as a contribution to the concept of a 'knowledge-based economy'.

In "The Age of Discontinuity", Drucker distinguishes the "age of continuity" which he ascribes to the years 1913 to the end of the 1960s, and

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them. Not all social activities can be assessed as economic value, for example the upbringing of children by parents;

2. Machlup concentrates on the demand side of national accounting and hence neglects the calculation of value production on the production side;
3. Machlup's quantification of the knowledge sector is in some parts heavily based on rough estimations which offer potential for miscalculations.

the "age of discontinuity" which follows. Focusing on economic development, Drucker argues, that the main technical inventions took place in the years from 1913 to the beginning of World War I in the industrialising countries. In the subsequent 50 years, an economic development took place, yet no change in structure. This age of continuity is – according to Drucker – replaced by the age of discontinuity, which brings about fundamental changes in the areas of technology, economy, political structure and society. Drucker identifies four factors that are responsible for the emergence of the age of discontinuity, namely: (a) the development of information and data configuration technologies; (b) the internationalization of the economy; (c) an individualization that leads to a neutralization of the main social and political organisations; as well as (d) the emergence of a 'knowledge society' in which knowledge becomes the central element in such societies. Drucker (1969: 60) points to the development of ICTs which embody a new economic reality. Similarly to Bell, Drucker addresses the knowledge-based character of these technologies as a central aspect of k-society. Yet, for Drucker, this new economical sector is directed to a new expansive economic phase in which the state merely creates the legal and infrastructural frame. This frame will then be filled by the industry itself. For Bell, in opposition to Drucker, these new industries point to an increasing dependence of economic growth from state organised basic R&D. Hence, the same focus (on ICTs as new industrial sector) is interpreted by Drucker and Bell very differently (Steinbicker, 2001: 23). In the economic sphere, Drucker predicts the development of a world economy that is characterised by increasing global integration, disregarding national borders. As an institution, guarding the production and distribution of goods worldwide, Drucker (1969: 103-107) suggests a multinational world corporation, not national governments. Looking at the micro-level of economy, he emphasises the increasing importance of the 'knowledge worker' in these 'knowledge industries'. In the political sphere, Drucker develops a theory of organisation which states that the modern society is increasingly structured by specialised organisations that concentrate on certain social and political aspects in society. The interweaving of organisations with autonomous orientation creates a new pluralistic order in society, according to Drucker (1969: 219-223), which in turn witnesses the state loosing its central role. Drucker sees the state as increasingly dysfunctional and argues that a reorganisation of the state and its roles is required. In the social sphere, he clearly sees a 'knowledge society' arising. He argues, that "the central wealth-creating activities will be neither the allocation of capital to productive uses, nor 'labour'...Value is now created by 'productivity' and 'innovation', both applications of knowledge to work" (1994: 8). Similarly to Machlup, Drucker points

to the growth of the 'knowledge industries'[8], which contributed one third to the GNP of the USA in 1965. He describes the development of knowledge, its character and importance in economy and society from knowledge of salvation (*Erlösungswissen*) in 1700 to the linkage of technology and science as well as the application of knowledge in industrial processes and finally the application of knowledge in knowledge production today. He concludes that the increase in formal education after World War II and consequently the increase in 'knowledge workers' on the labour market as well as the character change of knowledge are the main driving forces for the emergence of a 'knowledge economy'.

Steinbicker assesses Drucker's theoretical concept and mentions several critical points. For example, Drucker does not clarify the position of the management – being part of the 'knowledge class' – in society. Instead, he merely mentions the leading social groups by labelling them 'knowledge executives', 'knowledge professions' and 'knowledge employees' but without clarifying their characteristics and their leading roles in society. Hence, the role of the management and its powers remains unclear. Furthermore, Drucker assumes a threatening conflict between the 'knowledge class' and the 'service class', without specifying the characteristics of this conflict. He merely assumes that this conflict can be avoided by an increase of productivity in services. Steinbicker criticises the lacking analysis of social conflict and power relations as unsatisfactory (Steinbicker, 2001: 46). This is also the case regarding the hypothesis of the 'knowledge society' being a 'post-capitalist society', which Drucker does not understand as non-capitalist. Yet, he refrains from satisfactorily reasoning which aspects of the 'knowledge society' are legitimately called 'post-capitalist'. Similarly, Drucker does not offer a stringent definition of a 'knowledge worker'.

In his later books, Drucker develops the above outlined hypothesis further. He analyses the changes in economy and occupational structures, developments in knowledge and its role in economy and society, the emergence of 'knowledge workers', and the change in society towards a society of organisations. He maintains his original concept of a 'knowledge economy', but actualizes and sharpens his argumentation. This is mainly done in his two books "The New Realities" (1989) and "Post-Capitalist Society" (1993a). In

[8] Drucker defines 'knowledge industries' as industries, producing ideas and information rather than goods and services.

his more recent works[9], Drucker increasingly argues that k-society is a post-capitalist society and points to arising problems and dangers within it. He especially mentions possible conflict between service occupations and 'knowledge workers'. Furthermore, he emphasises the need to monitor social, political and economic effects of ICTs.

The above outline illustrates that the members of the scientific community who originally developed the multiple k-society concepts defined those categorically, meaning by dividing the assessed changes in society and economy into certain categories. The concepts as well as the terminology labelling the differing concepts are both manifold in character, used interchangeably and with textual overlaps. While the definitions of the varying k-society concepts are rather distinct, the interchangeably used and manifold terminology blurs the picture of what k-society is. Common to most academic works outlined above is nevertheless the belief that some kind of k-society is emerging due to the technological developments in the information and communication industries, the growth of the service sector and the increasing knowledge-intensity of industrial products. But before discussing how the k-society-idea entered national politics, I shall first outline the secondary phase of developing the theoretical concepts of k-society further.

Secondary Phase: Criticising and Furthering the Concepts

The primary phase of constructing the theoretical concepts 'knowledge society', 'information society' and 'knowledge-based economy' was followed by a secondary phase. Here, scholars built on the above outlined works and attempted to specify the analyses of the social and economic changes, the developed concepts of k-society and the introduced k-society terminology in order to offer a comprehensive picture of the assessed changes. During this secondary phase, the primary theories on the concepts were discussed, scrutinised and theorised further, while they continued to act as main reference theories.

[9] Such as "The Rise of the Knowledge Society", published in 1993 and "Knowledge Work and Knowledge Society – The Social Transformation of this Century" published in 1994 (Drucker, 1993b, 1994).

A Knowledge-driven Society – 'Knowledge Society'

Bell's concept of the 'post-industrial society' – mentioned above – was one of the first detailed and rather comprehensive theoretical frameworks proposing that the driving energies of industrial capitalism are replaced by knowledge. Nevertheless, it is also the concept that was criticised the most. Partly, this criticism was already mentioned in section 2.2.1. Yet, some of the critics shall be discussed here separately.

After having developed his argument in several journal articles (Kumar, 1976), Krishan Kumar in 1978 publishes his book "Prophecy and Progress: The Sociology of Industrial and Post-Industrial Society", which scrutinises the concept of Bell's 'post-industrial society'. Kumar reviews several 19th century theories on industrialism (Dürkheim, Marx, Weber), as well as some 20th century theorists subscribing to Bell's post-industrial society (Bell, Galbraith, Touraine). He argues that post-industrialism is merely a culmination of the most fundamental forces underlying industrialism itself. He disagrees with Bell's statement that it is a radically different development stage, but argues that industrialism and post-industrialism as theoretical ideas both go back to the late 18th century enlightenment period. Kumar identifies St. Simon's theory on industrialism as encompassing all central aspects of 'post-industrialism'. In this theory, St. Simon points to the rising hegemony of science and rational thought after the breakdown of the feudal order and increasing industrial growth. He argues that the power of religion declines, while the influence of scientists rises and is even further culminated by joining with the classes of merchants and industrial entrepreneurs. The image drawn, of production being increasingly based on theoretical knowledge, illustrates – according to Kumar – that the theoretical ideas of industrialism and post-industrialism are if not the same, at least a continuum of another but no radical discontinuum or revolutionary change. His final thesis is, that post-industrialism is the full maturation of industrialism which is defined by full rationalisation of the work-force and the concentration of power with the industrial class. This is supported by professionals and the keepers of scientific and managerial knowledge. Kumar does not suggest a different term to describe this matured stage of industrialism that Bell names 'post-industrialism', but merely leaves it as what it is according to his argumentation: nothing else than the mature state of industrialism.

Besides Kumar, many other authors such as Webster (1995) and Steinbicker (2001) criticised Bell's concept of the 'post-industrial society'.

Most of them nevertheless chose to group their criticism under the term 'information society' rather than 'knowledge society'.

Furthermore, Stehr (1994) refers to Bell's theorem in detail and actually ascribes to Bell's argument that knowledge emerges as the axial principle in post-industrial or what Stehr calls 'knowledge society'. Nevertheless, Stehr (1994: 122) formulates the aim to draw a theory on the anatomy of contemporary society and argues that society's transformation into a 'knowledge society' goes hand in hand with a radical transformation in the structure of the economy. He states: "The most common denominator of the changes (…) seems to be a shift from an economy driven (…) by 'material' inputs (…) to an economy (…) determined much more by 'symbolic' or 'knowledge-based' inputs and outputs" (1994: 123). According to Stehr, in economic terms, scientific knowledge has taken its place as the most important factor of production passing capital, land and labour. Hence, knowledge "has become the crucial source of (added) value" (1994: 8), restructures social stratification, newly identifies the role of institutions, the ruling class and the relationships between social actors such as institutions and civilians. Stehr concludes, that 'knowledge societies' are indeterminate and flexible networks that empower the individual rather than alienate them from each other (1994: 16). Seeing the critical downside of these transformations, he emphasises that the transition from an industrial to a 'knowledge society' is coupled with serious problems, such as unemployment and the fragmentation of social life (1994: 262). Nevertheless, Stehr does not succeed in actually developing an all-embracing theory of 'knowledge society'. Additionally, his reasons for the term 'knowledge society' and why scientific knowledge, not any kind of knowledge, emerges as the defining characteristic of 'knowledge societies' – as discussed in section 2.1.1 – are rather unsatisfying. Furthermore, he does not discuss the societal consequences resulting from the emergence of scientific knowledge to the prime denominator of economic and social development. Stehr argues that knowledge actually replaces physical labour in the production process. But he does fails to offer empirical proof. The reader is left with a rather diffused and blurred image of something called 'knowledge society'.

Similarly to Stehr and Böhme, the sociologist Helmut Willke contributes to the primary as well as secondary phase of construction. His theoretical ideas on the role of independent, decentralised knowledge production as well as his thoughts on organised knowledge work state a clear primary contribution to constructing the concept 'knowledge society', as discussed in section 2.1.1 (Willke, 1998, 1999). Nevertheless, Willke does not draw a coherent

picture of the concept 'knowledge society' but rather focuses on several small aspects, such as the production of knowledge and its main producers.

As a member of the scientific community interested in the globalisation of the concept 'knowledge society' as well as the impact of increasing knowledge production and exchange on globalisation, Hans-Dieter Evers can be identified. He published a multitude of papers on the interplay of local and global knowledge, the role of epistemic cultures for an arising k-society and the attempts of Southeast Asian governments in constructing k-societies (Evers, 2000, 2002a, 2002b, 2003, 2005; Evers, et al, 2000, 2004; Evers/Menkhoff, 2003). Aiming to grasp the concept 'knowledge society', Evers attempts to define its distinctive characteristics (Evers, et al, 2000). Therefore, he repeatedly emphasises the distinction of local and global knowledge, pointing to the importance of assessing local definitions of knowledge in order to understand the divergent forms of k-societies. As major players, he identifies large organisations, experts and consultants (Evers/Menkhoff, 2003), as well as 'knowledge workers' (Evers, et al, 2000). Evers argues that universities no longer possess their near monopoly status of basic knowledge production but instead a triple helix of science-industry-university has emerged producing knowledge polycentrically. Based on this, he argues that every major player in k-society is required to create its own epistemic culture. In line with this, Evers regards the fostering of 'epistemic cultures' and 'milieus of knowledge construction' as increasingly important in order to succeed in a knowledge-driven globalisation (Evers, 2000, 2005). Here, Evers refers to Karin Knorr-Cetina who states: "A knowledge society is not simply a society of more experts, more technological gadgets, and more specialist interpretations. It is a society permeated with knowledge cultures, the whole set of structures and mechanisms that serve knowledge and unfold with its articulation" (Knorr-Cetina, 1999: 7-8). Although developing multiple interesting ideas on how to approach the concept 'knowledge society', Evers does not actually offer one stringent definition or theoretical concept of it. His various ideas and assessments of singled-out aspects of k-societies are nevertheless a rich contribution to the academic debate, less so with reference to Germany than to Asian constructions of k-societies. His works assessing the creation of k-societies in Malaysia, Singapore and Indonesia offer rich local details (Evers, 2002b; Evers, et al, 2004).

Very often scholars refer to k-society as a societal state lying one phase higher or further advanced than the 'industrial society'. This is also done by Jeanette Hofmann. She poetically states (2001: 3, translation by the author): "The time of smoking slots, mass production and monotone hand

labour is over; the future belongs to knowledge processing, intelligent and clean jobs. Hence, we are in the middle of a structural change which ends with the replacement of the industrial age by the knowledge society, just as once the industrial age superseded the agricultural society." Nevertheless, Hofmann also points to the usage of the term 'knowledge society' especially in the political sphere as a vision of a better future without specifying its exact meaning. In order to fill the term with substance, she concentrates in her work on copyrights and intellectual property right regulations. In November 2005, she is nominated as a group member representing the German civil society in the German government delegation on the UN-World Summit for the Information Society. Due to the civil society part of the government delegation has merely very limited decision making rights, the engagement might be more of a symbolic character. Nevertheless, Hofmann's as well as the whole German civil society's engagement in the two parts of the world summit clearly stands for a less technologically determined understanding of the societal changes discussed. This is expressed by using the term 'knowledge society' rather than 'information society' which is part of the title of the summit.[10] An international agent present on the world summit who clearly states its preference of the term 'knowledge society' rather than 'information society' is the UNESCO. The UNESCO clearly emphasises the importance of equal access to knowledge worldwide as well as the closing of the digital divide within and between societies. It therewith stands in for a rather egalitarian definition of a future world society. The UNESCO turns against the technologically-determined definition of an 'information society' heralded by the ITU which in many aspects represents the economic interests of the industrialised countries.

Overall one can state that the German scientific community is far more actively contributing towards the construction of k-society concepts in the secondary phase than in the primary phase. In the early 2000s, Hubert Knoblauch (2004, 2005; Tänzler/Knoblauch/Soeffner, 2006) points to the constructed character of k-societies. From the perspective of the sociology of knowledge, all societies are k-societies. Hence, Knoblauch probes into the reasons behind the sudden popularity of the terms 'knowledge society' and 'information society' (2004: 358). He looks back to the first publications in the political sphere using these terms and argues that the terms were politically instrumentalised for pushing state funding for ICT development (espe-

[10] Another member representing the German civil society on WSIS I and II is Rainer Kuhlen who – as discussed in section 4.2. –generally identifies information, not knowledge, as the defining element of the changes taking place.

cially by national militaries) as well as the building of the required technological infrastructures. For Knoblauch, the terms do not originate from the academic discourse surrounding them but were far more influenced and defined by the politics of national governments adopting them (2004: 360-361). The question was less how current society looks like but instead how it should look like in the future, which is inherent in the political discourse surrounding the terms (2005: 255/257). Hence, for Knoblauch the discussion concerning 'information or knowledge societies' in the political sphere represents the aim to construct social reality. This is further underlined in "Concerning the Criticism of the Knowledge Society" (*Zur Kritik der Wissensgesellschaft*) (Tänzler/Knoblauch/Soeffner, 2006). Here, the editors regard the idea of the 'knowledge society' as "one of the last great inventions of the social sciences" which caused some sensation also outside of the academic world (Tänzler/Knoblauch/Soeffner, 2006: 7). Unfortunately, Knoblauch supports his hypothesis merely with little empirical data, especially his argument that national militaries in many countries acted as main drivers for the formation of the political aim to construct k-societies. This book probes Knoblauch's hypothesis that k-societies are constructed by national governments as forms of social reality by providing and analysing the necessary empirical evidence.

In 2005, Hans-Dieter Kübler scrutinises the terminological usage and theoretical concepts 'information society' and 'knowledge society' in his book "Myth Knowledge Society" (Mythos Wissensgesellschaft). Kübler describes broadly the academic and political history of the concepts, concentrating on German and European politics. He ends with the question "'Knowledge Society' ante portas?" ('Knowledge Society' in front of our doors? – 'Knowledge Society' about to come?) and concludes, that 'knowledge society' is until now merely a myth constructed by academics, politicians and the media. In his opinion, it will be for several more years disregarding the fact whether it will actually ever become real or replaced by another term describing, while at the same time mythologizing, social change. As an overview on the emergence of the concepts, the book is very recommendable. Yet, it is not a satisfying analysis of 'knowledge society' as a myth as indicated by the title. While trying to scrutinise the concepts but lacking sufficient empirical data, Kübler contributes to their continuing existence lacking terminological and conceptual clarity.

In 2003, Heidenreich attempts to group the academic works of the 1960s and 70s on the concept 'knowledge society'. He identifies three assumptions forming the basis for the academic understanding of the concept (Heidenreich, 2003):

1. Expansion of public and private R&D-activities, which becomes the basis of the scientification of multiple industrial sectors (Lane, 1966);
2. Parallel to the expansion of the service sector and the increasing importance of theoretical knowledge, knowledge-based activities gain economic value (Bell, 1973; Machlup, 1962);
3. The occupational pattern is increasingly characterised by professional, academically qualified knowledge workers: With the expansion of the educational system and the service sector, the number of knowledge-based activities grows (Bell, 1973; Machlup, 1962).

Similarly to Evers et al (2000), Knorr-Cetina (1999) and Willke (1999), Heidenreich (2003) argues that the university and research sector have long lost their dominant position in society. According to him, all sectors in contemporary society – economy, technology, mass media and family (shown by increasing divorce rates) – emphasise and believe in innovation, not merely the university and research sector. Heidenreich groups and discusses the existing k-society-theories, while his own contribution to their clarification is limited.

A Technology-determined Society – 'Information Society'

From the 1980s onwards, multiple authors contributed to the further development of the concept 'information society'. Some of them heralded the emergence of an 'information society' and emphasised the theoretical ideas developed in the primary phase, while others scrutinised the construct, which even involved abandoning the concept or by illustrating its constructed character. Some of these authors and their works are illustrated in this section.

In 1988, David Lyon publishes his book "The Information Society: Issues and Illusions" in which he attempts to assess, up to what extent the forecasts of an arising 'information society' are actually true. In order to do so, he recalls several theories of primary authors. He distinguishes two main theses (1988: 17): (a) the popularised version seeing social change towards an 'information society' as a result of technological development; and (b) a more cautious and open-ended concept, using the term 'information society' as a problematic rather than a descriptive term. It is Lyon's aim to assess how the emergence of an 'information society' "is orchestrated, by whom, to what purpose and with what methods and effects" (1988: 20). Yet, Lyon also re-

gards the 'information society' as emerging, not as created and therewith contributes to the construction of the vision of a self-emerging k-society (discussed in chapter 6). The book ends with a discussion on the use of the concept in an ideological manner in order "to disguise the reality of powerful interests and beliefs at work within it" (1988: 19). He points to three prominent dangers in using the concept ideologically. *Firstly*, the existence or non-existence of access to information will split the world into half. The inequalities arising from it come with a potential for vast conflict. *Secondly*, these inequalities and potential conflicts are often related to unsolved contradictions. While, for example, information that became a commodity offers potential for trade, it at the same time poses problems for entities such as libraries, where information is made available freely. Furthermore, communication technologies bear great potential for worldwide cooperation and intercultural exchange, but it can be used for organising terror networks at the same time. *Thirdly*, the arrival of the 'information society' appears like a natural phenomenon – the outcome of progress in industrial societies. To Lyon, its consequences might be revolutionary, but its emergence seems natural. Lyon confronts some of the prime theories of the 'information society' with the realities which transpire in the political, economic and social arenas. Based on this, he finally concludes that the concept 'information society' is ideological as well as utopian in character, but nevertheless should not be abandoned. Instead, it should be used with four conclusions of Lyon in mind: (a) the process of 'informatising' poses questions concerning social, economic and cultural life that have to be discussed; (b) the development of ICTs is of social as well as technical relevance; (c) it has to be remembered that technological potential is not social destiny; and (d) ICT-policies should always also involve social analysis.

Lyon is one of the first critics, who scrutinises the prime theories on 'information society', points to the ideological character of the concept. However, he also subscribes to it. He argues that something like an 'information society' might emerge, yet, it can be influenced by the societies experiencing the change. He therefore calls for the social shaping of the k-society discourse.

Similarly to Lyon, Dordick and Wang in 1993 attempt to provide an appropriate estimate of reality compared to the forecasts heralding the 'information society' (1993: 7). Yet, they contrast from Lyon by not taking on his criticism of 'information society' used ideologically. Instead, Dordick and Wang focus on the current developments regarding information technology, 'information society' and 'information economy', the problem of statistical

measurement as well as the policies and infrastructure supporting these developments. Furthermore, they discuss changes in the work force and social changes caused by the increased usage of ICTs. Finally, Dordick and Wang discuss to which extent these developments have spilled over into less developed countries. While interesting, the work offers little analytical base to the existing primary theories, but mainly descriptive analyses of reality.

In 1995, Frank Webster publishes his book „Theories of the Information Society", in which he outlines and analyses several theoretical concepts of information and 'information society'. His selection includes Daniel Bell's concept of the 'post-industrial society', Anthony Gidden's thoughts on information, the nation state and surveillances, Herbert Schiller's theory on information and advanced capitalism, Jürgen Habermas' writings on the decline of the public sphere, Fordism, Postmodernism and Manuel Castells on information and urban change. Webster's intention is clear: to analyse various concepts of contemporary society that differ widely but, at the same time subscribe to the idea of information taking on a key position in the modern era (1995: 2). Satisfactory reasons for drawing the arena of prime theorists as done by Webster are not given. This leaves the reader with the impression that several highly divergent theories with little commonalities are assessed. Each theory is outlined, its contribution towards an understanding of information assessed, as well as its theoretical and empirical strengths and weaknesses in comparison to other theories discussed. Webster does nevertheless sort the discussed scholars into two groups: (a) those who proclaim the emergence of a new type of society (eg. Bell, Castells, Baudrillard etc.); and (b) those who emphasise continuities (eg. Schiller, Harvey, Giddens, Habermas, Garnham etc.). Webster himself doubts the accuracy of the concept 'information society' since it is – according to him – based on a multitude of suppositions about what has, is or will be changing. As one aim of the book, he clearly states the need "to shake at least some of the presumptions of those who subscribe to the notion of the arrival of a novel 'information society'" (1995: 4). All assessed scholars subscribe to the belief that information is of increasing importance and cause of social change. Yet, the ways they analyse and explain this differs widely. After discussing each theoretical work, Webster concludes to be drawn towards the works of Schiller, Habermas and Giddens. He gives the following reasons (1995: 216-217): (a) their works stand up to empirical scrutiny, and (b) the conviction of all three that informatisation of life has been an ongoing process since centuries but has heavily increased in the past years. Hence, informatisation of life has to be accounted as historical antecedents and continuities. Webster criticises a too strong fo-

cus on change by stating that it might lead to constant analyses attempting to prove the rise of a new form of society, such as an 'information society'. Hence, analyses become biased and arguments easily become deterministic in character (1995: 218). Webster implicitly, but not explicitly, points to the possibility of k-societies being constructed, as argued in this book. The strong emphasis on technological development as a prime vehicle of social change can – according to Webster – lead to a misconception of social change by de-socialising key elements of it. The assumption, that a new form of society arises, blinds scholars convinced of this idea and causes them to merely seek phenomena that might characterise the new order. The analyses follow the idea rather than the observation of social phenomena of change shapes the idea. Webster's work has to be regarded as a great contribution to scrutinising the concept 'information society' on the whole. Nevertheless, his analyses regarding specific theories sometimes seem to be too focused on criticising any theory that argues in favour of an arising 'information society'. Webster does not offer a satisfactory explanation for his choice of assessed theories. His five groupings of analytical definitions of an 'information society' (technological, economic, occupational, spatial and cultural) appear slightly forced onto the assessed theories. While the technological, economic and occupational categories are satisfactorily argued for, the spatial and cultural groups could also be merged with the former three. Overall, it is surprising that Webster takes on the term 'information society' in the title of his book, while he himself does not subscribe to the idea of such a society.

Jochen Steinbicker, in 2001, publishes his book "Regarding the Theory of the Information Society" (*Zur Theorie der Informationsgesellschaft*) in which he discusses the works of Drucker, Bell and Castells contributing to the primary phase of constructing k-society concepts by drawing different images of an 'information, knowledge, networked or post-industrial society'. Steinbicker reasons for selecting these three authors and their theoretical concepts for in-depth analysis by identifying them as the three primary theorists who developed comprehensive and independent concepts. Theorists such as Stehr, Willke, as well as Touraine could – according to Steinbicker – *first*, not defend their ideas comprehensively enough against criticism and *second*, their conceptual ideas rely heavily on the works of these three primary theorists (Steinbicker, 2001: 19-20). Steinbicker first outlines the main theses of each of the three analysed concepts before scrutinising them.

Concerning Drucker's concept of 'knowledge society', Steinbicker points to its economic and highly functional focus which radically reduces the role of politics and culture in his analysis. Yet, Steinbicker accepts this focus

and states that Drucker's concept is "the vision of shaping the future – and the society – through management" (Steinbicker, 2001: 44). Hence, the management is regarded as playing a distinctive role in the social changes assessed. Steinbicker's criticism is outlined in detail section 2.1.3. With regard to Daniel Bell, Steinbicker stresses, that Bell after first developing his rather powerful theoretical concept of the 'post-industrial society', also turns to the concept of the 'information society' in the 1970s. Nevertheless, his ideas regarding the 'information society' never reached the analytic as well as empirical depth as the theory of the 'post-industrial society'. Overall, Bell's concept of the 'post-industrial society' was heavily discussed by a multitude of secondary authors (Steinbicker, 2001: 70) and some of their criticism is outlined in section 2.1.1. One very general question is whether the tendencies observed by Bell – especially the growth of the service sector and the increasing importance of knowledge – in fact pose a significant change from industrial to 'post-industrial society'. Furthermore, what is often criticised is the incomplete outline of central aspects of his book. As examples can be mentioned, the transmission from the production of goods to the production of services, the central position of knowledge and the rise of a knowledge-based class structure (Steinbicker, 2001: 70-71). Despite all criticism, Steinbicker points out that many topics addressed and questions posed by Bell – not so much his answers – are valid until today. Problems such as the bureaucratizsation of the scientific community, the growth of the service and information sector as well as knowledge-based industries, the economic importance of public R&D-spending and the redefinition of the role of universities and tertiary educational institutions remain until today unanswered. Steinbicker concludes that neither Bell's concepts of the 'post-industrial society' nor his concept of the 'information society' offer a comprehensive theory. Yet, he offers a framework of interrelated, until today relevant problems that point to important aspects for a theory of an 'information society' (2001: 77). Steinbicker discusses Castells theory of the 'informational society' by calling it the most comprehensive and richest description of the 'information society'. Nevertheless, he criticises the gap between the theoretical model and the empirical basis. The richness of the empirical analysis is not counterbalanced by the analytical model of structural change.

Steinbicker ends his work by comparing all three approaches. He concludes that a synthesis of all three would be best for the development of a theory of an 'information society'. As a common basis, Steinbicker identifies a structural common ground which is expressed in two aspects: (a) the new means of productivity that are expressed in the organisational structure, work

processes and changes in the academic system, as well as in the relationship between scientific community, state and economy; and (b) the transformation of labour and work relations. For Drucker, this is the inner contradiction of 'knowledge work'. For Bell, the central characterisation of the 'post-industrial society' typifies work/labour as the 'play between humans'. For Castells, the work conditions lever through the changes in the social structure that affect society. These aspects are not considered as most important by the authors themselves, but – according to Steinbicker – pose a possibility for connecting all three approaches towards forming a theory of the 'information society', backed by an empirical analysis. Concerning Castells' concept, this empirical analysis could focus on the interplay of technological development, economy, state and research as well as the institutional structures evolving. An empirical assessment of the transformation of work conditions should include (a) the thesis of structural change concerning work conditions; (b) the analysis of the gap between 'knowledge workers' and lower qualified workers as pointed out by Drucker and Castells; (c) the relation between 'knowledge work' and organisations as well as the meaning of hierarchy and control in the work process; and (d) the social relevance of structural change concerning work conditions. Based on this, Steinbicker aims to work towards a theoretical model of the 'information society'. Yet, he leaves the reader with this outlook without developing the theoretical model mentioned.

In line with Webster's criticism of technological determinism underlying many analyses of the 'information society', Armand Mattelart (2003) subscribes to the idea of change being caused by technological developments taking place. Yet, Mattelart goes one step further by assessing the magnitude of which this technological development is the result of geopolitical interests. He finally argues that the idea of a global 'information society' is a construction that releases symbolic powers while at the same time used to legitimise political activities. It is a construct which is used for geopolitical and economic interests. This book offers empirical data for Mattelart's argument (chapters 6, 8 and 9). Mattelart sees the roots of the idea of an 'information society' in the time of the Cold War when it was developed based on the idea of the end of ideologies. The term 'information society' develops due to the invention of the intelligent machines built during World War II. From the 1960s onwards, it emerges as academic, political and economic aim. Besides the belief in the power of technological development – according to Mattelart – the utopia of the "library of Babylon", the idea of a place where all books and all existing human knowledge is saved spurs the 'information society' idea. The combination of (a) the belief in technology and technological proc-

ess as well as (b) the idea of a sanctuary of all human knowledge buids the ideological foundation of the term 'information society'. Aiming at the genealogical deconstruction of the term 'information society', Mattelart takes a geopolitical perspective and goes back in time, outlines the development of informatic machines, the academic debates on post-industrialism and its impacts on the national politics of Japan, France and the USA as well as the spread of the concept into international politics. In his last chapter, Mattelart focuses on the potential geopolitical effects of a global 'information society'. Here, he discusses the role of information and ICTs in a uni-polar world, divided by a digital divide, its diplomatic, military as well as developmental implications.

Mattelart (2003: 141) heavily criticises the discourse surrounding 'information society' by pointing to its economic-technological determinism which announces everything as out of date and generates a form of modernity without memory, ignoring all social concerns. He sees the "old demons of anti-intellectual populism" re-surfacing in a time during which any form of not-shared positivism towards societal change is regarded as technophobia or antimodernism. He criticises Drucker, for drawing an ideal of modernity that basically is nothing else than a westernisation of the world under a different image, the vision of a global 'information society' (2003: 142). Yet, different types of 'information societies' and different forms of modernities are not allowed. Here, Mattelart's criticism shows clear parallels to Eisenstadt's paradigm of multiple modernities, although Mattelart does not refer to it, but states that the global 'information society', as constructed by academics, economics and politicians, reflects the ethnocentrism of imperial times. Instead, the technology merely shifts the problem, rather than solving it. The question, how to conceptualise and implement different models of development remains unanswered and is forgotten due to the enthusiasm heralded by the 'information society' discourse.

Mattelart goes – historically as well as analytically – far back in order to analyse the origin of the construct 'information society'. From there, he passes the academic and political discourses on it broadly and without in-depth detail, in order to move on to his actual interest: the geopolitical consequences of a global 'information society'. The book offers a very critical line of thought on the concept, closely along the lines of political and geopolitical reality. It does – in contrast to Webster or Steinbicker – not discuss the theoretical works contributing to the primary phase of conceptual construction in great detail, but rather focuses on the origin and consequences of the discourse and the creation of 'information society' in reality. He attempts to

grasp the concept's ideological and legitimising power for structuring geopolitics of the future and as such, offers a line of thought that is worth reading.[11]

Overall, the term as well as the concept 'information society' entered the political sphere more rapidly than the more academic term 'knowledge society'. One reason might be its technological connotation, emphasising the importance of ICTs and their infrastructure, which emerged as a political focal point in many countries from the 1980s onwards. The concept was therefore quite strongly used but at the same time constructed as a vision of a self-emerging k-society and as stage of development by the political sphere, as will be illustrated in chapters 6 to 9.

A 'Knowledge-based Economy' – KBE

The concept 'knowledge-based economy' was developed by theorists as outlined in section 2.2.3. These members of the scientific community did not clearly refer to the term 'knowledge-based economy' but concentrated their work on the economic changes taking place. Yet, the main construction of the term 'knowledge-based economy' took place actually in the sphere of international politics, international organisations and think tanks, from where it triggered down to national politics. In national politics, it was locally defined and constructed further. After being mainly constructed in the political sphere, the term re-entered the academic sphere. In comparison to the terms 'knowledge society' and 'information society', the term 'KBE' was therefore less constructed in the academic sphere, but mainly developed by international political organisations. This is outlined in the following.

Since the beginning of the 1990s, the concept of the 'knowledge-based economy' is becoming increasingly (cyclically dependent) popular in the political sphere. Multinational organisations such as the Organisation of Economic Cooperation and Development (OECD) as well as the Association of South-East Asian Nations (ASEAN) choose to speak in some papers of a

[11] Besides the here mentioned secondary theorists, many more contributed to the construction of the concept. These include authors such as Uwe Bittlingmayer (2005); A.E. Cawkell (1987), Wilson P. Dizard (1982), John Feather (1998), Nicholas Garnham (2002), Karamjit S. Gill (1996), Leah A. Lievrouw/Sonia Livingstone (2002), William J. Martin (1995), Dorothy I. Riddle (1988) and Frederick Williams (1982, 1991).

'knowledge-based economy', rather than 'knowledge society' or 'information society'. Yet, in other publications the organisations use terms such as 'information economy' or 'knowledge society', so that a consistency in terminology cannot be observed. Nevertheless, the use of the term 'knowledge-based economy' is adopted by some national governments and as such further spread. As outlined in chapter 7, Singapore's government for example shows a clear preference towards the usage of the term 'knowledge-based economy' rather than 'information society' or 'knowledge society'. In 1996, OECD defines in its paper "The Knowledge-based Economy in 1996: Science, Technology and Industry Outlook" the 'knowledge-based economy' by emphasising the importance of knowledge as "the driver of productivity and economic growth leading to a new focus on the role of information, technology and learning in economic performance" (1996a). In another article published by OECD in the same year, the origin of the term 'knowledge-based economy' is seen in the "fuller recognition of the role of knowledge and technology in economic growth" (1996b). The 'knowledge-based economy' is here regarded as naturally emerging. This description of the 'knowledge-based economy' contributes to the construction of the vision of a self-emerging k-society. OECD observes this emergence by assessing changes in the economy. Indicators of this emergence are: (a) the strongest expansion of output and employment in high-technology industries such as computers, electronics and aerospace; and (b) the rapid growth of knowledge intensive service sectors such as education, communications and information. Based on this, OECD estimates in 1996 that more than 50% of GDP in the major OECD economies is knowledge-based (1996b: 9). The approach taken by OECD is similar – if not the same – to the approach taken by many other international and national organisations working in the sphere between politics and scientific community, such as international organisations, political foundations or think tanks. International examples include the World Bank, the United Nations Economic Commission for Europe (UNECE) and Development Gateway, although OECD can be identified as one of the main constructors of the concept. In the Asia-Pacific region, the Asia-Pacific Economic Cooperation (APEC) acts as a major secondary constructor which takes on the conceptual ideas of OECD. In its publication "Towards Knowledge-based Economies in APEC" (APEC, 2000), APEC defines the 'knowledge-based economy' as "an economy in which the production, distribution, and use of knowledge is the main driver of growth, wealth creation and employment across all industries." This definition is later also adopted by the Singaporean government, as stated by Toh (2002). The emergence of a 'knowledge-based economy' is not questioned by these organisations but merely assessed along

mainly economic indicators. By doing so, working with a concept and assessing it as reality without questioning its existence, the concept is constructed.

Following this usage of the term 'knowledge-based economy' in international and national politics, several academics adopt the term into their writings and therefore contribute to its further construction and spread. Yet, a clear differentiation from the terms 'information society' and 'knowledge society' is generally missing, which fosters the blurry character of the term. John H. Dunning, for example, in 2000 publishes the book "Regions, Globalisation and the Knowledge-Based Economy". This selection of articles covers the analytical as well as economic foundation of the concept, assesses its legitimacy in several country case studies and argues in favour of regional policies guiding the development into a 'knowledge-based economy' (Dunning, 2000). The assessment of the analytical foundations of the concept regards the concept as the result of factual economic and industrial geographic developments. The constructed character of the concept is not discussed.

Paul A. David and Dominique Foray refer in their paper "An Introduction to the Economy of the Knowledge society" to the conceptual work of the OECD in defining economic indicators of a 'knowledge-based economy'. Additionally, the authors stress the importance of ICTs as "instruments of knowledge" which in combination with innovations accelerate the development into 'knowledge-based economies' (2002: 11). The authors identify knowledge-based communities that produce new knowledge or decode tacit knowledge, as main drivers of change. The paper points to several questions posed by the described developments. These regard the 'knowledge-based economy's' demand for specific skills and abilities, the unequal access to knowledge and the role of intellectual property rights. The authors draw a circle to the concept 'knowledge society' by stating that the development of a 'knowledge-based economy' into a 'knowledge-based society' depends "on the proliferation of knowledge intensive communities" (2002: 21). These knowledge intensive communities are – according to David and Foray – characterised by their strong knowledge production and reproduction. Their existence and increased emergence is regarded as the precondition of a 'knowledge-based economy' developing into a 'knowledge society' (here the authors even use the term 'knowledge society'). This argument of David and Foray shows a clear parallel to Willke's and Gibbons' et al reasoning that 'knowledge societies' exist when knowledge production is decentralised in all parts of society. Yet, David and Foray do not refer to this line of thought but leave the reader with the conclusion that all issues discussed in their paper regarding the labour market, access to knowledge and the role of intellectual

property rights have to be answered before a 'knowledge society' rather than 'knowledge-based economy' can be developed. Overall, the paper merely highlights some thoughts on the concept 'knowledge-based economy'. Interestingly, the authors identify – just as this book – the work of the OECD as fundamental to the concept. The authors distinguish between 'knowledge-based economy' and 'knowledge society' and indirectly state that the 'knowledge society' is a higher state of society that can only be reached by first developing into a 'knowledge-based economy'. Here, the authors draw a circle between the different concepts as well as the actors constructing them. From the political sphere (OECD), the concept 'knowledge-based economy' returns into the academic sphere where it acts as basis for the conceptual idea of a 'knowledge society'.

In 2002, Lloyd and Payne assess a government debate in Great Britain which focuses on the building of a 'high skills future'. The authors point out that despite widespread use of terms such as 'knowledge economy', 'high skills society' and 'learning society' much confusion remains as to what exactly these various societies or economies are. In order to add some clarity to this debate, Lloyd and Payne redraw the "emergence" of the various visions and the actor groups behind each vision. The authors identify the following actor groups: "(a) government and 'social actors', (b) those writing from an educationalist background, and (c) those coming from a broadly industrial relations tradition" (2002: 1). In tandem to this book, Lloyd and Payne identify k-society-visions as accelerators for the creation of k-societies and name three main groups of actors. A brief overview on the k-society-visions mainly discussed in Great Britain is given and the possibility of constructing some type of k-society is acknowledged and emphasised. Yet, such a process of construction is regarded as laying far ahead in the future, while currently the visions surrounding the different k-society concepts merely offer "a watery whirlpool of idealism" (Rikowski, 1998 qtd. in Lloyd/Payne, 2002: 22). The constructed character of these visions is implicitly outlined.

Discussion

The academic works outlined above attempt to define the concepts 'knowledge society', 'information society' and 'knowledge-based economy' categorically by identifying the differing characteristics of each concept and grouping them in differently weighted categories. While this is done with great intensity, no comprehensive, generally accepted definition, characteris-

tics, and differences of each theoretical concept are offered. Instead, multiple widely varying definitions exist, subsumed under a manifold terminology. By using the same term for differing theoretical concepts or different terms for two similar or same concepts, the overall terminology used, lacks clarity. The members of the scientific community mentioned above did not succeed in offering one comprehensive definition of what k-society actually is.

Consequently, it is the aim of this book to contribute to the understanding of k-societies by assessing what they are defined as by the actors creating them. This is based on Berger and Luckmann's definition of knowledge, stating that knowledge is everything that is regarded as knowledge in and by society (Berger/Luckmann, 1984: 16). Hence, k-societies are as what they are defined by the actors creating them. It will become obvious in chapters 8 and 9 that the mode of defining k-society as well as the definitions of k-society inherent in the political programmes creating these k-societies, highly differ from the theoretical definitions outlined above. While the members of the scientific community constructing the theoretical concepts of k-society mainly define those categorically, the actors of the subsystem state who attempt to create k-societies as stages of development mainly define k-society procedurally, hence inherent in the programmes creating it. Following Berger and Luckmann's definition of knowledge, it is these political programmes creating k-societies that express what k-societies are, since the actors creating k-societies express their k-society definitions in the programmes launched.

This book furthermore argues in favour of the constructed character of k-societies and aims to provide the empirical proof for it with regard to Germany and Singapore. Each state, its government and administration – in cooperation with the remaining subsystems of society – defines and constructs k-society differently. Consequently, there is and will not be one theoretical k-society concept, but instead multiple, widely varying and differently labelled types of k-society. Each path to k-society depends on the structural realities (discussed in chapter 3) and locality-specific definitions of knowledge and information (discussed in chapter 4) prevalent in each country.

Merely few members of the scientific community mentioned above point to the constructed character of k-societies. Instead, most scholars assess and describe k-society as if it was simply emerging due to the development of ICTs, the growth of the service sector and the increasing economic importance of knowledge intensive industries. Merely, Lyon (1988, 1996), Webster (1995), Mattelart (2003), Knoblauch (2004, 2005), Kübler (2006), Tänzler/Knoblauch/Soeffner (2006) and Evers/Hornidge (2007) point to the aspect of k-societies being created by social actors and the ideological utilisa-

tion of the concepts in order to justify political action. Yet, this point is only peripherally argued and the empirical basis supporting this argument is small. The aspect of the existence of multiple, highly varying and locality-specific types of k-societies in various countries was merely briefly mentioned by Mattelart.

The general idea of a self-emerging k-society developed by the scientific community as well as the academic k-society terminology (discussed in this chapter) entered the national politics of many countries. The picture of k-societies being self-emerging as well as the assessed lack of terminological clarity provide a fertile ground for the construction of a vision of a self-emerging k-society. This was also assessed by the national politics in Germany and Singapore, both of which made use of it and constructed this vision of a self-emerging k-society (outlined in chapter 6). This vision was – and still is – used to legitimise the political programmes creating k-societies as forms of reality and therewith is constructed and spread further. The manifold academic k-society terminology was adopted by the political sphere and contributes to a rather vague language concerning what shall be created (discussed in chapter 7). Yet, the academic concepts of k-society hardly influenced the k-society definitions in the political spheres, but instead k-society is redefined in the political programmes constructing it (discussed in chapters 8 and 9). Here, the uniquely German and Singaporean k-societies are defined very precisely, inherent in the programmes creating them.

The multiple categorical definitions of k-society concepts outlined above highly differ from the types of k-society actually created in Germany and Singapore. Although in both countries the involved social actors in interviews with the author regard 'knowledge society' as a state of societal development that should be longed for, the political action plans conceptualised and implemented by these social actors mainly focus on the development of ICT and ICT infrastructure as well as on economically viable R&D. Hence, the types of k-society that are actually created show hardly any similarities to the theoretical concept 'knowledge society' which emphasises the knowledge production, dissemination and utilisation by every citizen. But instead the k-societies created far more appear to be 'ICT-economies' and 'ICT-societies'. But before focussing on the construction of k-societies in the political sphere, the countries of comparison, their structural realities and dominant definitions of knowledge shall be introduced to the reader.

Chapter 3

Introduction into the Countries of Investigation

Analysing the role of the state in the process of constructing k-societies, I chose one very federal political system – Germany – with its decentralised structure fostering a wide multitude of differently poled state actors; as well as one centralised city-state – Singapore – where the state strongly influences political, societal and economic change. This chapter offers a broad introduction into the countries of investigation – Germany and Singapore – which is necessary for a comparative analysis. Within this broad sketch, the structural realities of each country, which influence the construction processes of k-societies are mentioned. I will, nevertheless, return to the most relevant structural realities as well as their influence on the country-specific definitions and paths to k-society in more detail later on in this book. Based on the statements of my interview partners, the following can be identified as main structural differences between the two countries: (a) size of population and land; (b) type of political system, backed by its legal infrastructure; (c) central versus federal structure; (d) historical experiences; (e) maturity level of economy; (f) degree of economic exposure to the world economy; (g) tradition of R&D; (h) tradition of the educational system; (i) level of civil organisation; as well as (j) model of functional differentiation with structures of decision-making between state and remaining subsystems of society.

Many aspects in this chapter will be common knowledge to readers from each particular country, but possibly new information with regard to the other country.

Germany

Geographic Setting

Diagram 3-1: Map of Germany

The Federal Republic of Germany is located in the centre of Europe with borders to Austria, Belgium, Czech Republic, Denmark, France, Luxembourg, Netherlands, Poland and Switzerland. The federal state system consists of 16 states. The federal government is located in the capital city of Berlin. On Germany's 357,031 km² land mass live 82.5 m inhabitants and the official language is German.

Government and Politics

After the Second World War, the four winning powers – United States, USSR, England and France – implemented two different political systems in Germany. While West Germany (formally known as the Federal Republic of Germany) has been a democratic-parliamentary federal state system since 23 May 1949, East Germany experienced a socialist-communist dictatorship with the German Democratic Republic formed on 7 October 1949 (Schäfers, 1981: 108).[1] Since the re-unification of West and East Germany on 3 October 1990, the political system of the whole of Germany is the democratic-parliamentary federal state system implemented by the western winning powers in 1949 (DBt, 1996: 314-316; Görtemaker, 2002: 28-37; Müller, 2002: 329-331; Schäfers, 1981: 40-46).[2] Today's constitution of Germany is the basic law (*Grundgesetz*). The federal parliament is called the *Bundestag* with 669 seats and is elected by the people (all citizens of minimum 18 years of age) every four years. Besides the *Bundestag*, the *Bundesrat* contains 69 seats. The *Bundesrat* represents the federal states (*Bundesländer*) and enacts, together with the *Bundestag,* the laws of the nation. Only the Federal President has the power to dissolve the *Bundestag* under exceptional circumstances (Müller, 2002: 331-332). The current Federal President, Dr. Horst Köhler, was elected on 4 May 2004 by the *Bundestag*. The head of government is the current Federal Chancellor, Angela Merkel, since the last election in September 2005, which saw the CDU/CSU and SPD coalition gain power. The Chancellor is appointed by the Federal President.

The German electoral system for voting the *Bundestag* is called the system of personalised proportional representation, which combines majority

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[1] The Soviet occupied zone of Germany, the German Democratic Republic, formed on 7 October 1949, was constitutionally being organised as a federation with 5 *Länder* and East-Berlin as capital. Yet, the federal structure was abolished in 1952 and the East German Länder were re-divided into fourteen 'districts'. When the GDR acceded to the Federal Republic in accordance with Article 23 of the constitution, it ceased to exist as an independent state with effect from 3 October 1990. Its former territory was reorganised in six states.

[2] Throughout its history, Germany has rarely had a centralist structure, apart from the period under Nazi dictatorship (1933-1945) and the one party system in the communist German Democratic Republic (1949-1990) in the east of Germany. Before the Nazi dictatorship, various forms of federal systems existed, such as the North German Confederation (1867-1871), the *Reich* (Empire; 1871-1918) or the Weimar Republic (1919-1933).

and proportional representation (Müller, 2002: 331-332). This system is generally applied in elections on the national as well as, with minor regional variations, on the state (municipal) level.[3] Each voter has two votes: the first vote (*Erststimme*) is given directly to one of the candidates in their respective constituency (election on a plurality basis). Therefore, one half (328) of all seats in the *Bundestag* is filled by representatives voted directly. The second vote (*Zweitstimme*) is given to one of the state lists (*Landesliste*) decided on by the parties. The remaining 328 seats in the *Bundestag* are then distributed among the parties in proportion to the number of second votes received. The *Bundesrat* is not elected by the people but is composed of members of the state governments or their representatives (each state has at least three, but not more than six votes depending on its population size). Since the first general election after the war and re-unification (DBt, 1996: 424-425) held in 1990, the landscape of the political parties in Germany has been structured mainly by six parties represented in the *Bundestag:* the Christian Democratic Union of Germany (CDU), the Social Democratic Party of Germany (SPD), the Free Democratic Party (FDP), the Christian Social Union (CSU), the Left Party (*Linkspartei*) (a union between the Party of Democratic Socialism (PDS) and the Union Left (WASG)) and the Alliance 90/The Greens.

In comparison to the structural realities in Singapore, there exists a major difference in the federalism in Germany. Germany's federal structure divides the functions of the state on a territorial basis between two independent political entities, the constituent states (*Bundesländer*) and the central state, the federation (*Bund*). The federation is significantly strengthened at the expense of the constituent states and is therefore called a unitary federal state. Constitutional law regulates the juxtaposition and interaction of two tiers, the horizontal one between legislature, executive and judicature, and the vertical one between the constituent states and the central state. It must ensure a complete distribution of responsibilities and powers, regulate financial relationships, provide for conflict management mechanisms, and establish other federalist rules (Herder-Lexikon Politik, 1995: 79). The distribution of responsibilities and powers immensely affects political planning, but also definitions of which knowledge is regarded as valuable. As such, it forms an important difference to Singapore in the construction of k-societies.

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[3] On the level of the 16 states (*Bundesländer*), very similar electoral rules structure the elections of the legislative bodies, usually called '*Landtag*' or, in the case of the city states, '*Bürgerschaft*' (Bremen and Hamburg) or '*Abgeordnetenhaus*' (Berlin).

Economy

The German constitution does not prescribe a certain economic system but excludes a purely free market economy by insisting on adherence to the principle of a welfare state. The present economic concept in Germany is often called the 'social market economy' (*Soziale Marktwirtschaft*) (Müller, 2002: 349-350; Schäfers, 1981: 110, 142). Hence, the German government provides an extensive array of social services and intervenes in the economy through the provision of subsidies to selected sectors. As outlined in the collective labour law, the social partnership of labour unions and employer associations structures the labour market. It is the institutionalised way of settling conflict, negotiating wages and working conditions.

From the currency reform in 1948 onwards, West Germany experienced almost continuous economic growth until the early 1970s. From the mid 1970s until the early 1980s, real GDP growth declined, hit by a recession. In the mid 1980s, economic growth increased again but was ended by a downturn in 1992. Since then, Germany's annual average real growth rate ranges around 1.5% with high unemployment above 9%. Despite some structural reforms of the social security system, summarised under the name Agenda 2010, GDP growth rate for 2004 is – according to the federal government portal deutschland.de – estimated at around 1.7%. The GDP in 2004 amounted to €2,178.20 billion. This stands for a GDP per capita in 2004 of €26,400. According to the Federal Employment Office of Germany, the unemployment rate amounts to 10.5% in August 2006 (Statistisches Bundesamt Deutschland, 2006a).

Traditionally, the German economy relies on a major export share. Exports in 2004 amounted to €731 billion, imports to €575.4 billion. Major export goods are cars and car parts, machines, as well as chemical products. Nevertheless, the main economic sectors of Germany have shifted their importance over the past few years. As in many industrialised countries, the service sector, but also IT, biotech, renewable energy and environmental protection, have become considerably more relevant. Sector-specific shares of the GDP are – according to the Federal Office of Statistics – as follows: services 69.8%, economy and construction 29% and agriculture 1.2% (Statistisches Bundesamt Deutschland, 2006b). Consequently, it can be assessed that the maturity level as well as the degree of exposure to the world economy is rather high. According to the Federal Ministry of Foreign Affairs, approximately 90.000 additional jobs have been created in sectors involving intensive research and in the knowledge intensive service sector approxi-

mately 1.46 million jobs since 1997. It also results in an increase of German patent applications at the European Patent Office. In 2003, the overall number of German applications exceeded 22,701, which corresponds to 19.47% of all applications. In the field of infrastructure development, the government has restructured the railroad system on a corporate basis and is privatising the national airline, telecommunications, and postal service (Auswärtiges Amt, 2005).

Education and Research

Germany looks back on a long tradition of education and research. The cultural, educational and academic system is until today structured by the legal measurements implemented by the western allies after World War II. *Firstly*, the German constitution guarantees freedom of self-expression, of teaching and research, as well as in the choice of profession, training, and workplace (Schäfers, 1981: 109/110). *Secondly*, education, science and research are under the right – as well as financial responsibility – of the states, not the federal government (Schäfers, 1981: 219).[4] The federal government can influence these areas merely in cooperation with the states which takes place in the Commission of the Central Government and the Federal States for Education Planning and Research Support. Additionally, the states cooperate with each other in the Standing Conference of the Ministers of Education and Cultural Affairs (Schäfers, 1981: 220).

Currently, 360 tertiary educational institutions exist in Germany[5], of which approximately 90 are universities (entitled to award doctorates) and

[4] An exception is the vocational training in the dual education system which is under the right of the federal government (Schäfers, 1981: 226/227). Approximately 65% of all school leavers each year learn an official trade in the German dual system of vocational training. Here, theoretical knowledge is gained in vocational schools as well as practical training, which takes place either at the workplace or in special training facilities. Furthermore, a change in the basic law in May 1969 (Art. 75 Section 1 Basic Law) gave some of the rights concerning the organisation of tertiary education (published in the Higher Education Act (*Hochschulrahmengesetz*)) as well as the financial support scheme for students to the federal government (Heinrich, 2003: 48-68, Vogel, 2000: 173-176).

[5] Details on the geographic locations and academic foci of the research institutions can be found in BMBF, 2006. For details on the primary and secondary school system as well as education for certain groups of society (e.g. adult education) see Auswärtiges Amt, 2005.

approximately 190 universities of applied sciences (*Fachhochschulen*). Most universities are public institutions financed by the states. Private universities (e.g. University of Witten-Herdecke) form an exception.[6] 263 of these 360 institutions of higher education are represented by the Association of Rectors and Presidents and other Higher Education Institutions (*Hochschulrektorenkonferenz*) as a body promoting mutual cooperation.

University education in Germany is based on Humboldt's theory of the unity of teaching and research i.e. that students are relatively early encouraged to conduct their own research. The research conducted in the institutions of higher education is used and conducted further by a vast number of public and private non-commercial organisations (Heinrich, 2003: 69-76, Vogel, 2000: 177-185).[7] These include *Max-Planck*-Foundation, *Fraunhofer*-Foundation, *Helmholtz*-Foundation and *Wilhelm-Leibnitz*-Foundation. Additionally, the federal government participates in large-scale European and international research projects, such as the European Organisation for Nuclear Research (CERN). The publicly and privately financed research is linked by the Working Group of Industrial Research Organisations (*Arbeitsgemeinschaft Industrieller Forschungsvereinigungen*). Central administrative body for the promotion of research at higher education institutions as well as state-financed research institutes is the German Research Council (*Deutsche Forschungsgemeinschaft*). It promotes research in all academic fields by financing research projects, cooperation between researchers and setting up research networks. Additionally, a multitude of scholarship and research foundations exist. As examples can be mentioned *Fritz-Thyssen*-Foundation, *Volkswagen*-Foundation, *Alexander-von-Humboldt*-Foundation as well as the political think tanks of the parties in the German *Bundestag*.[8]

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[6] Until today, students are generally not charged tuition fees for their first degree completed within a certain period of time. Tuition fees for second degrees and when exceeding a certain period of study are charged in some states since 2002.

[7] These are financed by the state and the federal government(s).

[8] *Konrad-Adenauer*-Foundation, *Friedrich-Ebert*-Foundation, *Hans-Seidel*-Foundation, *Friedrich-Naumann*-Foundation, *Heinrich-Böll*-Foundation and *Rosa-Luxembourg*-Foundation.

Society and Culture

The 82.5m inhabitants of Germany form a heterogeneous society including approximately 9% foreigners.[9] Practised religions are Christianity (66% - Catholics 33%, Protestants 33%), Islam (3%) and Judaism (0.1%).[10] The German society is – as common to a modern society – socially differentiated into social strata which are defined and hierarchised based on social indicators such as occupation, income, education and property. These indicators are achieved by performance and personal abilities rather than birth or ethnicity and determine the social status of each member of society (Schäfers, 1981: 54). Hence, high vertical mobility is assumed and possible. Besides its social differentiation, German society is functionally differentiated into independently acting subsystems, as argued by Luhmann (1984). Each of these subsystems of society fulfils its unique functions and by doing so contributes to the society as a whole. Luhmann identifies subsystems of society such as scientific community, politics, economy, education, religion, art and law.

This independently acting character of each subsystem is supported by the constitution (Article 5, Section 1), which guarantees freedom of speech, the press and generally accessible information. Censorship does not exist (Schäfers, 1981: 110). In June 2002, 23.2m newspaper copies were distributed daily; around 230 radio stations and on average, 30 TV channels are available to the public. The German news agency, Deutsche Presse-Agentur (dpa) is one of the biggest worldwide, ranking behind Reuters, the French agency Agence France Press (AFP) and the US Associated Press.

Most cultural affairs are under the responsibility of the states and municipalities. The constitution grants only limited influence to the federal government (Schäfers, 1981: 220). This very independent status of states and municipalities in their cultural politics results in a diverse cultural scene all over Germany. The German National Library (*Deutsche Bibliothek*), a federal institution, for example, has branches in Frankfurt/Main, Leipzig and Berlin. The Federal Records Office, whose headquarter is in Koblenz, has – amongst others – offices in Berlin, Potsdam, Freiburg and Bayreuth. The greatest concentration of media companies is found in Hamburg. The cities Cologne, Düsseldorf and Kassel are regarded as the centres for the modern fine arts.

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[9] According to the Federal Ministry of Foreign Affairs, in every sixth marriage, one of the partners has a foreign passport.

[10] The religious heterogeneity is backed by the constitution, guaranteeing freedom of faith, conscience and religious or ideological belief.

The most renowned theatres and museums are in Berlin, Dresden, Hildesheim, Frankfurt/Main, Cologne, Munich, Nuremberg and Stuttgart. The two most important literature archives are in Marbach and Weimar. Furthermore diverse cultural scenes have developed in small towns and districts. As an example, the region of the Ore Mountains (*Erzgebirge*) can be mentioned where the manufacturing of wooden handicrafts such as toys and Christmas decorations originates from.

Since 1982, the activities of cultural associations on the state level are overseen by the politically independent German Cultural Council. It acts as an umbrella organisation mainly on the national level and represents German cultural activities in and outside of Germany. Altogether, it represents more than 190 independent associations and establishments. Internationally, German culture is mainly represented by the Goethe-Institute, German Academic Exchange Service, Alexander-von-Humboldt-Foundation and the Institute for Foreign Relations.

Traditionally, German society is well organised in associations, churches, charitable and self-help groups, neighbourhood initiatives or other civil society groups. According to the Federal Ministry for Family, Seniors, Women and Youth (BMFSFJ), 36% of all Germans older than 14 years of age perform honorary roles and volunteer jobs for the community without receiving remuneration. A further 34% are active in clubs, associations and civil society groups without a volunteer position (BMFSFJ, 2004).[11]

With regard to the construction of a German k-society, the data collected for this book suggest that the communication between the state and the remaining subsystems engaged – economy, scientific community, civil society, media[12] – is characterised by a high level of independence and hierarchical equality. The channels of expressing the interests of one subsystem to the subsystem state (e.g. government commissions) are advisory, not decision-making in character. Whether the advice expressed by one subsystem is heard by the state and respected in its decisions is up to the state alone, just as the interests of the state can but do not have to be heard by the remaining subsystems if not communicated by law.[13]

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[11] An earlier survey of BMFSFJ yielded the result of 34% of all Germans older than 14 years of age being engaged as volunteers and 32% active in civil society groups without volunteer position (BMFSFJ, 2001), while acknowledging the methodologyical difficulties of assessing volunteer engagement (BMFSFJ, 2002: 26-27).

[12] Identified and discussed in chapter 5.

[13] This is outlined in detail in chapters 5 and 8.

Singapore

Geographic Setting

Diagram 3-2: Map of Singapore

The Republic of Singapore is an island wide city-state in the centre of Southeast Asia with sea borders to Malaysia and Indonesia. On its 699.0 km² land mass live 4.3 m inhabitants. The official languages are Malay, Chinese (Mandarin), Tamil and English. However, English is the language of administration and business. The generally spoken local dialect of English is called Singapore Colloquial English or Singlish.

Government and Politics

Singapore is – since its independence from the Malaysian Federation on 09 August 1965[14] – a republic with a parliamentary system of government based on the Westminster model. The head of state is the President, currently occupied by Sellapan Rama Nathan, who was elected on 01 September 1999 for a fixed term of 6 years by popular vote. The unicameral parliament is elected by popular vote every five years and consists of 84 seats plus up to nine nominated members. Voting has been compulsory since May 1959.[15] The parties in parliament are the governing People's Action Party (PAP), which occupies 82 seats, the Worker's Party (WP) which occupies one seat and the Singapore Democratic Alliance (SDA) which also occupies one seat. The cabinet, formed by all ministers and appointed by the President, is led by the Prime Minister, Lee Hsien Loong since 12 August 2004. Having been in power since independence, PAP has been accused over the years of taking harsh actions against opposition parties and redrawing electoral districts to one's favour (Quah, 2001: 296-314 and Yeo, 2002: 203-232).[16] Internationally, this resulted in the description of Singapore as a single-party-system, illiberal democracy, communitarianism or authoritarian system.

The created legal environment for Singaporean citizens is generally aimed at enforcing a disciplined society (Yap, 2000: 109). The media, including magazines, newspapers, movies and TV programmes are overseen by government censorship (Ooi, 2000: 183-188). Furthermore, homosexual intercourse, pornography, oral and anal sex are illegal. Punishments such as caning and execution as well as the death penalty for murder or drug trafficking exist. Nevertheless, one has to state that charges concerning offences such as homosexual intercourse, oral or anal sex hardly take place. In 2000, Gomez's book 'Self-Censorship. Singapore's Shame' moved the discussion of censorship into the public eye. He argues that the "practice of self-

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[14] Whether Singapore "gained independence" from the Malaysian Federation or whether it was expelled, depends on the personal view of every historian. Interesting references are: Lee, 1998: 495-510; Regnier, 1992: 50; Vasil, 2000: 2-14.

[15] The penalty for not voting is an administrative fee of SGD$5 to restore the non-voter's name on the electoral register (Quah, 2001: 323; Elections Department Singapore, 2006).

[16] Furthermore, there have been several civil suits by government leaders against the opposition for libel or slander. As such, J.B. Jeyaretnam, leader of the Worker's Party lost a series of court cases against members of the PAP and was declared bankrupt in 2001, disqualifying him from taking part in future elections (Jeyaretnam, 2000).

censorship" common to Singapore society is more effective than any form of legal censorship implemented by the government in fostering a rather obedient and stream-lined society (Gomez, 2000).

Economy

Singapore's economy can be described as a free-market economy, characterised by high competition, little or no corruption, stable prices and one of the highest per capita GDP in the world.[17] Similar to Germany, Singapore's economy heavily depends on exports, especially from the electronics and the manufacturing sector. With heavily export-oriented policies, Singapore's government developed the nation as one of the Asian Tigers from a less developed country after independence to an industrialised country today (Yap, 2000: 110). In 2004, the GDP at market prices amounted to SGD$ 180,554.4m. This stands for a GDP per capita of SGD$ 42,581.0. The annual GDP growth rate was 8.4% and the unemployment rate reached 4.3%. Exports and imports amounted in 2004 to SGD$ 303,476.3m, and SGD$ 276,894.1m respectively. According to the Department of Statistics of the Singaporean government (2005), major export goods are oil, crude materials, manufactured goods, machinery and transport equipment. Hence, the degree of economic exposure to the world economy is high, while the maturity level is characterised by rapid development from a less developed to an industrialised economy (Yap, 2000: 110).

Singapore's economy was badly hit by the global recession in 2001. In December 2001, the government set up the Economic Review Committee (ERC) concerned with "remaking" Singapore's economy and establishing a sustainable growth strategy for long-term development (ERC, 2003; The Remaking Singapore Committee, 2003). Part of this new economic strategy is the aim to increase local content development, local research and development in the fields of bio and life sciences, creative industries and high-tech development. Furthermore, Singapore aims to establish itself as a regional media and finance hub as well as an attractive tourist centre.

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[17] According to the World Development Report 1998/99, Singapore was the fourth richest country in the world in 1997 behind Switzerland, Japan and Norway (Worldbank, 1998/99: 190-191).

Education and Research

The educational system in Singapore is spear-headed by the Ministry of Education (MOE). It is in charge of the development and administration of public education institutions and acts as supervisor to private ones. The estimated educational budget in 2005 amounts to 20.8% of the overall government budget and is therefore very high in international comparison (MOF, 2005b). Acknowledging the multiethnic background of Singaporean society, it is compulsory to learn one so-called mother tongue (the language of the ethnic origin of the father: Mandarin, Malay, Tamil or English) and English from primary school onwards. The medium of instruction is generally English (Yap, 2000: 111).

Dissimilar to Germany, Singapore looks back on a rather short – but in the past two centuries intensely pushed – academic history. In 1823, Sir Stamford Raffles, the British founder of Singapore, suggested the establishment of the first college, providing educational and research facilities. Nevertheless, only in 1949 the University of Malaya with full-degree granting powers was founded as a union of the two until then established colleges (King Edward VII College of Medicine and Raffles College). In 1955, a second university, Nanyang University, was built from donations of the Chinese community. In 1980, these two universities were combined to form the National University of Singapore. Today, there are altogether 5 tertiary education institutions in Singapore and 2 more will be opened in the coming years (2006 and 2008). 4 of these 7 institutions are universities. Additionally, the Singaporean universities open their campuses to 9 worldwide renowned universities in order to conduct postgraduate courses in Singapore (e.g. Johns Hopkins Univeristy, Massachusetts Institute of Technology, Stanford University and the Technical University of Munich).

In the past, the Singaporean educational system has been criticised for explicitly focusing on certain subjects (maths & natural sciences), while neglecting the fostering of creative thinking, free, critical discussion, fine arts and social sciences. Reacting towards this criticism, the Ministry of Education rewrote the curricula (from primary to tertiary education), increasing the role of arts, music and social sciences as well as applied pedagogic processes to enhance the development of creativity.

Similarly to the tertiary education, R&D has a relatively short but intense tradition in Singapore. With the beginning of the 1980s, the government decided to put more emphasis on the local production of knowledge in

order to move up the value-chain and create a basis for long-term economic growth. In 1981, the first research institute outside the universities – Institute of Systems Science – was established under a partnership programme between the National University of Singapore and IBM. From 1984 to 2003, total R&D expenditure in Singapore increased from 0.54% to 2.15% of GDP (A*STAR, 2004: 26; Phillips/Yeung, 2003). Consequently, several more R&D-institutes were founded under the Singapore Science Council. In 1990, the Singapore Science Council became a statutory board of the government[18] and was renamed into National Science and Technology Board (NSTB). At the same time, R&D-activities in the universities heavily increased. In 2002, NSTB was renamed into The Agency for Science, Technology and Research (A*STAR) and its capacities and competencies were increased. Today, A*STAR oversees 12 research institutes, all working in the fields of science and engineering as well as biomedicine and life sciences and maintaining close ties to economic players. In contrast to this rapid development of economically viable R&D stands the much smaller amount of R&D in less economical profitable fields. As such, government financed R&D in the fields of social-, human sciences and arts, is merely conducted in the universities as well as the Institute of Southeast Asian Studies, a statutory board of the government under the Ministry of Information, Communications and the Arts (MICA).

Society and Culture

The 4.3m inhabitants of Singapore can be described as an amalgam of Chinese, Malay and Indian migrants, who were attracted by the British to come to Singapore as labourers in the port or on the plantations in Malaysia. Due to little interethnic marriages, the cultures of the various ethnic groups

[18] According to the Ministry of Trade and Industry (2005), statutory boards are semi-independent agencies that specialise in carrying out specific plans and policies of their parent ministry. Statutory boards are established by an act of parliament that specifies the purpose, rights, and powers of the body. Their activities are overseen by the cabinet minister of the parent ministry who represents the parliament to the board and the board to the parliament. Statutory boards are managed by a board of directors whose members include senior civil servants, businessmen and professionals. The chairman of the board of directors, usually a senior civil servant or Member of Parliament, is appointed by the cabinet minister who has jurisdiction over the board. According to the Ministry of Finance (2005a), most boards finance themselves by imposing charges on some or all of their services. Statutory boards that do not generate sufficient revenue to meet their expenses receive grants from the government.

are still practised side by side until today. The major ethnic groups are the Chinese (76.8%), Malays (13.9%), Indians (7.9%) as well as Eurasians and smaller minority groups (1.4%). The major religions practised are Buddhism, Taoism, Christianity, Islam and Hinduism. While orthodox religions are generally tolerated, all organisations, including religious congregations, have to be approved by the government, as regulated in the Societies Act.[19]

Similar to the German and most modern societies, the Singaporean society is socially differentiated into social strata which are defined and hierarchised based on social indicators such as occupation, income, education and property. These indicators – achievable by performance and personal abilities rather than birth or ethnicity – determine the social status of each member of society. As outlined by Chan and Evers (1978), the Singaporean government after independence aimed to construct a Singaporean culture, based on the values meritocracy, performance orientation, efficiency and pragmatism, which support high vertical mobility.

Besides its social differentiation, Singaporean society is functionally differentiated into subsystems, each of which fulfils its unique function. Nevertheless, the data collected for this book suggest that the functionally differentiated subsystems of Singapore society do not act as fully independent and hierarchically equal to each other, as argued by Luhmann (1984) in his theory on social systems. Instead, the boundaries between the subsystem state and the remaining subsystems of society appear slightly permeable. Due to the legal conditions restricting the freedom of the press and opinion, personal rights of the individual, as well as due to universities and research centres being statutory boards of the government rather than fully independent bodies, the subsystem state maintains a dominant position.[20]

Cultural activities in Singapore are overlooked by the Ministry of Information, Communications and the Arts (MICA) as well as its statutory boards. Along with the search in the mid 1990s for a long-term economic growth strategy and the increased fostering of creativity in schools, the arts, as well as museum, heritage preservation and library scene were regarded as fertile grounds for cultural depth to society. The following investments into arts and culture were therefore strongly based on the belief that they will – in the long run – indirectly contribute to GDP growth (MICA, 2005). Consequently, the number of associations engaged in cultural activities grew from 1999 to 2004 from 224 to 267. Furthermore, the library system was extended

[19] Jehovah's Witnesses, for example, are banned.
[20] This will be discussed in detail in chapter 5 and 9.

to 40 libraries, which are to become centres of discussion, knowledge exchange and social capital building (NLB, 2005).

While this extensive cultural infrastructure is hoped to foster the development of an energised civil society, the legal conditions hindering the development of bottom-up civil society groups remains.[21] Besides the Criminal Law (Temporary Provisions) Act and the Internal Security Act which allow the government to detain citizens without trial, laws such as the Societies Act, the Charities Act, the Public Entertainments Act and the Public Lotteries Act for raising public funds, the Newspaper and Printing Presses Act (for the licensing of newsletters) and the Penal Code for unlawful assembly, obscene or other speech subject to criminal sanction affect civil society development negatively (Ooi, 2000: 183-184).[22] Hence, in comparison to Germany, Singapore's society and the specifically Singaporean culture are younger, less civilly organised and more guided by the government (Gomez, 2000; Ibrahim, 2004; Izzuddin, 2003). Yet, increasingly more space is granted by the government to the people, for example by establishing libraries as centres of discussion. The future will show, up to what extent, all possible topics are allowed to be articulated in these centres of discussion. Change is slowly taking place and possibly a uniquely Singaporean civil society is developing under the auspices of its potential economic contribution.

With regard to the construction of a Singaporean k-society, the data collected for this book suggest that the communication between the state and the remaining engaged subsystems – economy, scientific community, civil society, media[23] – is characterised by the above mentioned dependence of the remaining subsystems from the subsystem state and the permeable boundaries between the state and the remaining subsystems. The channels of expressing the interests of one subsystem to the state (e.g. final reports of gov-

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[21] According to George, this discovery of the value of an energised civil society by the PAP government in the 1990s is ironic seeing that all civil society groups had been submitted under the authority of the state, for the previous three decades (George, 2000: 127-129).

[22] This ambivalent situation between supporting the arts, culture and a library scene that is supposed to foster social capital building as well as (on the other side) a rather restrictive legal infrastructure, might best be described out of the perspective of the people, as argued by George: "Most view civil society as just talk. They see government-erected walls everywhere and conclude that there is no way around them. But there are also civil society practitioners who spot the gaps – small though they may be – and run, walk or crawl through" (George, 2000: 128).

[23] Identified and discussed in chapter 5.

ernment commissions, boards of directors in statutory boards) allow the participation of selected members of this subsystem in political decision-making. Yet, in reverse, the state heavily influences the remaining subsystems in their decision-making (e.g. controls media, develops school curricular and decides on research foci of publicly financed R&D-institutes). Consequently, the subsystems of Singapore do not act fully independently but widely in accordance with the interests of the state.[24]

Discussion

The broad sketch above is the attempt to capture the main characteristics of the structural realities of Germany and Singapore. It is necessary for comparing the two widely varying societies. Yet, such an introduction into the structural realities of two countries can always only be limited in character. Hence, the sketch above leaves out important details and generalises where exceptions shape the norm. With this in mind, the above identifies ten aspects of the structural realities of Germany and Singapore that are of direct relevance to the country-specific definitions of knowledge which then again shapes the country-specific definitions of k-society as well as the paths taken to realise those. The structural realities that mainly influence the creation of k-societies in both countries were identified as: (a) difference in size of population and land; (b) type of political system, backed by its legal infrastructure; (c) central versus federal structure; (d) historical experiences; (e) maturity level of economy; (f) degree of economic exposure to the world economy; (g) tradition of R&D; (h) tradition of the educational system; (i) level of civil organisation; as well as (j) model of functional differentiation with structures of decision-making between state and remaining subsystems of society.

The Federal Republic of Germany is characterised by its federal, democratic political system, backed by a legal infrastructure that protects personal rights of the individual, allows for freedom of opinion, speech and the press. The protection of these rights is strengthened by the historical experiences under the Nazi regime and the communist system in East Germany. The economy rests on the foundations built during industrialisation but has constantly developed further and relies today heavily on the service and knowledge-producing sectors. As the biggest economy of the European Un-

[24] This is confirmed by the data collected for this book and illustrated in chapter 5 and 9.

ion, it is heavily exposed to the world economy. Germany looks back to a long tradition of R&D and higher education, the results of which have been main carriers of economic development until today. Having said this, the degree of absorbing R&D-outcomes by the economy and consequently yielding profit is often criticised as too low. The German society is highly organised in associations and volunteer activities. Furthermore, Germany's cultural scene is characterised by regional cultural centres specialised on the production of certain cultural goods and multiple, often politically coloured, subcultures. This is further enhanced by the fact that cultural, educational and information politics are under the right of the states rather than the federal government, which allows for a diverse discourse on these topics.[25] Furthermore, the high level of functional differentiation with independently acting subsystems and little mutual influence supports the creation of plural views on social reality, each shaped and fostered by one subsystem of society.[26]

The Republic of Singapore is characterised by its central, one-party democracy, backed by a legal infrastructure that strengthens the dominant position of the state in defining reality. As such, freedom of opinion, speech and the press are restricted. The historical experience of successful, rapid development from a less developed economy and newly formed nation state into an industrial country strengthens the position of the government. Furthermore, it can be held responsible for a strong focus on economic growth and efficiency of government action. Traditionally, Singapore's economy, centred around the port, has been heavily exposed to the world economy. The economic development experienced after gaining independence in 1965 built on these experiences in overseas trade and was further encouraged by the government with foreign investment-driven, export-oriented policies. In the late 1960s, Singapore's economy mainly comprised low-skill, labour-intensive manufacturing for export. This was followed by the steel and cotton industry, the chemical industry as well as the microchip and semi-conductor industry. Since the beginning of the 1990s, Singapore's government identified knowledge-based industries as future area of economic growth. This results in increasing investments into knowledge-producing sectors such as R&D, arts and design, which traditionally look back on a very short history in Singapore. Due to the short history of economic development, the maturity level of Singapore's economy cannot entirely be compared with Germany's. Nevertheless, the growth rates of Singapore's economy lie far above Germany's. Similar to the short tradition of R&D, Singapore's educational system is

[25] This is discussed in detail in chapter 4.
[26] This is discussed in detail in chapter 5.

rather young and its main task is the production of graduates who can easily be absorbed by the economy. The unity of education and research, argued for by Humboldt, is rather neglected. Also contrary to Germany is the low level of civil organisation. While people are frequently organised in neighbourhood groups (the formation of which is encouraged by the ruling party) voluntary engagement seems to be rather low. Furthermore, the model of functional differentiation, with close linkages and institutionalised forms of structural coupling between the state and the remaining subsystems of society, supports the dominant definition of the state in defining social reality. This almost singular view is shaped by the dominant subsystem, the state, but is spread and maintained by all subsystems of society.[27]

[27] This is discussed in detail in chapter 5.

Chapter 4

Definitions of Knowledge and Information

This book argues that k-societies are constructed as stages of social and economic development and are legitimised by a vision of a self-emerging k-society, which shall be monitored, guided and guarded. Yet, it is these programmes that actually construct this apparently self-emerging k-society as a form of social reality. The different, country-specific types of constructed k-societies nevertheless seem to depend on the structural realities and definitions of knowledge and information prevalent in each country.[1] In order to shed further light on this hypothesis, this chapter focuses on the definitions of knowledge and information prevalent in Germany and Singapore, i.e. which types of knowledge and information, together with their production and dissemination, are regarded as valuable and worthy of support.[2] This assessment is based on the locality-specific state-financed funding for research and development (R&D)[3], education and cultural activities (museums, libraries, etc.), as well as statements of interview partners.

The main question probes which knowledge – in terms of its production and dissemination – is primarily supported financially in both countries.

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[1] In 1962, for example, Machlup describes the country-specific understanding of knowledge in the United States by pointing to the "idiosyncrasy in favour of the immediately practical and against the general theoretical" (1962: 202). Lane, in 1966, picks this up and concludes: "The United States has been slow to recognise the importance of scientific knowledge (…). Although, in some ways, science grows out of technology, it is often the other way around; even in technology the United States in the 19th Century tended to lag behind Europe" (1966: 652).

[2] As illustrated in Appendix E and Appendix G, the private R&D funding traditionally exceeded the public and therefore certainly contributes to the prevailing definition of knowledge. Nevertheless, it does not influence the state definition of k-society, which is the focus of this book. Consequently, this chapter concentrates on the definition of knowledge framed by the national governments of Germany and Singapore and expressed in the public R&D funding. Private R&D funding is neglected in the analysis.

[3] As the main instruments of state-financed R&D-support, three categories can be identified: (a) direct support via state funding; (b) indirect support via tax reductions; as well as (c) the creation of a positive R&D-climate through policies, high technology acceptance and transfer, as well as an effective legal, financial and information infrastructure (Heinrich, 200376-85; Vogel, 2000: 139-154).

This includes (a) the different sectors of knowledge production and hence different knowledge areas (e.g. natural sciences, medicine, engineering, arts, fine arts, etc.); (b) the varying applicability of knowledge (basic and/or applied research)[4]; as well as (c) the range of knowledge areas (is the production of some knowledge forbidden?).

With regard to Singapore and Germany, and as I will show in this chapter, the definitions of knowledge and hence which types of k-societies are created, are heavily influenced by their respective structural realities.[5] In Germany, the definition of knowledge is strongly shaped by the decentralised organisation of the state, a well organised civil society, media and education being under the right of the states, high exposure of the economy to the regional and world economy, a long tradition of R&D and the educational system based on Humboldt's idea of the unity of teaching and research, as well as free speech, opinion and free press being assured in the constitution. Consequently, a sectorally wide range of basic and applied research is conducted, although the recession of the past years results in an increasing commercialisation of the decision as to which knowledge is produced and financially supported. In Singapore, the small size of population and land, the central organisation of the city state, its historical experiences after independence, the focus on manufacturing after independence in order to develop from a less developed to an industrial country, the short tradition of R&D and education as well as the one-party democratic system strengthened by a legal infrastructure that enables state intervention in free, critical speech, determine a definition of knowledge that strongly focuses on its economic profitability. Hence,

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[4] The Commission of the European Union defines 'basic research' as follows: "Basic research can be defined in a combining manner: by reference to its ultimate purpose (research carried out with the sole aim of increasing knowledge); its distance from application (research on the basic aspects of phenomena); or the time frame in which it is situated (research in a long-term perspective)" (2004c: 4). Applied research stands in opposition to basic research and is characterised by its intention to directly contribute to a certain application. It generally is regarded to directly contribute to the economy.

[5] As briefly outlined in chapter 3 the following could be identified as most relevant in the process of k-society construction: (a) difference in size of population and land; (b) aspect of centrally organised versus federal; (c) historical experiences; (d) maturity level of the economy; (e) degree of economic exposure to the world economy; (f) tradition of R&D; (g) tradition of the educational system; (h) the political system, backed by its legal infrastructure; (i) level of civil organisation; as well as (j) model of functional differentiation with structures of decision-making between state and remaining subsystems of society.

applied R&D in economically viable sectors is mainly conducted. Yet, the realisation that sustainable long-term development requires creativity that does not result from applied R&D in natural sciences and engineering causes a change of thinking in the past years.

The differences in who acts, outlined in chapter 5, are also reflected in the definition of what is considered as valuable knowledge. In Singapore, the state strongly influences the definition of knowledge, mainly based on the criterion of which knowledge might generate future economic growth. This is further strengthened by the legal infrastructure that restricts free speech and the press. In Germany, the decentralised organisation of the state determines that not only the federal, but also each state government (*Länder*) define independently which knowledge is regarded as valuable. This results in a multitude of differing views, the sum of which forms heterogeneous definitions of knowledge. In addition to the state in Germany, the civil society is highly organised in associations and non-governmental organisations that independently define which knowledge they regard as valuable.[6] In Singapore, the less organised civil society leaves more room for the state definition of knowledge to mushroom. The small city-state developed itself within half a century from a less developed into an industrialised country by engaging every citizen into activities directly contributing to economic growth. The subjects mainly taught in school are natural sciences and mathematics, while the conducted research is mainly applied, rather than basic research. In contrast to this, the federal republic of Germany spared time and money on subjects less directly contributing to economic growth such as the arts or fine arts as well as basic and applied research.

Nevertheless, in more recent times, these two overall developments are changing. While in Germany, the ongoing recession results in an increasing focus on directly paying-off knowledge, in Singapore the high level of economic development reached increasingly calls for local creativity and content production in order to assure further long-term growth. Hence, the definitions of knowledge in the two countries – traditionally highly divergent – seem to increasingly converge in recent times. The main difference, nevertheless, remains due to the differing legal infrastructures concerning free speech, opinion and the press.

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[6] Examples of groups representing directly opposing definitions of knowledge are abortion critics versus advocates, punks versus neo-nazis and advocates of renewable energies versus advocates of nuclear energy.

Knowledge in Germany

The history of German R&D-politics can be split into (a) the period of construction from 1800 to 1914; (b) the period of extension from 1914 to 1945; and (c) the period of reconstruction after 1945 (Vogel, 2000: 155-157). The period of construction was characterised by the establishing of a research infrastructure in order to keep up with England's industrial development. In 1810, Wilhelm von Humboldt developed his theory of the unity of teaching and research, emphasising the need for research as part of teaching.[7] In 1825, several polytechnic universities were founded and after the formation of the German Reich in 1871, public R&D funding was further increased (2000: 156).[8] During the period of extension, the two world wars affected the R&D politics by focusing on marine, aviation and weapon technology. From 1914 to 1945, research was highly weakened due to the migration and killing of approximately one third of Germany's university professors. After World War II, the phase of reconstruction was coined by the division of Germany. In West Germany, the western allies reconstructed the former R&D structure, rebuilt research institutions such as the *Fraunhofer* Society for Applied Sciences and re-established Germany's formerly decentralised political structure (Vogel, 2000: 157-159). Furthermore, the freedom of speech, opinion and press was assured in the constitution (Heinrich, 2003: 7-27) and education, research and media politics were assigned under the rights of the states. Slowly, West Germany regained its former competitiveness based on a strong state, as well as a privately-financed R&D backbone, diversifying its research portfolio and mutually enriching basic and applied research. The federal government took growing interest and responsibility in the field from the mid 1960s onwards. After re-unification of West and East Germany in 1990, R&D facilities in East Germany were reconstructed and the state governments regained some of their former competencies (Heinrich, 2003: 48-68; Vogel, 2000: 157).[9]

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[7] In 1810, the Humboldt University of Berlin is formed as the first German university following his theory. Humboldt's theory forms the basis of German university education until today.

[8] Germany as a nation increasingly defined itself by its performance in education and culture, represented by musicians (e.g. Bach, Mozart, Wagner), poets (e.g. Goethe, Schiller), philosophers (e.g. Kant, Hegel) and academics of many fields (Nida-Rümelin, 2005).

[9] A historical overview of the R&D-politics of Germany is outlined in Appendix D.

The following table illustrates the financial splitting between the federal government, state governments, municipalities and special-purpose associations referring to education, science and culture. The right to define which knowledge is regarded as valuable is distributed amongst the actor groups accordingly.

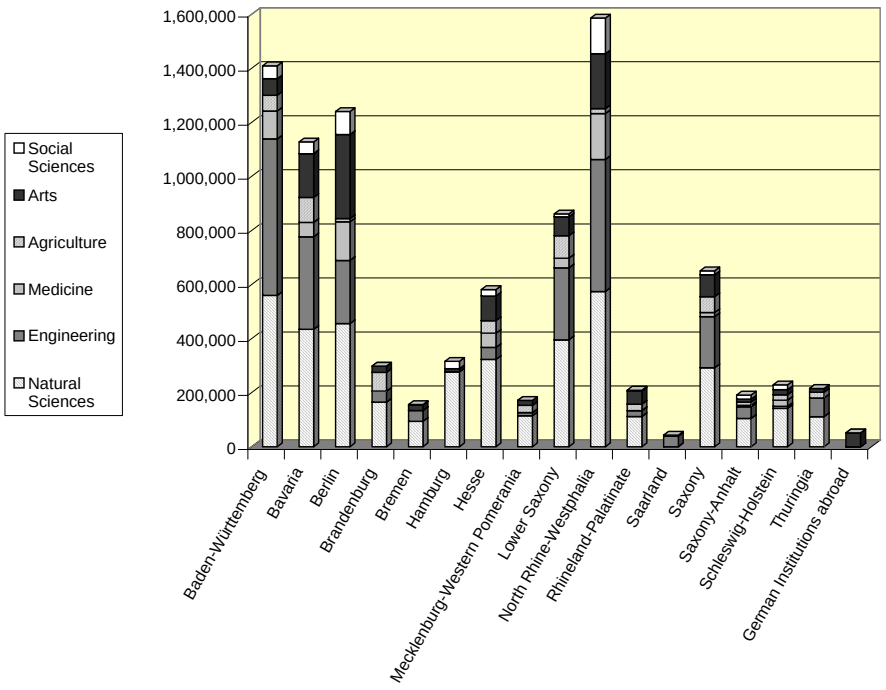
Table 4-1: Expenditure (Basic Funds) of Public Budgets on Education, Science and Culture

Central, regional and local authorities /sectors / indicators	2001 actual	2002 actual	2003 (preliminary, actual)	2004 (target)
by central, regional and local authorities – EUR m -				
Total	87 207	90 161	90 711	91 761
Federal government	10 178	10 530	10 547	11 534
States (*Länder*)	62 293	64 850	65 316	65 379
Communities and special-purpose associations	14 735	14 781	14 848	14 848
Indicators of education, science and culture, total				
EUR m	87 207	90 161	90 711	91 761
EUR per inhabitant	1 059.11	1 093.09	1 099.26	1 112.27
Shares in the public sector budget (%)	17.29	17.97	19.65	19.62
Shares in the gross domestic product (%)	4.20	4.28	4.26	4.21
Indicators of education				
EUR m	70 444	73 444	73 972	74 898
EUR per inhabitant	855.52	890.43	896.41	907.87
Shares in the public sector budget (%)	13.97	14.64	16.02	16.01
Shares in the gross domestic product (%)	3.40	3.49	3.48	3.44
Indicators of science and research outside institutions of higher education				
EUR m	9 342	9 233	9 354	9 506
EUR per inhabitant	113.46	111.94	113.36	115.22
Shares in the public sector budget (%)	1.85	1.84	2.03	2.03
Shares in the gross domestic product (%)	0.45	0.44	0.44	0.44
Indicators of culture				
EUR m	7 421	7 483	7 385	7 357
EUR per inhabitant	90.12	90.72	89.49	89.18
Shares in the public sector budget (%)	1.47	1.49	1.60	1.57
Shares in the gross domestic product (%)	0.36	0.36	0.35	0.34

Source: Statistisches Bundesamt, 2005, last updated on 08 August 2005.

Since the end of World War II, the state governments (*Länder*) bear most of the financial burden for education, science and culture (Schäfers, 1981: 220). The federal system with research and education being mainly under the responsibility of the states provides a decentralised ground for defining which knowledge is regarded as valuable. Each state government decides independently which areas of R&D and cultural activities are financially supported and up to which degree. While in one state the educational institutions emphasise natural sciences and mathematics, in a different state, the emphasis lies on social sciences. This is expressed in the state budgets as illustrated in diagram 4-1 and Appendix F:

Diagram 4-1: Expenditure of Public Research Institutions in 2002
- by States and Research Areas
- thousand Euro –



Source: Compiled by the author based on Statistisches Bundesamt, 2004: 19.

Apart from Baden-Württemberg, all states regard natural sciences as the most important field of research and education. Nevertheless, there are slight differences in the rating of the remaining research areas. In Berlin and Hesse for example, arts receive the second highest funding, whereas most other states identified engineering as the second most important field. The reasons for these differing foci amongst the states are mainly historical, economical and party-political in nature. A historical reason is for example a long tradition of knowledge production and cultivation in certain fields. An economic reason is the indirect support of local industries with public R&D funding in knowledge areas that are of interest to local industries. Political reasons evolve from the party-political orientation of each state government and the resulting support of certain lobby groups and their interests. Berlin, for example, as a capital-city looks back on a long tradition of arts, fine arts and architecture. Baden-Württemberg, in contrast to Berlin, is Germany's centre of car manufacturing and therefore continues its long tradition of engineering. This heterogeneity of knowledge definitions as a result of the decentralised system does not exist in a centralised system, where merely one state budget decides on the ranking of areas of research and education. The wide range of financed knowledge production and preservation practised in Germany is also illustrated in table 4-2.

Table 4-2: Expenditure of Public Research and Academic Institutions in 2002 - by Institutional Group and Research Area - thousand Euro –

Institutional Group Institutional Form	Natural Sciences	Engineering	Medicine	Agriculture	Arts	Social Sciences	Total
Public R&D-Institutions	815 622	336 153	190 728	461 549	151 096	48 236	2 003 384
of the Federal Gov.	706 638	290 687		213 382	95 801		1 527 409
of the State and Municipal Gov. (without Leibniz-Society)	108 984	45 467		248 167	55 295		475 975
Public R&D-Institutions financed by Federal & State Gov.	2 986 208	1 694 505	395 660	70 627	218 338	186 507	5 551 844
Helmholtz-Centres	1 261 683	863 982	206 881			13 872	2 356 756
Institutes of Max-Planck-Society	893 762		88 370		96 221	43 148	1 132 057
Institutes of Fraunhofer-Society	308 044	700 430	15 348			13 108	1 046 878
Leibniz-Association ("Blue List")	495 312	119 203	84 299	52 412	72 521	113 468	937 214
Academies	27 407		761		47 527	2 911	78 939
Other publicly financed organisations w/o financial reward f. R&D	320 371	387 859	41 141	21 403	128 541	168 075	1 067 391
Academic Libraries and Museums (without Leibniz-Society)	50 157	12 410	8 613	8 412	698 677	29 806	808 074
Public Libraries, Archives, Centres for information and documentation	272			3 964	249 964	3 416	259 326
Publicly sponsored Libraries, Archives, Centres for information and documentation	21 398	7 928		4 448	114 476		177 790
Museums	28 487				334 237		370 958
Total	**4 172 358**	**2 430 927**	**636 141**	**561 991**	**1 196 653**	**432 623**	**9 430 693**

Source: Statistisches Bundesamt, 2004: 18. Translation by the author.

The financing of knowledge production and preservation, illustrated in table 4-2, includes research centres such as the *Fraunhofer*- and *Max-Planck*-Institutes, which focus mainly on natural sciences, as well as the *Max-Planck*-Institutes and the *Leibnitz*-Association that also conduct research in the arts and social sciences. Additionally, libraries and museums are financially supported. This financial support of a wide range of knowledge production and dissemination, embracing (nearly) all sectors of research and education, stands for an integrative definition of knowledge in Germany. Knowledge in general is seen as something positive and worthy of support. The question whether this knowledge pays off shortly after, and whether it is profitable, has traditionally not been a prime aspect in deciding on the budget for R&D and education. This is also indicated by the German educational system, which rests its structure until today on the idea of the '*deutsche Allgemeinbildung*'. While in most Anglo-Saxon systems and also in Singapore students are required at the age of sixteen to specialise on three to five subjects, in Germany it is common to study ten to thirteen subjects, with a special focus on two to four, until graduation from secondary school at the age of 18.

Nevertheless, as pointed out by one interviewee, there are some categories of knowledge that are not supported, partly even forbidden by law, in Germany. They include fields of research such as recombinant engineering, stem cell research and other areas of life science, as well as the research on or with radioactive materials. The Executive Director of the Genome Institute of Singapore, a research institute belonging to A*STAR[10] argues:

> "Germany has a somewhat schizophrenic view of science. Because Germans enjoy science and at the same time they are suspicious of science. In America, the people are on the whole ignorant of science: scientists are sometimes considered nerdy whereas the athlete is popular. In Germany, the schism is not uncool versus cool, but it is good versus bad" (E. T. Liu, 04.02.05, interview with the author).

He continues by reasoning:

> "Because of the extremes of Germany during the Nazi era, there is a very strong sense of morality that every thinking German is concerned about. Germans do not inherently trust themselves to manage powerful tools that science can offer, especially when there is a potential for them to be used as weapon."

[10] A*STAR is a statutory board of the Singaporean government, which oversees 12 research institutes working in the fields of bio and life sciences as well as engineering.

Hence, the generally wide range of knowledge production covering most research fields, cannot be observed in sectors of knowledge production which have been classified as 'unethical' or connected to Nazi-ideology.[11]

Besides the range of research fields supported by the German politics of knowledge production, several interview partners referred to the value of basic research as well as applied research as second aspect specific to German knowledge politics. This basic research was also described as "knowledge for knowledge sake" by one informant. The Head of the Department Information, Publication, Editing (*Referat LP 4, Information, Publikation, Redaktion*) of the Federal Ministry of Health and Social Security in Germany, explains the role of scientific research in Germany as follows:

> "Politics and industry have to produce results that are graspable and marketable. The academia is far away from this. For the academia, no result is also a result" (J. Zweig, 30.09.04, interview with & translation by the author).

If no outcome is also an outcome of scientific research, outcomes do not necessarily have to be profitable as long as they further scientific enlightenment. Emphasising the role of the state in providing a necessary framework for basic R&D, the Head of the Centre for Advanced Media Technology (CamTech), a collaborative project between the Nanyang Technological University in Singapore and the *Fraunhofer* Institute for Computer Graphics in Germany, states:

> "It is definitely important that the state creates an environment in which plants can develop; meaning that basic research can be conducted without having to justify it with economic success. In Germany, this is still possible" (W. Müller-Wittig, 03.02.05, interview with & translation by the author).

Based on the above, one can overall identify two country-specific traits of the German politics of knowledge production. *Firstly*, a wide sectoral range of knowledge production is supported, instead of focusing on few specific research fields. *Secondly*, basic and applied R&D are conducted, both of which mutually enrich each other. These two characteristics point to an integrative definition of knowledge. This means that generally all kinds of knowledge are regarded as something positive and worthy of support, with the exception of knowledge, explicitly qualified as 'unethical'. Nevertheless, this until now quite open definition of knowledge is increasingly overshadowed

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[11] The above quoted informant sees this as a strong restriction to R&D in Germany. He states: "It really hampers the scientific advancement" (E. T. Liu, 04.02.05, interview with the author).

by a commercialisation of knowledge and information. The aspect of marketability and profitability of knowledge becomes increasingly important. The currently ongoing economic downturn and the felt need to compete with the educational systems of other countries leads to a restructuring of the German system of education and R&D along the demands of the market.[12] New university courses are constructed either in direct preparation for a certain job or a scientific, academic career. Humboldt's theory of the unity of teaching and research is neglected in a time in which critical thinking and the ability of decision-making becomes increasingly the best qualification for a job (Nida-Rümelin, 2005: 3). *Diplom* and *Magister*, the traditional German university degrees which include training for a certain job as well as research, are replaced by bachelor and master courses in which the transfer of job-oriented knowledge in a modular system is common practice.

Hence, it is questionable whether the picture, drawn above of the German definition of knowledge, characterised by the support of a sectorally wide range of knowledge production as well as basic and applied research, remains valid. One has to be aware of the changes taking place towards a commercialisation of knowledge production in Germany although the decentral structure with education and research being mainly under the responsibility of the states continues to make an integrative and heterogeneous definition of knowledge possible.

Information in Germany

With a short interruption around the end of World War II, Germany has developed archiving as its system of documentation. It is basically the preservation and the making available of information for centuries. Nevertheless, the research field information science is only formed in the mid 1960s,

[12] The vacuum after World War II was – in West Germany – filled by the identification with the strong D-Mark, the economic miracle and the establishment of the welfare state. Due to the introduction of the Euro, the economic downturn since the beginning of the 1990s, and the following reduction of the welfare state, these former bases of identification no longer exist. Furthermore, the results of the Programme of International Student Assessment (PISA) from 2000 and 2003, placing German schools below average in international comparison, took away the strong belief that German schools were of world class quality (Artelt/et al, 2001; Prenzel/et al, 2003).

one of its main drivers being the Sputnik shock in the USA in 1957.[13] In 1963, the German federal government creates the Department for Documentation in the Federal Ministry of Research and Technology (BMFT) and therefore assigns responsibility concerning documentation practices to a federal government body. Nevertheless, the documentation and information centres and libraries continue to act as independent bodies, with full decision-making powers on which information is bought, preserved and made available. The coordinating body merely oversees these activities in order to ensure that all important thematic fields are covered and duplications are avoided. Hence, the structures of information and documentation practices in former West Germany are decentralised. The central system of East Germany, where one central body coordinated the accumulation, preservation and distribution of information, is not adopted after reunification. The disadvantages of a decentralised system, such as the lack of coordination between libraries, are addressed in six programmes of the federal government.[14] According to Thomas (2002), one can observe a cyclical up and down in the degree of responsibility taken on by the federal government in information sciences. In the 1960s to 70s the importance of information as a resource for economic development is recognised and the complete supply of information for all citizens is regarded as a task of the state.[15] In the 1970s to 80s this perception changes, the state support fades and the private sector is regarded as mainly responsible for the information market. The state only steps in where the market fails. In the 1980s to 90s, international cooperation, especially European cooperation, increases, national institutions receive less financial support and the centres for information and documentation are partly transferred to the private sector. Yet, from the 1990s until today, information

[13] On 04.10.1957, USSR starts Sputnik 1, the first artificial satellite. The USA, not able to identify the signals of the satellite, regards it as a military threat. The US-government spends USD$ 20m to decode the signals, only to discover later that the USSR had actually published the English translation of these signals beforehand and these translations were available in 6 US-American libraries at the time of the start of Sputnik 1. This incident leads to the government decision to develop and expand the existing information and documentation system in the USA.

[14] (a) The Information and Documentation Programme 1974 – 1977; (b) The Information Programme of the Federal Government 1985 – 1988; (c) The Information Programme of the Federal Government 1990 – 1994; (d) The Programme of the Federal Government 1996 – 2000: Information as Resource for Innovation; (e) Innovation and Jobs in the Information Society of the 21st Century 2000 – 2003; (f) Information Society Germany 2006.

[15] One further interesting reference is Häußer, 1986: 351-364.

is increasingly regarded as an important factor for economic prosperity. The role of the state in information politics is re-discussed and its responsibility increased.

The information politics of Germany are until today decentrally organised.[16] This goes back to the influence of the allied forces (USA, USSR, England and France) after World War II on West Germany's media and information politics. Siegmar Mosdorf, Head of the enquete-commission "Future of the Media in the Economy and Society" confirms this:

> "The allies aimed to prevent a central power as the Nazis reaching power again and therefore created decentral structures in the media and information sector" (S. Mosdorf, 27.10.05, interview with & translation by the author).

Similarly, information politics are conducted in a decentralised fashion. The decision as to what kind of information is archived and made available depends on each information and documentation institution itself. Hence, the range of available information is rather heterogenous and influenced by the interests of each subsystem of society, since each subsystem is welcome to maintain its own information and documentation centres.

Furthermore, information gets, just as knowledge, increasingly measured according to its economic profitability.[17] The economic value of information is manifested in patents and copyright laws which establish information as a protected commodity and hinder its free flow. By doing so, these patents and copyrights divide society into information 'have' and information 'have-nots' which, in a time when information and knowledge increasingly become factors of production, determines one's own chances for development and upward mobility.[18]

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[16] Today's only central body concerned with information politics in the federal government's administration is the department Digital Library in the Federal Ministry of Education and Research. It digitally connects mainly scientifically oriented libraries and information centres (*Fachinformationszentren*).

[17] The Head of the Information Science Department of the University of Constance criticises: „The strong commercialisation of information reduces the emancipative aspect of the information society" (R. Kuhlen, 26.11.04, interview with & translation by the author).

[18] This was also discussed during the UN-World Summit for the Information Society in 2003 (Geneva) and 2005 (Tunis), where there was no solution found on how to prevent knowledge divides from opening up further (WSIS, 2003a, 2003b).

Knowledge in Singapore

The Singaporean politics of knowledge production seem to focus on (a) certain fields of R&D, which are identified as future economic growth areas; and (b) applied research. The focus on certain fields of research and education goes back to the economic development of Singapore after independence in 1965. Traditionally, Singapore's economy was based on the port as the centre for international and regional trade. Around this port, numerous small manufacturing sites were established, producing wigs, kitchenware and other low skill manufacturing items. Yet, with increasingly manufacturing sites moving out of Singapore to neighbouring countries, the Singaporean government had to identify new economic sectors to tap into. After two expert groups formed by the government returned to Singapore from visits to the USA and Japan in 1980, the decision was made to develop Singapore into a regional centre for computer and disk drive production (Ang, 1992). Yet, the neighbouring countries developed as well and Singapore realised in the late 1980s that it had to increase local content production and high technology development in order to continue moving up the value chain (Anwar/Zheng, 2004). Consequently, the total public and private R&D spending as a percentage of GDP was increased from 0.85% in 1990 to 2.15% in 2003. The public R&D spending as percentage of GDP was responsible for 0.39% in 1990 and 0.84% in 2003. The yearly increase in the R&D funding resulted in a steady increase of research scientists and engineers. The total number of research scientists and engineers (RSEs) holding a PhD degree rose from 970 (of 4329) in 1990 to 3791 (of 17074) in 2003.[19]

Government statistics on the sectoral splitting of the R&D funding could only be found with regard to science and technology. Information on the R&D expenditures regarding the humanities, social sciences and fine arts are neither part of the yearly published 'National Survey of R&D in Singapore' of A*STAR[20], nor stated in the yearly budget of the government (Government of the Republic of Singapore, 2005). Concerning science and technology, table 4-3 illustrates the spending by type of R&D and research areas.

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[19] The yearly increase is illustrated in Appendix H.

[20] Referring to the OECD-definition of R&D (OECD, 2002), the National Survey of R&D in Singapore 2004 assesses the government spending for basic research, applied research and experimental development. Regarding the R&D-subjects covered, it states: "The scope of the definition of R&D for this survey extends to R&D in science and technology only and excludes the social sciences and humanities" (A*STAR, 2005: 30).

Table 4-3: R&D Expenditure by Type of R&D and Field of Science and Technology

$ million

	Private Sector			Government Sector				Higher Education Sector				Public Research Institutes				Total		
Field of Science & Technology	Basic Research	Applied Research	Experimental Development	Pure Basic Research	Strategic Basic Research	Applied Research	Experimental Development	Pure Basic Research	Strategic Basic Research	Applied Research	Experimental Development	Pure Basic Research	Strategic Basic Research	Applied Research	Experimental Development	Basic Research	Applied Research	Experimental Development
Agricultural & Food Sciences	1.04	24.66	9.95	0.00	0.00	4.76	0.65	0.04	2.85	0.91	0.27	0.00	0.00	0.00	0.00	3.93	30.33	10.87
Biomedical & Related Sciences	37.52	134.46	60.75	2.77	11.96	75.25	26.71	9.51	58.42	33.29	10.28	161.07	39.72	67.85	9.31	320.98	310.84	107.06
Basic Medicine	4.75	14.53	3.40	0.00	1.77	2.01	1.88	0.39	9.16	6.03	0.71	0.00	2.72	0.00	0.00	18.80	22.57	5.99
Biological Sciences	26.18	50.55	12.38	2.77	8.95	10.22	0.00	4.69	26.76	9.60	3.97	161.07	33.58	43.51	9.31	264.01	113.89	25.66
Clinical Medicine	0.00	8.41	15.79	0.00	0.28	45.13	2.05	4.33	21.12	15.48	5.60	0.00	2.06	6.00	0.00	27.79	75.03	23.44
Health Sciences	0.00	0.79	2.19	0.00	0.96	0.85	0.85	0.09	1.38	2.15	0.00	0.00	0.00	0.00	0.00	2.43	3.79	3.04
Pharmaceutical Sciences & Manufacturing	0.55	13.19	22.68	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	18.33	0.00	0.55	31.52	23.59
Other Related Biomedical Sciences	6.04	46.98	4.31	0.00	0.00	17.04	21.03	0.00	0.00	0.03	0.00	0.00	1.36	0.00	0.00	7.40	64.05	25.34
Engineering & Technology	102.39	406.94	1,338.15	0.00	1.72	65.03	180.13	20.70	49.59	69.74	51.31	1.55	94.35	112.40	9.41	270.29	654.11	1,579.01
Aeronautical Engineering	0.08	2.27	7.01	0.00	0.00	0.00	11.70	0.00	0.01	0.01	0.00	0.21	0.43	1.49	0.00	0.73	3.77	18.71
Biomedical Engineering	0.00	4.76	0.63	0.00	0.00	0.00	0.00	1.68	3.96	4.15	3.62	0.00	2.72	0.00	0.00	8.36	8.91	4.26
Civil & Architecture Engineering	0.23	1.75	3.50	0.00	1.72	13.44	9.89	0.83	5.02	9.21	7.01	0.00	0.00	0.00	0.00	7.80	24.39	20.39
Computer Engineering	7.61	20.45	84.05	0.00	0.00	0.00	0.00	3.07	6.35	2.68	1.16	0.00	0.00	0.00	0.00	17.03	23.13	85.21
Electrical & Electronics Engineering	55.73	201.45	950.04	0.00	0.00	36.53	92.57	6.09	13.62	20.11	14.79	0.36	30.28	36.10	1.98	106.09	294.20	1,059.38
Infocommunication & Media Technology	10.38	42.66	87.00	0.00	0.00	0.00	0.00	0.04	1.42	5.56	2.82	0.00	20.47	24.55	0.00	32.31	72.77	89.82
Marine Engineering	0.13	7.58	2.00	0.00	0.00	0.26	6.82	0.05	0.55	1.84	1.68	0.25	0.50	1.74	0.00	1.47	11.42	10.50
Material Sciences & Chemical Engineering	5.71	28.26	46.80	0.00	0.00	4.86	1.54	4.58	8.84	9.93	6.75	0.00	31.71	39.92	6.56	50.85	82.97	61.65
Mechanical Engineering	21.84	94.03	148.06	0.00	0.00	9.95	57.61	4.36	9.22	14.40	11.85	0.73	8.23	8.59	0.87	44.38	126.96	218.39
Metallurgy & Metal Engineering	0.68	3.74	9.07	0.00	0.00	0.00	0.00	0.00	0.61	1.84	1.63	0.00	0.00	0.00	0.00	1.29	5.58	10.71
Natural Sciences (excluding Biological Sciences)	43.37	80.19	105.67	0.00	0.00	21.14	41.44	7.94	34.28	31.50	16.96	1.23	45.33	21.74	0.00	132.14	154.57	164.07
Chemical Sciences	6.02	25.97	36.21	0.00	0.00	8.55	0.00	0.80	13.79	3.63	0.30	0.23	36.20	15.09	0.00	57.04	53.24	36.51
Computer & Related Sciences	36.84	53.62	63.72	0.00	0.00	7.10	41.19	1.52	4.95	8.19	4.42	0.66	5.05	6.65	0.00	49.02	75.57	109.33
Earth & Related Environmental Sciences	0.08	0.26	3.33	0.00	0.00	0.04	0.25	0.00	7.97	13.60	9.64	0.00	0.00	0.00	0.00	8.05	13.90	13.22
Physical Sciences & Mathematics	0.42	0.34	2.41	0.00	0.00	5.45	0.00	5.62	7.57	6.08	2.60	0.34	4.08	0.00	0.00	18.03	11.87	5.01
Other Areas	7.87	50.50	186.53	0.00	4.28	0.00	6.33	0.84	24.60	1.24	0.43	0.04	0.07	8.39	32.56	37.70	60.13	225.86
Total	192.19	696.74	1,701.06	2.77	17.96	166.17	255.27	39.03	169.74	136.69	79.25	163.88	179.47	210.38	51.29	765.05	1,209.98	2,086.86

Source: A*STAR, 2005: 15

Besides the focus on science and technology research, regarded as directly contributing to economy, the table also indicates a strong focus on applied rather than basic research. While the total R&D expenditure for basic research amounts to SGD765.05m, applied research was supported with 1,209.98m and experimental development with 2,086.86m. Hence, the two types of research that are regarded as directly leading to economic growth – applied research and experimental development – are supported the most.

During the research conducted for this book, the interviewees explained the rather sudden emphasis on R&D investment from the early 1990s onwards, the focus on natural sciences and engineering as well as on applied research, with the following. The recession in the mid 1980s urged the government to implement its first Economic Review Committee in 1986 in order to assess Singapore's economy and identify potential growth areas. This committee as well as Philip Yeo, then chairman of the Economic Development Board (EDB), advised the government to emphasise the production of scientific knowledge as well as the bio and life sciences. It results in the National Science and Technology Board (NSTB), later renamed into Agency for Science, Technology and Research (A*STAR).[21] As a statutory board of the Singaporean government, A*STAR oversees 12 research institutes working in the areas of biomedicine, science and engineering.[22] In 2002, Singapore's President S. R. Nathan explains the increased emphasis on science and technology at the opening of the 25th Singapore Youth Science Festival at the Singapore Science Centre:

> "But what is clear is that the future will favour nations which are best able to innovate, create new knowledge, and upgrade human skills to exploit the economic opportunities that science and technology makes available for us. There is no dispute that embracing and harnessing science and technology is the way forward for our nation" (Singapore Science Centre, 2002).

President S. R. Nathan identifies science and technology as future growth and prosperity promising sectors, while humanities and social sciences are neglected. The Deputy Director of the Institute for Microelectronics

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[21] The Director of Temasek Laboratories, a research institute of the National University of Singapore (NUS) describes the process leading up to A*STAR's founding: "The government realised, that all industrialised countries were investing more than 2% of GDP into R&D, while Singapore invested 0.85%. So it was decided to aim for 2% of GDP and the National Science and Technology Board (NSTB) was formed" (Lim H., 17.02.05, interview with the author).

[22] Furthermore, A*STAR's scholarship-programme aims at qualifying Singaporean students in the areas of life and bio sciences at top-universities worldwide.

(IME), a research institute under A*STAR, explains this focus on science and engineering as follows:

> "[The government] advocated, for example, if you want to be a good swimmer, just train hard to be one! So in the same way, if you want to succeed economically, pursuing science and engineering is a good bet and therefore you should excel" (Lim Th. B., 18.02.05, interview with the author).

Besides the founding of A*STAR, R&D conducted by Singaporean universities moves into the centre of attention. The Director of Temasek Laboratories, a research institute of the National University of Singapore (NUS) explains:

> "Before the late 1980s, the universities were doing little R&D but were mainly educational institutions producing graduates to support the national requirements for skilled manpower. Only 15 to 20 years ago universities in Singapore were granted regular budgets for R&D" (Lim H., 17.02.05, interview with the author).

The research conducted by universities as well as A*STAR institutes today is basic as well as applied research, with the latter forming the main focus. The Director of Temasek Laboratories outlines the history of R&D in Singapore:

> "Before 1990s, people tended to believe that technologies can be bought, and it was not necessary for Singapore to undertake R&D. Yet, as Singapore strived to move up the technology ladder, we learned that leading-edge technology with high commercial value cannot be bought, and without strength in R&D, we also had difficulty attracting high-tech investment to Singapore. This led to a change of mindset, and A*STAR (called National Science and Technology Board, NSTB, then) was founded to undertake R&D in a range of topics of 'economic relevance'. This was to develop a local R&D capability and to demonstrate to potential investors our commitment to support high-tech investment" (Lim H., 02.06.06, email to the author).

Nevertheless, basic research forms the smaller share of R&D conducted in Singapore. Its high costs and little direct financial pay-offs are continuously topic of debate in Singaporean knowledge politics and the quest for applicable research, rather than basic research, has yet to be resolved.[23] The

[23] The Director of the School of Information Systems at the Singapore Management University describes: "From the early 1990s, we put more emphasis on R&D. 'Technopreneurship' became a commonly used term, describing the need for research but

Head of the Centre for Advanced Media Technology (CamTech) cautions against increasingly reemphasising applied research:

> "A*STAR looks into research and not simply market oriented development. Yet, it is increasingly requested to conduct research along the demands of the market. This is problematic, since research requires space in order to make creativity possible" (W. Müller-Wittig, 03.02.05, interview with & translation by the author).

The Dean of the School of Communication & Information, Division of Journalism of the Nanyang Technological University describes this emphasis of applied research by relating to Germany in the 1940s when theoretical physics, which was often regarded as 'useless knowledge', enabled the USA to build the atomic bomb:

> "Singapore is still where Germany was in the 1940s, asking, what is the point in knowing how many atoms are in somewhere. The Singaporean approach is how can we make economic value of certain knowledge, and ideally fast. This mentality is very pervasive. (…) There isn't the idea of producing knowledge just for the knowledge sake. So a lot of research in Singapore is applied research. This might change slowly, but I think Singapore will be very cautious and you probably will need some basic output at least" (Ang P. H., 21.02.05, interview with the author).

The change indicated by this statement is also expressed by the founding of a Ministerial Committee on R&D, chaired by the Deputy Prime Minister and Coordinating Minister for Security and Defence, Dr. Tony Tan in October 2004. The aim of this committee is to review the national R&D strategies and directions and to identify new growth areas for the country. In this endeavour, Dr. Tony Tan is assisted by four ministers including: Lim Hng Kiang (Ministry of Trade and Industry), Rear Admiral Teo Chee Hean (Ministry of Defence), Tharman Shanmugaratnam (Ministry of Education) and Dr. Ng Eng Hen (Ministry of Manpower). On 11 August 2005, Dr. Tony Tan recommends that Singapore should be transformed into "an R&D-driven innovative knowledge-based enterprise economy" to compete on knowledge and talent as well as on efficiency and cost-effectiveness (People's Daily Online, 12.08.2005). Furthermore, the government should increase its R&D funding to at least 3% of GDP in the next five years. The clear focus should lie "on selected areas of economic importance where Singapore can be internationally competitive" and a balance should be achieved between investigator-led and mission-oriented research in these areas. Based on this state-

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also the need for this research to be applicable and marketable" (A. D. Narasimhalu, 29.03.05, interview with the author).

ment, it can be concluded that the change towards increasing basic research, as a sustainable foundation for economic development is nevertheless focused on R&D fields that are of direct economic relevance and ensure Singapore's competitiveness.

Although the high costs of basic research are difficult to legitimise on a short-term basis, given no basic financial output contributes to the economy, Singapore's government is aware of basic research creating a depth of knowledge that, in effect, contributes to applied research. This awareness of basic research possibly contributing to more sustainable economic development than merely applied research secures its insecure position. Hence, the motivation to support basic research, just as the support for applied research, is driven by the aim for economic prosperity. Therefore, basic research is merely supported in the fields of knowledge production that are of economic importance, such as science, technology and biomedicine. Consequently, a change towards increasing basic research is not a change of the overall definition of knowledge. But knowledge in Singapore, no matter whether from applied or basic research, is very much weighted according to the financial profit and economic growth generated by it. This can also be observed in the government's recent turn towards creative industries in 2002. Here, the government formulated the aim to develop the arts, design and media – not just as "arts for arts sake" – but as economic sectors which contribute to GDP. The Director of the Educational Technology Division in the Ministry of Education describes:

> "The one who has made the most compelling and convincing argument in terms of supporting the creative industries is Dr. Tan Chin Nam. As Permanent Secretary in the Ministry of Information, Communication and the Arts (MICA), he cleverly positioned the whole thing not as 'arts for arts sake' but art as the foundation for a new industry, the creative industries" (Koh Th. S., 30.03.05, interview with the author).

This rather recent development towards supporting arts and culture, heritage preservation and the building of various, thematically divergent museums expresses the government's realisation that the focus on a few areas of knowledge production and dissemination stands in the way of long-term sustainable development of an industrialised country.[24] It is based on the awareness that Singapore as a developed economy can no longer rely on ideas coming from overseas, but has to increase its own local content production.

[24] This awareness also finds expression in the opening of the School of Creative Arts and Media at the Nanyang Technological University, as well as the planned opening of a faculty of arts and social sciences at this presently technological university.

Singapore's government wants to make Singapore innovative and 'creative'. This poses an immense change in the definition of which knowledge is regarded as valuable. The former stringent focus on natural sciences and engineering is dissolved by the felt need to become creative. In order to do so, Singapore discovers the arts, humanities, social sciences, theatres, museums and libraries as attractive fields and places of knowledge production and dissemination. The Head of the Media & Digital Entertainment, Infocomms & Media Cluster in the Economic Development Board (EDB) describes this felt need and aim to become more creative:

> "There is a definite emphasis on building a greater awareness and appreciation of the arts, predicated on the belief that in building the appreciation, one also fosters a sense of creativity. Our Ministry of Education realises that this is the challenge of tomorrow, meaning that the people of today need to be a lot more versatile and creative thinkers" (J. Tan Y.-P., 26.01.05, interview with the author).

The above statement is the official government perspective, which finds its expression in changing the curricula from primary to tertiary education. Besides the formerly dominant subjects such as the natural sciences and maths, arts, music and social sciences are introduced or strengthened.

Hence, the urge for economic stability and growth leads to a change in the prevalent definition of knowledge: The former focus on profitable, marketable fields of knowledge production changes towards a more liberal definition of knowledge, integrating a wider range of knowledge including those that were neglected earlier. The former focus on science and engineering softens and subjects such as arts, social sciences, design and media gain importance. Yet, the reason behind this change is the belief that those fields of knowledge production – which were regarded as less important for economic growth and therefore neglected – are now seen as contributors to long-term development and therefore gain importance (Lee, 2004). The arts and social sciences are strengthened as contributors to economic growth, not – as mentioned by one informant – as arts for arts sake. Hence, within these fields of knowledge production, the focus on applied knowledge remains relevant. It is not the experimental arts that get actively fostered by the government, but 'money-making' arts such as movie production, design and media. Experimental arts are merely respected, since they might eventually contribute to commercial arts. The Director of Creative Industries Singapore in the Ministry of Information, Communications and the Arts describes this process:

> "We will not promote experimental arts, but we also don't draw a distinctive line between commercial and experimental arts. We should improve the commercial, marketing infrastructure of the non-commercial sector to help it become more financially successful. (…) The arts-infrastructure has to allow for the initial spark of creativity to happen. Then some company could market this intellectual property for the artist and exploit it commercially" (Baey Y. K., 30.03.05, interview with the author).

Hence, the definition of knowledge in Singapore opens up for a wider range of knowledge creation and dissemination. Nevertheless, this opening up is very much market orientated and market driven. Basic research as well as experimental, non-commercial arts are respected as long as there is potential that the knowledge and ideas created, enrich applied research or the commercial arts. They are not respected as arts for arts sake or knowledge for knowledge sake. Nevertheless, the statement above shows that the following conclusion of Cordeiro and Al-Hawamdeh of Nanyang Technological University Singapore (2001) has been heard by the government and its administrative bodies: "Singapore cannot simply produce managers and engineers as it has been doing for the last 30 years. Today, it needs a convincing nucleus of inherent and intrinsic entrepreneurial talent". The aim to construct a Singaporean k-society caters to the hopes of the government to foster a vibrant culture of specifically Singaporean knowledge production that enables sustainable economic development. The deputy director (Industry) of the A*STAR-member Institute for Microelectronics explains:

> "KBE is a matter of bread and butter. If you have a very knowledgeable society that cannot translate that knowledge into bread and butter, it doesn't help. Therefore, it must be more than knowledge for knowledge sake, but more knowledge for some application, for life, for survival!" (Lim Th. B., 18.02.05, interview with the author).

Hence, the opening up of Singapore's definition of knowledge goes back to the will to create a form of economy and society that uses knowledge for sustainable development.

Information in Singapore

Singapore looks back on merely a short history of information politics. In the first years after independence in 1965, foreign investment driven economic growth was at the centre of political interest. The development of a nation wide system of archiving and documentation was of much lower priority. Nevertheless, several libraries and documentation centres existed and new

ones were slowly created.[25] Soon after independence until today, the distribution of information by the media, however, was guarded by the government. In the beginning of the 1970s, Singapore's government restricted press freedom under the mantle of a discussion on Asian values in journalism (Masterton, 1996). Starting with the Chinese-language newspapers Sin Chew Jit Poh and Nanyang Siang Pau, which were urged to merge and form Singapore News and Publication Ltd in 1983, all newspapers – apart from 'Today' – were eventually merged into the 'Singapore Press Holdings', of which the government is a major share holder. Additionally, several laws were passed enabling the government to control the media. For example the Newspaper and Printing Press Act from 1974 (Amendment in 1979) can be mentioned. These restrictive measurements resulted in limited press-freedom and high self-censorship among journalists (Gomez, 2000; Haentzschel, 2004).[26]

Following Singapore's first recession in 1986 and the recommendations of the Economic Review Committee for Singapore's economy to diversify in order to continue moving up the value chain[27], the Minister for Infor-

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[25] In 1971, for example, the Singapore government established, with the support of the German Friedrich-Ebert-Foundation, the 'Asian Media Information & Communication Centre (AMIC)'.

[26] On 31 December 1985, Singapore leaves UNESCO, together with Great Britain and following the USA who turned against the 'New International Information Order' demanded by UNESCO in the early 1980s. The order aimed at the fighting of pro-Western bias in the global news agencies. Specifically, the organisation sought the licensing of journalists, the creation of an international code of press ethics, and increasing government control over the media. Since Singapore implemented all parts of the 'New International Information Order', except the press freedom, it is until today unclear, why Singapore left UNESCO and has not rejoined since, while UK and USA have long done so (Haentzschl, 2004). With regard to the current Major Programme V "Communication and Information", one might ask, whether not being a member is a stronger statement than being one. In the Major Programme V, UNESCO commits itself to the "fostering of equitable access to information and knowledge for development" with USGD$12.009m and to "promoting freedom of expression and communication development" with USGD$9.604m (UNESCO, 2003). While Germany supports these activities that express a rather liberal approach to knowledge and information, Singapore – as a non-member – does not. Yet, it is questionable whether Singapore actively chooses not to support this or whether her not supporting is simply a side effect of not being a member.

[27] This is further underlined in the government document "The Next Lap – Singapore's Blueprint for the Future", published in 1990, with the inauguration of Goh Chok Tong as Prime Minister. The document strongly emphasises that the long-term

mation and the Arts, George Yeo, establishes the Library 2000 Review Committee in 1992. Its task is to review the possible contribution of the library system to Singapore's development in the 21st century. Until today, the Singaporean library system is coordinated by the National Library, which is entrusted with a limited budget and responsible for the functioning of national as well as public libraries.[28] In 1994, the Library 2000 Review Committee publishes its report, entitled "Library 2000: Investing in a Learning Nation" (Library 2000 Review Committee, 1994).[29] As a result of this report the existing hierarchical structure of the Singaporean library system was dissolved and the National Library Board (NLB) was established.[30] Today, NLB centrally manages the national library (1 in number), regional libraries (3), community libraries (18) and community children's libraries (18). Furthermore, NLB-staff organises government department libraries and junior college libraries (11). Each of the three functional areas of NLB, namely national, public and government department/junior college libraries is headed by a separate NLB-director. The university libraries as well as libraries of research institutes, such as for example the Institute of Southeast Asian Studies, are run by the institutes themselves but stand in close cooperation with NLB.

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competitiveness of Singapore depends on its people, on their intellect and skill and on their ability to learn.

[28] This responsibility is officially stated in the National Library Act (NLA) of 1958. The public library provisions include the establishment of lending libraries to promote the use of library materials. Yet, due to the limited budget of the National Library, it mainly concentrates on developing the public library functions while heavily neglecting its national library functions. Furthermore, NLA (1958) provides the National Library with effective responsibility and control over the public and the national library, but not over the development of other publicly financed libraries, such as academic libraries (of universities, schools, and research institutions). As a result, most library services of these academic libraries are not integrated in the system of the public library functions. The lack of coordination contributes to a rather ineffective use of the nation's information resources (Ramachandran, 1999).

[29] According to this report, it is the vision of the library in Singapore to "continuously expand the nation's capacity to learn through a national network of libraries and information resource centres providing services and learning opportunities to support the advancement of Singapore" (Library 2000 Review Committee, 1994: 5).

[30] On 16 March 1995, the Parliament of Singapore passes a bill to establish the National Library Board (NLB) from 01 September 1995 onwards. Furthermore, NLA 1958 is replaced by the National Library Board Act (NLBA), which forms the legal basis of NLB.

Hence, the coordination of the different sectors of the Singaporean library system is nearly completely centralised under NLB.[31]

In the recently published strategic plan of the National Library Board called "Library 2010", NLB increasingly regards libraries as centres of knowledge exchange, fruitful discussion and critical thinking,[32] especially the fostering of knowledge sharing and exchange, which could lead to a fundamental change in the definition of knowledge and information in Singapore. Yet, as long as free speech and opinion can lead to legal consequences, expressed by the Internal Security Act (ISA) as well as the Newspaper and Printing Press Act, a library system that encourages knowledge sharing will nevertheless be unable to turn this sharing of knowledge into a pool of discussion, with free and critical thinking, as a step towards creative ideas and innovation.

The definition of information in Singapore is strongly influenced by the state and communicated by information politics, implemented by the National Library Board, as well as the legal infrastructure concerning the freedom of the press, freedom of opinion and speech. The centrally organised information system assures efficiency and at the same time enables control over information which is accumulated, archived and made available. A tendency to create room for creativity which requires free flow of information, exists, as expressed in "L2010". Nevertheless, the space for creativity to take place is predefined by the government, which raises the question whether creativity can and does take place in a predefined space.

Discussion

Comparing the definition of knowledge dominant in Germany to the one in Singapore, the chairman of the enquete-commission "Future of the Media" of the German *Bundestag* and later permanent secretary of BMWA points to cultural and structural differences. His statement is based on a visit to Singapore in his position as chairman of the enquete-commission, during which he met with the former Ministers for Information Society and Economics in the mid 1990s:

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[31] Exceptions include the university libraries.

[32] Nevertheless, the Chief Executive of the National Library Board points out that the role of libraries is restricted to providing the infrastructure for creativity: "NLB and the library network provide the people with the resource information for ideas, but it can't convince the people to actually have ideas and to make money with the idea" (N. Varaprasad, 11.02.05, interview with the author).

> "Singapore was much earlier approaching the topic of information society than Germany. (…) But they are culturally not as strong as our society. Singapore society is a relatively small unit which had an authoritarian government for a long time. Hence, they could act very fast and was very technologically determined, aiming for the greatest possible innovativeness. In Germany, (…) topics regarding the media are under the responsibility of the states, not the federal government, which was especially difficult for the work of the enquete-commission" (S. Mosdorf, 27.10.05, interview with & translation by the author).

Yet, this book assesses cultural reasons for differing knowledge and k-society definitions in the two countries of investigation only by acknowledging the role of culture in establishing certain structural realities that then again shape the country-specific k-society definitions. While the aspect of being a small, tightly governed country such as Singapore can pose an advantage in constructing a technologically determined k-society, the decentralised federal structure of Germany, with a highly organised civil society and education and research system largely under the right of the states, can pose an advantage for the construction of a culturally, creative k-society. At the same time, a centrally governed city-state with restrictions on free speech and press freedom might find the development of a heterogeneous cultural scene rather difficult. In addition a decentralised federal country might have difficulties with installing modern ICTs in all regions of the country. Nevertheless, not only are (a) the differences in size and (b) the aspect of centrally organised versus federal systems responsible for different definitions of knowledge, but also further structural realities that heavily influence the dominant definitions of knowledge and k-society in each country such as their respective (c) historical experiences; (d) maturity level of the economy; (e) degree of economic exposure to the world economy; (f) tradition of R&D; (g) tradition of the educational system; (h) political system, backed by its legal infrastructure; (i) level of civil organisation; as well as (j) model of functional differentiation with structures of decision-making between state and remaining subsystems of society.

Regarding the influence of historical experiences (c) of each country on the dominant definition of knowledge, one has to point to the distribution of media responsibilities to the state level rather than the federal government in Germany after World War II. In Singapore, the nation's aim to rapidly develop from a less developed to an industrial country contributed to a strong focus on applied R&D and on profitable knowledge after independence. The low level of maturity of Singapore's economy (d) after independence can be held responsible for a strong focus on low-skilled manufacturing

and hence the production of knowledge that could be applied in the manufacturing processes. In Germany's economy, the level of maturity demanded R&D that looked far beyond low-skilled manufacturing but instead into design and new inventions. Similarly, the level of exposure to the world economy (e) furthered in both countries the already existing tendencies. Singapore's economy was mainly exposed to the world economy due to the export of manufactured goods. Hence, further knowledge production concentrated on the improvement of these manufacturing processes. In Germany, the exposure to the world economy was far more versatile and its competitiveness is increasingly secured by R&D outcomes rather than merely manufacturing. This was further supported by Germany's long tradition in basic as well as applied R&D (f). When Singapore began to conduct local R&D, its economy was mainly based on manufacturing. Hence, the conducted R&D mainly concentrated on this. Similarly, the educational system in Singapore (g) merely goes back to the end of the 19th century when the first tertiary educational institution was established in order to produce graduates that could work in the colonial administration. Hence, education was very much focused on qualifying for certain professions. In Germany, the educational system looks back to Humboldt's idea of the unity of teaching and research. Therefore, education was not merely geared toward a job qualification, but to enable the conduct of research and hence generating enlightenment of the graduates. The differing political systems in both countries, their legal backing (h), the level of civil organisation (i) as well as the model of functional differentiation with structures of decision-making between state and remaining subsystems of society (j) support the singular-defined definition of knowledge by the state in Singapore and the plural definitions of knowledge by multiple actors of society in Germany. Germany's long tradition of basic, wide ranging research is backed by a democratic political system in which every citizen possesses the right to voice his/her opinion. The freedom of opinion and speech are embedded as basic rights in the German constitution and therefore allow for a culture of critical discussion. This is also fostered by a high level of civil organisation, which involves the existence of a multitude of knowledge and strongly opposing, socially constructed truths next to each other. This is further supported by independently acting subsystems of society, which can voice their own interests when aiming to influence the activities of another subsystem but are not necessarily heard. No subsystem possesses decision-making-rights regarding activities of another subsystem. Nevertheless, this quite integrative definition of knowledge is increasingly adapted to economic requirements and its value measured by its marketability. In Singapore, the legally insecure position of free speech, opinion and press

freedom strengthen the position of the state in defining which knowledge is created, disseminated and preserved. The permeable boundaries between the subsystems of society enable the state to influence the decision-making processes of subsystems such as the scientific community, civil society and media, but at the same time also grant selected members of these subsystems decision-making power in activities of the state. Furthermore, the low level of civil organisation results in little critical definitions of knowledge which possibly oppose the state's definition. Nevertheless, the urge for long-term sustainable development increasingly welcomes types of knowledge that merely indirectly contribute to economic growth. Hence, the formerly quite restricted definition of knowledge is increasingly opening up to knowledge areas such as arts, social and human sciences. Areas for free, critical discussion are created in public libraries in order to foster creativity in the hope to maintain Singapore's economic growth.

While Germany's decentralised and traditionally integrative definition of knowledge is hampered by an increasing focus on marketable knowledge, Singapore's focus on profitable knowledge areas is opening up towards arts, human and social sciences. It is hoped that the integration of these yields sustainable, long-term economic growth. Hence, the two formerly quite differing definitions of knowledge in Germany and Singapore are increasingly moving closer to each other. Yet, in Singapore this movement of convergence lacks legal foundation until today. The vast library system and the investments in arts, human sciences and museums provide grounds for an increasingly versatile definition of knowledge, supported by the attempt to use libraries as centres for building social capital and fostering creative ideas. Nevertheless, social capital and critical thinking are closely related to social and political criticism. A legal infrastructure that enables the state to intervene into free, critical speech does therefore hamper social capital building. As long as the freedom of opinion and speech of every citizen are not part of the Singaporean constitution, knowledge production and sharing will be guarded and guided by the state.

Opposite to the situation in Singapore, the currently strong movement towards an increasing commercialisation of knowledge in Germany is merely counterbalanced by the heterogeneity of actors defining which knowledge is regarded as valuable. This heterogeneity of actors is secured by the right to free speech and opinion, as well as the decentralised system. Hence, the differences between the definition of knowledge in Singapore and Germany can be seen as prevailing due to the differing legal infrastructures, even if a process of convergence is taking place.

Chapter 5

The Arena of Engaged Subsystems

The process of constructing k-societies as forms of social reality is carried out by an arena of subsystems, all of which are strongly interested in knowledge production, dissemination and economic exploitation. These subsystems comprise the state, economy, scientific community, civil society and media. This book empirically focuses on the state as a subsystem which takes enormous action in order to plan and construct a country-specific type of k-society. The remaining subsystems involved – economy, scientific community, civil society and media – are merely assessed with regard to their influence on the activities of the state in constructing k-societies.

The subsystems, as well as their means of communicating with and influencing the activities of the state, are assessed – based on the empirical data collected in both countries – with reference to Luhmann's system theory and the adaptations made to it by Dziewas, as outlined below. In his system theory, Luhmann (1984) develops the concept of social systems (subsystems of society) that structure modern society and therefore reduce complexity. Besides social systems, he also identifies psychical systems (human conscience) and organic systems. Yet, he focuses in his analysis on social systems and argues in his later works that these social systems are 'autopoietical' in character, i.e. they produce and reproduce all elements constituting them by themselves. They are therefore fully independent from other subsystems. Hence, all operations of a social system are self-referential, focusing on its own autopoiesis. As the basal element of these autopoietical subsystems, Luhmann identifies communication, which he defines as a multicausal operation, which includes the three aspects of information, notification and understanding. The unity of these three creates a self-referential process in which communication leads to more communication. Communication as the basal element of each social system reproduces itself autopoietically and therewith reproduces the social system. Since social systems (the subsystems of society) are – according to Luhmann – fully independent, they cannot instruct but merely irritate each other, by suggesting future action. In his earlier works, Luhmann describes this mutually taking influence of social systems with the term 'interpenetration', adopted from Parsons. Yet, in his later works, the term 'interpenetration' is replaced with the terms 'structural coupling' as well

as 'irritation' (Schemann, 1992: 219).[1] As forms of interpenetration, Luhmann describes autopoietical systems that mutually enable their existence by opening themselves up for the complexity of the other system, while at the same time continuing to form the environment for each other. For example, life is a necessary precondition of social systems. Hence, biological systems offer their own complexity for the construction of communication systems (Schemann, 1992: 217/218).[2] Luhmann describes structural coupling as close relationships between two autopoietical systems that act as environment to each other. When two subsystems of society or one subsystem and its environment, to which all other subsystems of society belong to repeatedly irritate each other and each time refer to what they discussed before so that a continuum of irritation is created, this is the point where structural coupling takes place. In order to consolidate these structural couplings, the subsystems of society use organisation and associations in which representatives of at least two subsystems of society participate as members (Luhmann, 1994: 195/196). As an example of structural coupling between judiciary and politics, Luhmann (1990) mentions the constitution which structures the relationship between these two subsystems and their specific interests.[3] Structural coupling is therefore a far more organised form of interaction than interpenetration. Irritations are closely related to structural coupling. Similar to information, irritations take place inside systems based on structural couplings. When one system for example changes its organisational structure, this reorganisation irritates, or affects, other systems that are interlinked with this system by forms of structural coupling. Schemann mentions as an example, the introduction of leasing as a form of transaction in economy. This introduction irritates the judiciary system which has to adapt to the changes made in the economy (Schemann, 1992: 223). Despite these forms of interaction between social systems, for Luhmann, social systems are first of all autopoietically

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[1] Additionally, Luhmann mentions 'operational coupling' but misses to define it and also in contrast to structural coupling (Schemann, 1992: 220). Consequently, it is not considered any further in this book.

[2] Luhmann's theoretical concept stands in clear contrast to Richard Münch's (1984) emphasis who argues that repeatedly taking place interpenetration forms a zone of interpenetration that in itself emerges as a social system.

[3] Lange mentions the German *Wissenschaftsrat* as an example of a consolidated channel of structural coupling between the political and the scientific subsystem in Germany. The German *Wissenschaftsrat* is an organisation in which members of both subsystems work together on topics concerning research and educational policies. The papers drafted, act as bases for discussion and decision-making of the political subsystem (Lange/Braun, 2000: 60).

closed. Yet, interpenetration, structural coupling and irritations can take place, which leads him to argue that systems are also open.

Concerning the role of human organisms (psychical systems) as actors in social systems (subsystems of society), Luhmann acknowledges humans as the precondition of communication, but he does not regard them as part of the autopoietical organisation of communication and, therefore of society, as an ensemble of social systems. He excludes humans from social systems and instead regards them as psychical systems and as elements of the environment surrounding the social systems constituting society. Apodictically, Luhmann states: "Humans cannot communicate; merely communication can communicate" (1990: 31). Ralf Dziewas (1992) criticises Luhmann's concept of humans as psychical systems by stating that action requires the presence of the psychical as well as organic systems of humans. Hence, communication processes would not be possible if humans were merely regarded as psychical systems. Instead, Dziewas argues that psychical and organic systems form the environment surrounding social systems. For him, only the unity of psychical and organic systems enables communication. Dziewas describes the relationship between psychical and organic systems as the process of 'mutual structural coupling'. The psychical system of the human organism absorbs the messages of other systems. It then sends the matching signals to the organic system which produces the necessary replies and actions. These nevertheless depend on the psychical system, the conscience. According to this, Dziewas regards the unity of the psychical and the organic system, the human organism, as the precondition to communication. He agrees with the model of autopoiesis and with the idea of the human organism, as being an autopoietical system. He merely adds to it that the two autopoietical systems of the human organism (psychical and organic system) are inseparably interlinked by structural coupling. Hence, action cannot be separated from the organic system. In this respect, Dziewas restores the human being as an empirical research category, while at the same time theoretically concurring with Luhmann's system theory. For Dziewas just as for Luhmann, the social systems abstract action from participating human beings (Dziewas, 1992: 131/132). Hence, the actions taken by actors can be better explained by situations rather than the mental condition of the actor. Nevertheless, Dziewas argues that it is individuals who act and only the participation of humans makes communication possible. The unity of the psychical and organic system means that the conscience, the psychical system no longer acts as a research category but the whole human being. Actions can be related to human beings responsible for them and as such, they can be observed.

This does not mean that human beings are assessed as independently and self-consciously acting individuals, but that the situations and social systems determine the actions of these individuals. Yet, the unity of the psychical and the organic system enables the researcher to empirically assess human action within the concept of Luhmann's system theory.

In the context of this book this means that the construction processes of k-societies are observed first, by assessing which social systems of society are involved. Since this book empirically focuses on the subsystem state[4], the remaining subsystems are merely assessed with regard to their interaction with, and influence on, this subsystem. The process of constructing k-societies is then assessed by analysing the definitions of k-societies given, and actions taken, by the state. Since actions are carried out by human beings, I interviewed experts representing the subsystem state and who are/were involved in the assessed actions. [5]

In this chapter, the subsystems involved in constructing k-societies in the political spheres of Singapore and Germany are identified and the channels of communicating their interests to the subsystem state are analysed. Similar to Lange's referece to the German *Wissenschaftsrat*, an organisation in

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[4] This book acknowledges public administration, politics and judiciary as separate subsystems of society but – differently to Luhmann – subsumes all three under the subsystem state. This contradicts especially with the later works of Luhmann in which he separates the judiciary from the public administration and politics as an independent subsystem. In this book, the aim is to redraw the construction of k-societies as forms of social reality with an empirical focus on the constructive measurements taken by the public administration, national politics and judiciary. Hence, these three are here subsumed as one subsystem, labelled 'state'.

[5] Based on the theory of new institutionalism (neo-institutionalism), the actors identified in this book, are seen as institutionally embedded. Institutions are regarded as actors in society with long cultural, professional, legal and historical traditions which shape their interests and aims until today. Institutions create, legitimise and transform the basic units of society, their identity as well as their social distribution. Politics are based on institutions, their interests and actions (Hasse/Krücken, 1999: 9) that take place in an institutional environment, an environment consisting of other institutions, their interests and their actions. Hence, institutions are actors that influence politics and shape social reality. Furthermore, institutions are generally part of certain subsystems of society which are either characterised by certain functions of society or by specialised services provided by the actors of one subsystem for another (Schimank, 2000: 248-251). Therefore, the institutions represented by the interviewees quoted in this book will be regarded in the following as actors that shape society and who are part of certain subsystems.

which representatives of the state and scientific community discuss R&D/educational policies (Lange/Braun, 2000: 60), the channels of taking influence identified in this chapter are regarded as forms of structural coupling.

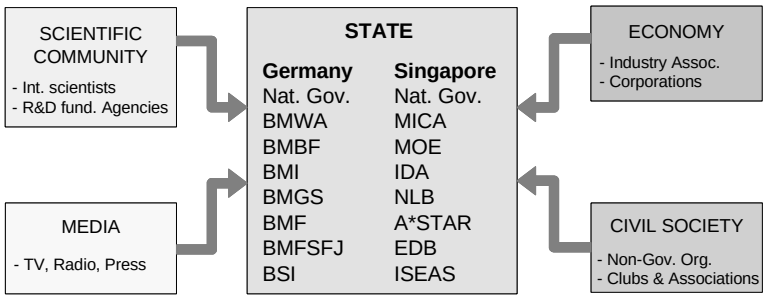
The main questions asked are: Which remaining subsystems are, besides the state, involved in the process of constructing k-societies? How do these subsystems communicate their interests in order to influence political action plans and programmes conceptualised and implemented by the state? What forms of structural coupling assure correspondence between each subsystem and the state in Germany and Singapore? Hence, how does communication take place between the federal government and its administration (state), state and economy, state and scientific community, state and civil society as well as state and media? Do they act as subsystems according to Luhmann in the process of constructing a German and a Singaporean k-society? Do the structural realities in both countries match Luhmann's description of modern society? And most pertinently, can the structural realities and actor relations described in this chapter be held responsible for two different types of k-societies being constructed in Germany and Singapore?[6]

Looking at the arena of acting subsystems in Germany and Singapore, it becomes obvious that in both countries Zöpel's notion of the 'asking state' (Zöpel, 1987: 19) applies. While in Zöpel's view, the state mainly asks the scientific community for solutions and some orientation in how to govern, Germany and Singapore both in their attempts to construct a new form of society or economy approach not only to the scientific community but especially the economy and to a lesser extent, civil society and the media for assistance. In Germany, this plea for help or – positively formulated – the openness for advice and cooperation, concentrates mainly on the implementation of projects. The process of policy formation is less open to the other subsystems. Their interests and views are heard via commissions of the German parliament (so-called 'enquete-commissions') and informal discussion rounds, but the formulation of a government action plan for example is not synchronised with the interests of the remaining subsystems before publishing. In Singapore, in comparison, this openness for advice is more institu-

[6] Luhmann regards societies which are functionally differentiated as modern societies and argues "structure follows function", i.e. the aim to be a modern society leads to a functionally differentiated restructuring of it. (The underlying idea is the same that led to the formation of the sociology of social action, and hence, the idea of the "human control over the system" (Dawe, 1978: 373, qtd. in Schimank, 2000: 206) in contrast to the belief of the middle ages that the basic structures of society are God given.)

tionalised and part of the policy formulation process. Through expert commissions, the consultation processes leading up to the formulation of action plans, as well as the membership on the board of directors of statutory boards, and the subsystems besides the state, heavily influence the formulation of action plans. As graphically illustrated in diagram 5-1, influence is taken by all five subsystems effectively, but to varying degrees. The economy clearly is the subsystem which is heard the most. Nevertheless, it has to be pointed out that it is always the state and its administration who invite the representatives of certain subsystems into their expert commissions and on their board of directors of statutory boards. Hence, the influence of the remaining subsystems is controlled by the state.

Diagram 5-1: The Arena of Engaged Subsystems



As graphically illustrated above, the subsystems which influence the activities of the state in constructing k-societies comprise economy, scientific community, civil society and media. These are the subsystems, besides the state, which are heavily interested in knowledge production, dissemination and economic exploitation. All of these interact with the state and influence the construction process of k-society. In Germany, the channels via which these subsystems communicate their interests to the subsystem state are expert, enquete and government commissions of the federal government, the implementation process of the government action plans, the public-private-partnership (PPP) initiative D21, as well as conferences and workshops on the topic. Nevertheless, it is important to note that all commissions on the level of the federal government can merely act as advisory bodies, and not as decision-making bodies. In Singapore, the main channels for influencing the activities of the state in constructing a k-society are committees assigned with

the conceptualisation of action plans, membership on the board of directors of a statutory board, or conferences and workshops. Similar to Germany, the expert committees merely act as advisory bodies without any decision-making power. Yet, in contrast to Germany, their final reports, including their recommendations, generally become government action plans, and hence become constructive activities after being passed by the minister cabinet or parliament, depending on who established the committee. Consequently, the interaction between state and remaining subsystems in Singapore, as well as their influences is far closer than in Germany.

Involved Subsystems and Structural Coupling in Germany

Te arena of actors besides the government and its administration includes in Germany the economy, scientific community, civil society and media. On the level of the states, the state governments and their administrations are additional main actors. This book empirically focuses on the constructive activities of national governments and hence will not discuss the state governments each separately.[7]

State

The subsystem state consists of (a) the federal government – *Bundestag* and *Bundesrat* (legislative bodies) with at the moment five political parties in the *Bundestag*, the federal chancellor and minister cabinet (executive bodies); (b) the administrative bodies – federal ministries and agencies (executive bodies); as well as (c) the judiciary.[8]

An idea such as the construction of a German k-society can be put forward by any legislative, executive and judiciary body. Yet, generally the overall policy directions are part of the government contract (often a coalition contract of each newly elected government) at the time of election.[9] Provided

[7] A discussion of the activities of all federal states (*Bundesländer*) towards a k-society would exceed the scope of this book by far.

[8] Since this book focuses on the activities of the legislative and executive bodies, the judiciary lies in the periphery of analysis.

[9] In the specific case of the current action plan "Information Society Germany 2006", the will to formulate a consecutive government programme to its predecessor "Innovation and Jobs in the Information Society of the 21st Century" was part of the coali-

that the specific topic shall be developed in the form of a government programme and not as an initiative of one ministry, the topic will be discussed and the drafting of an action plan decided by the minister cabinet. The cabinet assigns between one to three ministries with the drafting of the action plan/government programme. After presenting the final draft to the minister cabinet and applying final changes, it has to be approved by the cabinet. The implementation of the plan, as well as the formulation of progress statements and, after expiry, a final report will come under the auspices of one to three ministries in charge of drafting the programme. The action plan, its progress and final reports will be sent to the *Bundestag* and *Bundesrat* for debate. Inputs from these debates should be considered during the implementation of the plan. It is not common to include other subsystems of society such as the economy, scientific community, civil society and media in the formulation of the action plan, its progress and final reports. Nevertheless, it is common that these subsystems are involved in the implementation process of the government programme.

Since the mid 1990s, the conceptualisation of action plans aiming at the construction of a German k-society is under the auspices of the Federal Ministry of Economics and Labour (BMWA) under the department "Conceptual Questions and International Matters concerning the Information Society" (*Referat "Grundsatzfragen und internationale Angelegenheiten der Informationsgesellschaft"*) and the Federal Ministry of Education and Research (BMBF) under the department "Information and Communication; New Technologies" (*Information und Kommunikation; Neue Technologien*).[10] Between these two ministries, BMWA takes on the leading role, which finds expression in the

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tion contract of 2002 (re-election of the coalition government between SPD and Union90/The Greens).

[10] A member of the study commission "Future of the Media in Economy and Society – Germany's Road into the Information Society" states: "Until 1998, it was always the Federal Ministry for Research that was active in the field of the information society, never the Federal Ministry of Economics. The reason for the Federal Ministry of Economics being in charge of the action programmes today is an exchange of departments under Lafontaine as FM of Finance. He wanted the policy department and for this had to trade in the multimedia department of the research ministry. That was the reason why the Federal Ministry of Economics was renamed the Federal Ministry of Economics and Technology. Nevertheless, BMBF continued to be active in this field and until today these two ministries stand in unsolved competition to each other concerning this topic. Even though in all action programmes it is said "the federal government", there is no real coordination and cooperation" (H. Kubicek, 12.11.04, interview with & translation by the author).

fact that BMWA's permanent secretary Dr. Bernd Pfaffenbach heads the "Permanent Secretaries' Project Group Information Society" (*Staatsekretärsprojektgruppe Informationsgesellschaft*). In this project group, permanent secretaries of all ministries oversee the implementation of the government action plans. Besides BMWA and BMBF, most other federal ministries conduct programmes contributing to the creation of a German k-society and therefore are involved in the process of construction. The textual orientation and content of these activities conducted by the varying ministries do not always harmonise with each other.[11] Nevertheless, all activities are reported to BMWA/BMBF and incorporated in the action plans.[12] Exceptions form all eGovernment services offered by the federal ministries. These are coordi-

[11] A member of the study commission "Future of the Media in Economy and Society – Germany's Road into the Information Society" and representative of the scientific community (Professor of Informatics at the University of Bremen and Scientific Director of the *Stiftung Digitale Chancen)* gives the following example for missing coordination: "In the case of BundOnline, for example, the project group BundOnline 2005 in the Federal Ministry of the Interior is in charge but has no budget for innovations. Instead, BMWA finances some activities. Although meetings between BMI and BMWA take place, BMWA generally is not too impressed by what BMI says. For example the fact, that elections online in the political sphere will never take place. And this is obvious already since a long time. But BMWA still finances such a project with approximately €3m" (H. Kubicek, 12.11.05, interview with and translation by the author).

[12] As such, the Federal Ministry of the Interior (BMI – *Bundesministerium des Innern*) coordinates BundOnline, the eGovernment-activities of the federal government. The Federal Ministry of Health and Social Security (BMGS – *Bundesministerium für Gesundheit und Soziale Sicherung*), which supports the introduction of the electronic health card. The Federal Ministry of Finance (BMF – *Bundesministerium der Finanzen*), which coordinates Elster, a programme for filing tax electronically as well as Atlas, a programme for making custom duty available online. The Federal Ministry for Families, Seniors, Women and Youth (BMFSFJ – *Bundesministerium für Familie, Senioren, Frauen und Familie*), which promotes the use of information and communication technologies amongst senior citizens, women and youngsters from socially weak backgrounds. Furthermore, the federal government established the Federal Office for Information Security (BSI – *Bundesamt für Sicherheit in der Informationstechnik*) which is responsible for ensuring the secure use of ICTs in Germany.
Further details on the activities of each federal ministry can be found in chapter 8 of this book as well as in BMWA/BMBF, 2003: 77-90.

nated by the project group BundOnline 2005, which therefore communicates directly with the ministries of origin.[13]

The discussion process in the German *Bundestag* is commonly influenced by the subsystems economy, scientific community, civil society and media. Nevertheless, it is important to point out that the action plans of the German government are conceptualised by the German executive. Hence, the ministries assigned with the task, as well as the minister cabinet, authorise the final draft for publication. In the process of conceptualising these plans, the executive does not officially consult any other subsystems or thematically synchronise the concept of the executive with the interests of the economy, scientific community, civil society and media. According to the head of the department "Conceptual Questions and International Matters concerning the Information Society" in BMWA (B. Weismann, 10.09.05, phone conversation with the author), some informal discussion rounds and workshops are held with representatives of the economy, scientific community and civil society in order to enable them to voice their interests. Yet, the action plan is not discussed before being published. Once published, all subsystems of society are engaged in the implementation process. This stands in clear contrast to the practices in Singapore, where representatives of the subsystems besides the state can influence the conceptualisation of action plans, as discussed later.

The main channels for taking influence (more or less consolidated forms of structural coupling) on the subsystem state regarding the construction of a German k-society are study, government and enquete-commissions of the federal government,[14] the implementation process of the government action plan, public-private-partnership (PPP) initiatives[15], as well as conferences and workshops on the topic. They qualify as means of structural cou-

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[13] This direct communication, as well as the implementation of services broken down according to the ministries they originate from, is illustrated in the implementation plan of BundOnline 2005 (BMI, 2004: 10).

[14] For details on enquete-commissions of the German *Bundestag* see Heyer/Liening, 2004 and Rössler, 2002: 56-58.

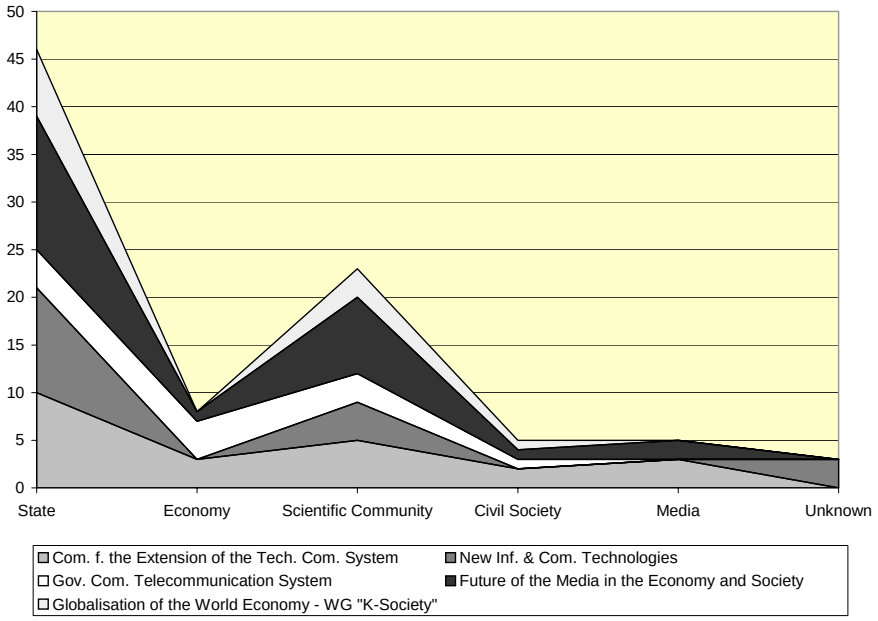
[15] The project group BundOnline of the Federal Ministry of the Interior defines PPP as the cooperation of the public with the private sector aiming at an economically more viable completion of public tasks (Harling, 2003: 3). In contrast to many Anglo-Saxon countries, PPP-initiatives in Germany are still quite young but gaining popularity. Several reasons can be mentioned, including the severe budget constraints of the public sector (on federal, state and municipal level), the aim to end the economic downturn by implementing economy-friendly policies, the increasing power of multinational corporations and growing dependency of the public from the private sector.

pling since representatives of the subsystem state as well as representatives of the remaining subsystems involved come together in these commissions, PPP-organisation, conferences or workshops in order to express their interests and prepare topics important to future policy-making. The topic of the German k-society was discussed by a total of five commissions on the level of the federal government: (a) one independent study commission ("Commission for the Extension of the Technical Communication System"); (b) one government commission ("Telecommunication System"); and (c) three enquete-commissions ("New Information and Communication Technologies", "Future of the Media in the Economy and Society – Germany's Road into the Information Society" and "Globalisation of the World Economy", which included a separate working group "Knowledge Society"). While the independent study commission as well as the government commission are both appointed by the federal government, the enquete-commissions are instruments of the federal parliament. It is the task of the independent study as well as that of the government commission to analyse a certain topic and formulate policy recommendations for the federal government. The enquete-commissions, in contrast, analyse certain topics and prepare reports meant for the federal parliament. The recommendations formulated by enquete-commissions are supposed to support the decision-making processes in the federal parliament (legislative body). Yet, they do not necessarily enter actual decision-making. This differs from the recommendations of the independent study commission and the government commission, which are heard directly by the whole government (legislative and executive bodies). Furthermore, enquete-commissions base their analyses on multiple – generally public – expert hearings to which they invite – besides their members and deputy members – representatives of the scientific community, economy, civil society and media. Partly due to these hearings, the work of enquete-commissions generally lasts longer than that of the independent study and government commissions. This results in the fact that often the final recommendations are published when the topic is no longer of immediate political interest. This is especially the case when a change in government takes place in the meantime. Based on the data collected for this book, it can be stated that the recommendations of the enquete-commissions contributing to Germany's k-society seemed to enter the political decision-making processes far less than the recommendations formulated by the independent study and government commissions. The independent study and government commissions report directly to the government and are – provided that they report to the same government that appointed them (as is generally the case) – more likely to be heard. The enquete-commissions generally report to a different parliament

than the one that established it (due to the long working periods of enquete-commissions). This will be discussed in more detail in chapter 8.

The subsystems economy, scientific community, civil society and media are represented in the five commissions of the German government contributing to the construction of k-society as illustrated in diagram 5-2.

Diagram 5-2: Subsystems' Presence in K-Society Commissions – In total numbers[16]



Source: Composed by the author based on DBt, 2002: 604-611; DBt, 07.12.1995: 163-167; DBt, 28.03.1983: 2; KtK, 1976: 15-17; Regierungskommission Fernmeldewesen, 1987: 10-11.

[16] This diagram is based on the total numbers of actual members of the commissions. Deputies and experts (*Sachverständige*) invited to expert hearings were not counted. If the numbers of all invited experts and deputy members were used for this diagram, the numbers of representatives of the scientific community and the economy had to be increased while nevertheless the state would form the biggest group, followed by the scientific community, economy, civil society and media. Concerning the commission "Globalisation of the World Economy" the members of its working group "Knowledge Society" were counted, not all members of the commission.

Diagram 5-2 clearly shows the dominant position of the state and the scientific community in all five commissions. A graphical illustration of the representation of the different subsystems in each commission separately in percentage can be found in Appendix I.

None of these commissions are granted the certainty that they will influence the conceptualisation of a government action plan or other forms of policy making. Nevertheless, government action plans are conceptualised by the executive and hence, the recommendations of independent study and government commissions that are reported directly to the executive and legislative branches of the government are generally taken into account. The legislative branches can accompany the conceptualisation process of a government action plan by formulating recommendations itself or voicing requests but it is not directly involved in the process of conceptualisation. The recommendations of enquete-commissions reporting to the legislative branches are therefore not as directly heard by the executive branches and hence are less likely to enter the conceptualisation of government action plans. Once the government action plan is conceptualised by the executive branch and passed by the minister cabinet, it is sent to the legislative branch merely for notification and discussion.

While not directly getting involved in the conceptualisation of the action plan, the remaining subsystems nevertheless can directly influence the implementation of the plan. This is possible via project-based engagement and therefore strong cooperation with the ministries in charge. Besides this, the PPP initiative D21 is specialised on the topic of creating a German k-society and offers a wide platform for the exchange of interests among all involved subsystems. It also organises a multitude of workshops and conferences concerning different subtopics that mainly aim at direct communication between the state, its administrative bodies and the economy, which is the subsystem mainly represented by the initiative. These channels of influence will be discussed in detail with regard to the subsystems using them.

Additionally within the subsystem state, the four political parties of the German *Bundestag* are ideologically and conceptually supported by their foundations, which act as political think tanks, communicate the interests and ideological standpoints of their parties to the public as well as advise their parties on concrete topics such as the action plan "Information Society Germany 2006".

Economy

The economy influences the state in constructing a German k-society either through its multiple industry associations or – in the case of some of the big multinationals – via their own representatives. The channels through which the state activities can be influenced include the five commissions of the federal government, the PPP-Initiative D21 as well as a multitude of conferences and workshops.

The main industry associations in Germany are the Federation of German Industries (BDI – *Bundesverband der Deutschen Industrie e.V.*), the Association of German Chambers of Industry and Commerce (DIHK – *Deutscher Industrie- und Handelstag*) and the Confederation of German Employers Associations (BDA – *Bundesvereinigung der Deutschen Arbeitgeberverbände*). Furthermore, there are associations focusing on certain industrial sectors such as the Association of the Chemical Industry (VCI – *Verband der chemischen Industrie*), PlasticsEurope e.V., the Association of Private Radio and Telecommunication (VPRT – *Verband Privater Rundfunk und Telekommunikation*), the Federal Association of German Newspaper Publishers (BDZV – *Bundesverband Deutscher Zeitungsverleger e.V.*) and the German office of the International Federation of the Phonographic Industry (BPV – *Bundesverband der Phonographischen Wirtschaft e.V.*) to name a few. These associations regularly represent the interests of their subsystem in the political sphere. As such, DIHK, BDA, VPRT, BDZV and BPV participated in expert hearings for the final report of the enquete-commission "Future of the Media in the Economy and Society" (DBt, 07.12.1995: 163-167). Furthermore, the representatives of major corporations took part in the expert hearings of this enquete-commission. Some examples include IBM Germany, Siemens AG, the German Telekom AG, AOL Bertelsmann Online Europe, and the Sparkassen Information Centre GmbH (DBt, 07.12.1995: 163-167). Also, the BDI participated in several expert hearings for the final report of the enquete-commission "Globalisation of the World Economy". Yet, no representatives of the economy were part of the working group "Knowledge Society" of this commission (DBt, 2002: 604-611).

As illustrated in diagram 5-2, the economy was overall represented with merely 8 members in all five commissions of the federal government, while the state was involved with 46 and the scientific community with 23 members. Civil society and media were each represented by 5 members. Hence, the representatives of the economy as a subsystem form the third biggest group in the commissions of the federal government concerned with

k-society construction. According to the presented data, the subsystem was mainly represented in the government commission "Telecommunication System" (4 members of 12) and the independent study commission "Commission for the Extension of the Technical Communication System" (3 members out of 23). In the enquete-commission "Future of the Media in the Economy and Society" the economy had one representative (of 26 members) and in the remaining two enquete-commissions none. This is illustrated in percentage in Appendix I.[17]

The implementation process of the government action plan is heavily influenced by the economy as a subsystem of society via projects such as "Internet for All" or "Schools on the Net"[18]. Here, the ministries in charge actively seek the cooperation with the economy (often via PPP-initiative D21) in order to conjointly pursue a common aim.

Since 1999, the Initiative D21[19] offers a heavily used platform for exchanging the interests of its members. It is Germany's largest public-private-partnership organisation with more than 400 representatives of enterprises, associations, political institutions and civil society organisations, including board members from companies such as Alcatel, AOL, Cisco Systems, debitel, IBM, Microsoft, Siemens and TNS Emnid. They are assisted by an advisory council which was until the recent elections, chaired by then German Chancellor Gerhard Schröder. D21 was initiated by the economy in cooperation with the federal government and its administrative bodies. Accordingly, the economy followed by the state form the subsystems which are most represented in the PPP-initiative. Much less involved are the civil society, scien-

[17] Members of parliament who participate in these commissions are counted as representatives of the state, since they officially represent the legislative branch of the government. Yet, some of these members of parliament are at the same time members of economic lobby groups and therefore act as unofficial intermediaries between the state and the economy.

[18] The project "Schools on the Net" is also an example for the cooperation between federal and state governments which are in charge of education. Depending on the projects, the states act as additional drivers.

[19] According to the Initiative D21, the shared goal of the involved subsystems is "to improve the general conditions necessary to move successfully into the information and knowledge society and to make Germany more internationally competitive and ready for the future" (Initiative D21, 2005). This overall goal is pursued in approximately 50 projects, headed by a representative either of the economy or the state, and mainly focus on the promotion of skills in using ICTs.

tific community as well as the media.[20] Besides a series of small events, conferences and workshops, D21 organises an annual congress which is heavily used by all sides to promote their interests, raise awareness, and amass the required financial or decision-making support. Hence, D21 offers a platform for the mutual exchange of interests without officially representing one specific subsystem of society.

In addition to the events organised by D21, a host of other conferences act as forms of structural coupling by offering the possibility to communicate the interests of the economy to the state. One international example is the UN-Summit for the Information Society (WSIS) in Geneva (2003) and Tunis (2005).[21]

Scientific Community

The scientific community of Germany basically uses the same channels of influencing the political discussion as the economy. The main differences, however, are that the scientific community (a) is represented in the commissions of the federal government by far more members than the economy; (b) is far less organised in associations and alliances representing its own interests; and (c) is not actually representing the interests of the scientific community but instead most members of the scientific community participate in the expert hearings of enquete-commissions due to their (socially constructed) expertise rather than as representatives of the scientific community. Due to the little organisation of the scientific community in interest groups, it is not always possible to actually identify the interests of the scientific community as a subsystem and even more difficult to represent them. Hence, the members of the scientific community mainly speak as independent experts of

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[20] A potential reason for this might be the annual membership fee of €5,150.00 which determines who can afford to participate. Alternatively, one can also become a supporter. The annual fee for supporters depends on the size of the organisation (number of employees) and ranges from €500.00 (up to 50 employees) to €2,500.00 (more than 250 employees).

[21] On both occasions, the federal government of Germany, under the auspices of the Federal Ministry of Economy and Labour (BMWA) illustrated its activities in constructing a k-society. The subsystems economy, scientific community and civil society cooperated closely with BMWA in order to present an all-embracing picture of the German k-society. For details see ITU, 2006.

the discussed topic and only secondarily as representatives of the interests of their own subsystem.

As illustrated in diagram 5-2, the scientific community was represented with altogether 23 (out of 90) members in the five commissions contributing to the construction of a German k-society. As such, the scientific community formed the second largest subsystem in these commissions, following the state. Diagram 5-2 illustrates that the scientific community was represented most in the commission "Future of the Media in the Economy and Society" (8 out of 26 members), second in the "Commission for the Extension of the Technical Communication System" (5 out of 23 members), with 4 of 18 members in the commission "New Information and Communication Technologies" and with 3 members each in the government commission "Telecommunication System" (3 out of 12 members) and the working group "Knowledge Society" of the enquete-commission "Globalisation of the World Economy" (3 out of 11 members). The representation of the scientific community in the five commissions in percentage is illustrated in Appendix I. Nevertheless, it is important to bear in mind that these representatives of the scientific community generally do not actually represent the interests of the scientific community but are involved in the commissions due to their expertise on the topic.[22] Similarly, the scientific community is present in the implementation process of the government action plan by being involved in certain projects for the state, economy and civil society, and not so much for the media. Thus, they act on the basis of their expert knowledge, and not as representatives of the scientific community.

One exception is the German Research Foundation (DFG – *Deutsche Forschungsgemeinschaft*) which is a self-governing body that promotes research at universities and other publicly financed institutes in Germany. With a yearly budget of around €1.3 billion[23] the DFG substantially directs research in Germany. Yet, DFG does not act as an association of all German universities and research institutes which directly represents the interests of the scientific community as a subsystem of society. The mere fact that DFG is in-

[22] As stated by the head of the Information Science Department, University of Constance, who was invited to an expert hearing of the enquete-commission "Globalisation of the World Economy", the scientific community sometimes merely acts as a fig leaf while the interests of lobby groups prevail (R. Kuhlen, 26.11.04, interview with & translation by the author). This will be discussed in detail in section 8.3.1.

[23] In 2005, it amounted to €1,309.2m, of which 58% were funded by the federal government, 41.7% by state governments and 0.3% by private donations and DFG's own income (DFG, 2006).

volved into a wide range of research conducted in Germany suggests that it indirectly supports the interests of the scientific community in an enquete-commission of the German *Bundestag*. It was represented by its vice-president in the enquete-commission "Globalisation of the World Economy" but not in its working group on "Knowledge Society".

Furthermore, some representatives of the scientific community participate in D21. This rather small circle is mainly composed of research institutes such as the *Fraunhofer Gesellschaft*, representing their own interests rather than the interests of the scientific community as a subsystem of society. Universities do not hold the membership title in D21. Similarly, members of the scientific community participate in conferences and workshops on both national and international levels without representing the scientific community as a subsystem. For example, the process leading up to both parts of the UN-Summit for the Information Society, as well as the summit itself, was accompanied by a multitude of members of the scientific community. But, in general, these academics were working for and representing one of the other subsystems, mainly state, economy, civil society, and to a lesser extent, the media – rather than the scientific community.

Hence, the influence of the scientific community on policy formation or the conceptualisation of an action plan such as "Information Society Germany 2006" exists, yet it is limited due to the lack of internal organisation of the subsystem. Their influence is generally not based on the interests of the scientific community as a subsystem (e.g. budget increases for R&D and education) but the scientific community offers expert knowledge to the process that has little to do with representing its own interests.

Civil Society

Civil society as a subsystem of society is represented by non-governmental, generally non-profit organisations, as well as associations and federations working for the common good (*Sozialverbände*). Although the influence of civil society groups engaged in the field of fostering a German k-society has increased in the past few years, it is still limited. Besides the general means of demonstrations and strikes, used by people to express their opinions on political matters, the channels to influence the construction of a German k-society are the same as used by the economy, scientific community and media. Naturally there is no one association representing the whole of civil society, but multiple groups, each representing their respective interests.

As illustrated in diagram 5-2, the civil society of Germany is on the whole represented in the commissions contributing to the German k-society up to the same degree as the media. While the civil society is represented in four out of these five commissions, the media is merely represented in two but therefore in these 2 with more members. diagram 5-2 shows the actual membership of the subsystem in the commissions. The civil society is most represented in the "Commission for the Extension of the Technical Communication System" (2 out of 23 members). This is quite surprising since this commission completely focused on the building of the technical infrastructure. In the enquete-commission "Information and Communication Technologies", the civil society is not represented at all (0 out of 18 members), but this means that they are represented in the remaining two commissions and the working group "Knowledge Society", with one member each ("Telecommunication System" – 1 out of 12; "Future of the Media in the Economy and Society" – 1 out of 26; working group "Knowledge Society" in "Globalisation of the World Economy" – 1 out of 11). This low rate of representation in the commissions is also mirrored in the expert hearings, such as the ones leading to the final report of the enquete-commission "Future of the Media in the Economy and Society". Here, only two groups representing the interests of the civil society participated (DBt, 07.12.1995: 163-167). These two non-profit organisations were the Chaos Computer Club e.V. which mainly represents hackers, as well as the TeleTrusT Germany e.V. which was originally founded in 1989 to promote the security of ICTs in an open systems environment. In the expert hearings of the enquete-commission "Globalisation of the World Economy", again merely two groups representing civil society were involved: Greenpeace Germany and the trade union ver.di (DBt, 2002: 604-611).

With regard to the process of implementing the government action plan, civil society is involved in a multitude of projects. Depending on the project focus, the ministries in charge actively look for cooperation with non-governmental organisations in order to use their infrastructure for carrying out the projects. For instance regarding the project "Internet for All" (and its sub-projects "Seniors on the Net", "Women on the Net", etc.), BMWA and BMBF turned to non-governmental organisations such as the German Red Cross and the network of adult education centres (*Volkshochschulen*) to conduct computer and internet training courses. Yet, this channel of influence is restricted to the process of project implementation. It is not a channel for

actually influencing the political discussion or the conceptualisation of the government action programme.

In the PPP-initiative D21, only a few groups represent civil society. Actual members of D21 include the organisation "Women give Technology new Impulses e.V." (Frauen *geben Technik neue Impulse e.V.*), which promotes the use as well as the further development of ICTs amongst women, and school@ktive e.V. (*schul@ktiv e.V.*), an association coordinating the distribution of donated personal computers amongst schools. Supporters, not actual members, of D21 include the Digital Opportunities Foundation (*Stiftung Digitale Chancen*), which addresses the closing of the digital divide in Germany and hence promotes the use of ICTs amongst low-income groups, as well as the Society of Informatic (*Gesellschaft für Informatik e.V.*) which represents professionals in the field of informatics.

Conferences and workshops are an additional form of structural coupling between the civil society and the state, in which representatives of both subsystems participate. Furthermore, civil society organises conferences on the German k-society without inviting state representatives. These conferences always serve the purpose to advance the topic and raise awareness. Up to what extent their results are heard by the state and actually enter policy making cannot be assessed here. Yet, the UN-Summit for the Information Society showed that civil society can make itself heard, when a high level of internal organisation is given. In other words: the better organised civil society is, the more governments have to listen to its interests.

Although the influence of civil society on the national level of German politics is quite low, it is important to mention that civil society in Germany strongly shapes the definition of which forms of knowledge are regarded as valuable and therefore worthy of support. This is done by non-governmental organisations, representatives of parenthood in schools, representatives of students on university boards, and small associations running local museums, libraries, organising exhibitions and theatre performances (BMFSFJ, 2004). This high level of cultural and educational engagement on a volunteer basis strongly determines a plural definition of knowledge prevalent and therefore influences which kind of k-society is constructed.

Media

Similar to the other subsystems of society engaged in the construction of a German k-society, the media also attempts to influence the con-

struction process in the political sphere via the government commissions. Nevertheless, the media is far less represented in the commissions than its level of influence on political decision-making suggests. Obviously this can be explained with its unique position of expressing but at the same time shaping and continuously constructing public opinion. The media does not need to seek ways how to influence political decision-making because it already possesses the most powerful one: the freedom of expression combined with its access to the minds of the people who are citizens, voters, consumers, users and tax payers. Nevertheless, the media was represented in two commissions contributing to Germany's k-society, namely in the "Commission for the Extension of the Technical Communication System" (3 out of 23 members) and in the enquete-commission "Future of the Media in the Economy and Society" (2 out of 26 members, as illustrated in diagram 5-2 and Appendix I). Therefore, the media was represented with 5 out of 90 members, in all five commissions contributing to a German k-society.

Besides the government commissions as channels of influence, the media does not attempt to directly influence the construction of a k-society or the conceptualisation of the government action plan. The media is not represented in the PPP-initiative D21 and does not contribute to the implementation of the government action programmes. Nevertheless, the media contributes to the construction of the vision of a self-emerging k-society by spreading the idea, envisioning a future increasingly based on knowledge, information and ICTs and therefore by making people believe in it. This vision, further spread by the media, is then used by the authors of government programmes in order to legitimise the political action taken.

Involved Subsystems and Structural Coupling in Singapore

State

In Singapore, the subsystem state consists of (a) the government – prime minister, president, minister cabinet (executive), the parliament (legislative); (b) the administration – ministries, statutory boards and government agencies (executive); as well as (c) the judiciary. When an idea such as the creation of k-society is established as a political agenda, it is generally first suggested by a minister, the chairman of a statutory board or by an expert commission. After being suggested, it will be discussed by the minister cabinet as well as the parliament. If approved, a ministry or statutory board is

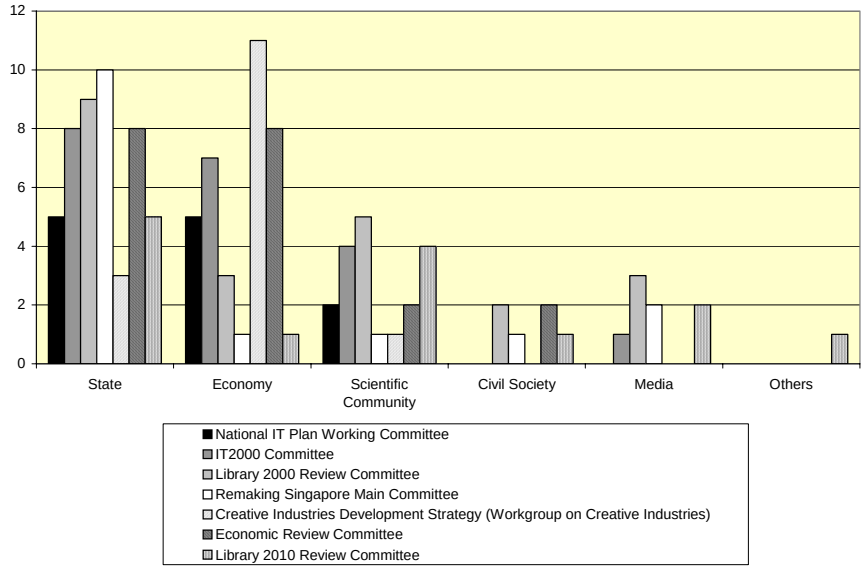
assigned with the conceptualisation of an action plan. Each plan drafted by a statutory board or a ministry has to be approved by the minister cabinet, the parliament or the minister of the parent ministry before being published. Which government body has to give approval depends on aspects such as the number of ministries involved, the size of the financial budget of the plan, and the relevance of the topic to overall politics. Within the ministries and statutory boards, communication runs along the established lines of hierarchy. Statutory boards in Singapore are semi-independent agencies under a parent ministry. The chairman of the board of directors reports directly to the cabinet minister of the parent ministry. Hence, the channels of communication between statutory boards and the cabinet are comparable in their immediacy to the channels of communication between permanent secretaries of ministries and the cabinet.

The interest of the Singaporean government to foster the creation of k-society goes back to 1980 when Goh Chok Tong, then Minister of Trade and Industry, appointed Dr. Tony Tan, then Senior Minister of State for Education, to chair a high-level ministerial Committee on National Computerisation (CNC). It was the task of this committee to study the potential benefits for Singapore from exploiting ICTs, which resulted in the founding of a National Computer Board (NCB) by the parliament (Neo/Soh, 1993: 2). Since then NCB acts as the main driver within the state administration for creating k-society. In 1999, NCB merged with the Telecommunication Authority of Singapore and together they formed the Infocomm Development Authority (IDA). IDA is since then a statutory board of the Singaporean government and operates under the Ministry of Information, Communications and the Arts (MICA). Besides the infrastructural emphasis of IDA, MICA as well as its statutory boards increasingly focus on content development since the beginning of the 1990s. The Ministry of Education (MoE) emphasises the use of computer technology as well as the development of creativity in schools. Furthermore, it is the task of the Agency for Science, Technology and Research (A*STAR), a statutory board of the Ministry of Trade and Industry, to raise the local content production in its 12 research institutes. The Economic Development Board (EDB), a statutory board of the Ministry of Trade and Industry, oversees all activities with regard to their economic relevance.

Main channels of influencing the conceptualisation of action plans and policy making for the subsystems economy, scientific community, civil society and media are (a) expert commissions/committees that report either

to the parliament, the minister cabinet, one ministry or a statutory board; (b) by becoming a member of the board of directors of a statutory board, or (c) during conferences and workshops. Expert commissions/committees as well as the membership on a board of directors of a statutory board are popular ways in Singapore to embrace the expertise of the subsystems as well as for the subsystems themselves to influence policy formation. The diagram below illustrates the influence of the subsystems in seven committees responsible for the drafting of action plans that contribute to the Singaporean k-society. Unfortunately, the list of contributors of the Committee on National Computerisation in 1981 is not accessible. Furthermore, the action plans "Infocomm21" and "Connected Singapore" published by IDA were drafted informally and without actual committees. Hence these three action plans are missing in the diagram beneath.

Diagram 5-3: Subsystems' Presence in Planning Committees - In total numbers

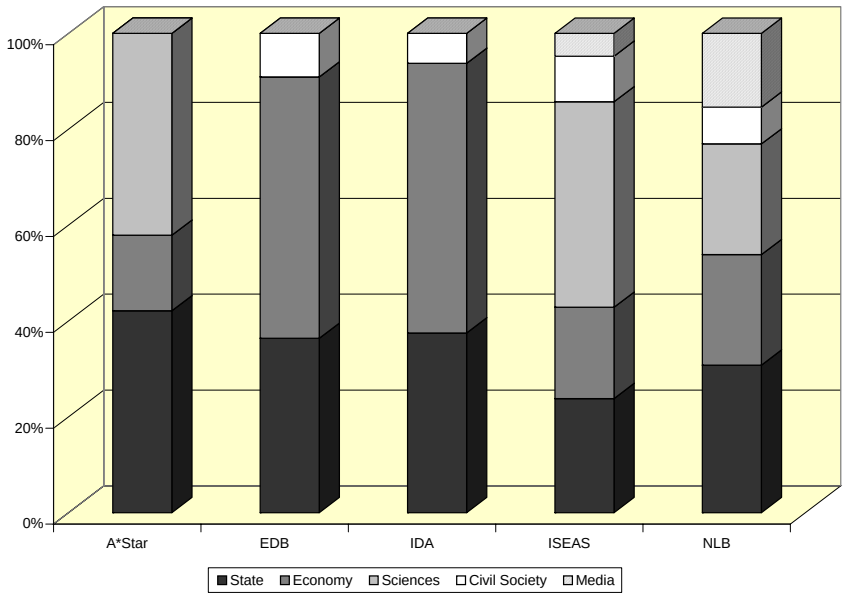


Source: Compiled by the author based on the contributor's lists of the committees (not subcommittees, due to lacking information on the occupations of the members) as published in action plans (National IT Plan Working Committee; 1985; NCB, 1992: 5; Library 2000 Review Committee, 1994: 121-129; The Remaking Singapore Committee: 2003, 90; ERC, 2003: 192-194; NLB, 2005: 35-42).

Naturally, the state is represented in every committee formulating an action plan. Furthermore, the economy carries strong influence and focuses especially on certain action plans such as the "Creative Industries Development Strategy" and the Economic Review Committee (ERC). The scientific community participates in all committees under surveillance, but is less in numbers than the state and economy. The civil society as well as the media are mainly represented in committees on the extension of the library network, but also in the ERC and the Remaking Singapore Main Committee. The group 'others' is a law firm that participated in the shaping of "Library 2010" and will not be addressed here.

Similar to the channel of government committees, the channel of having representatives on the board of directors of statutory boards is used by all subsystems, especially by the economy and scientific community. This is illustrated in the two diagrams below with reference to statutory boards engaged in the creation of a Singaporean k-society. The data illustrated below count representatives of Singaporean universities as members of the subsystem scientific community, although the two biggest universities – National University of Singapore and Nanyang Technological University – are statutory boards of the government. Personnel of both universities could also be counted as representing the state. This is not done here since they are institutionally embedded in the universities as primarily academic institutions, and only secondarily as state institutions.

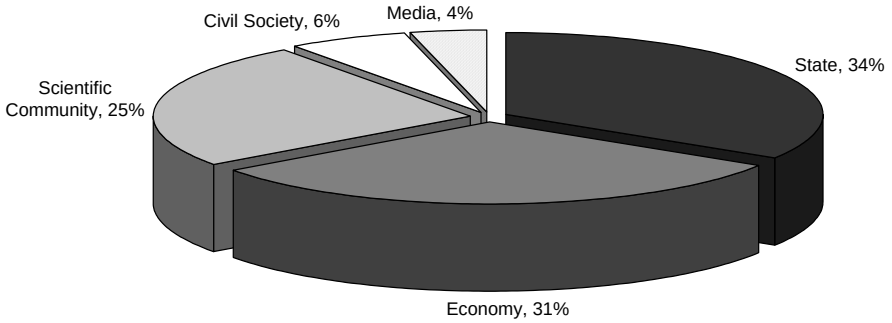
Diagram 5-4: Subsystems' Representation on Boards of Directors of Statutory Boards



Source: Compiled by the author based on Singapore Government, 2005.

The total participation of the 5 subsystems on the board of directors of the statutory boards under surveillance is shown in percentages in the diagram below.

Diagram 5-5: Represented Subsystems in Statutory Boards



Source: Compiled by the author based on Singapore Government, 2005.

The subsystems and their influence on the construction of a Singaporean k-society by the state is discussed in detail below.

Economy

Besides the state, the economy is the second best represented subsystem in government activities. The main channels for communicating its interests to the state, apart from informal channels, are committees concerned with the conceptualisation of action plans as well as the boards of director of statutory boards. Concerning the conceptualisation of action plans, NCB developed a comprehensive consultation process involving representatives of the state and the economy in the planning procedure, which is still used today by IDA. It aims at the exchange of knowledge and the communication of interests between the two subsystems leading up to each national IT plan.[24] This consultation process has been exported by NCB and is today used by most statutory boards for outlining new action or master plans. Depending

[24] The National IT Plan Working Committee in 1985 comprised representatives from NCB, EDB, Singapore Telecom and the National University of Singapore, all statutory boards of the government. Yet, in 1990, NCB felt the need for a new IT master plan (IT2000) focusing on ICT-infrastructure as well as applications. In order to write such a plan, a comprehensive consultation process was designed, identifying eleven industry sectors, most relevant to the Singaporean economy. For details, see Appendix V.

on the focus of each of these action plans, the conceptualising procedure includes representatives of all subsystems of society. As shown in diagram 5-3, the economy is present in all planning committees assigned with the formulation of action plans. Particularly strong is the influence of the economy in committees of IDA, such as the National IT Plan Working Committee (5 out of 12 committee members), the IT2000 Planning Committee (6 out of 20) as well as in overall government planning committees such as the Economic Review Committee (8 out of 20), as well as its Subcommittee Industry and Services responsible for the Creative Industries Development Strategy (11 out of 15). Less represented is the subsystem in the planning processes concerning 'soft' policy areas such as the Library 2000 Review Committee (2 out of 20) and the Library 2010 Review Committee (1 out of 14). One exception is the Remaking Singapore Main Committee in which the economy is only represented by 1 out of 15 committee members with the state being the biggest group with 10 members. Yet, in the subcommittees of the Remaking Singapore Planning Process, the representatives of the economy amount to a similar number as the representatives of the state.[25]

The second most common channel for influencing the conceptualisation of action plans is the membership of representatives on the boards of directors of statutory boards. Diagram 5-4 and diagram 5-5 illustrate the strong influence of the economy in most statutory boards contributing to the Singaporean k-society. At IDA, 9 out of 15 members of the board of directors are representatives of the economy; only 6 represent the state and only one represents the civil society. A similar situation can be assessed in EDB, where 6 of 11 board members represent the economy, 4 from the state and only 1 from an organisation representing civil society. Less dominant is the influence of the economy in the statutory boards focusing on the educational and research aspects of k-society as compared to infrastructure and economic or technological development. Hence, only 3 out of 19 board members of A*STAR are representatives of the economy, while 8 work for the state and 8 for academic institutions. At ISEAS, the economy is only represented by 4 out of a total of 21 board members, the state represented by 5 members, civil society represented by 2 and the media represented by 1. The members of the scientific community on the board of directors of ISEAS form the biggest group with 9 out of 21 board members. The representation of all five subsystems is most widely distributed on the board of directors of NLB. Here, the

[25] This could not be illustrated in diagram 5-3 above since in most action plans the institutional embeddedness of sub-committee members is not revealed.

state is represented by 4 members, the economy by 3, the scientific community also by 3, civil society by 1 and the media by 2 board members.

Overall the influence taken by the subsystems on the political planning process appears to be rather strong. Channels for communicating the interests especially of the economy, but also of the scientific community and to a lesser extent of civil society and the media to the state, are heavily used. Nevertheless, there is a strong bias towards the interests of the economy. This is expressed by the economy's strong position in the process of policy formation, meaning in government committees and on boards of directors of statutory boards. The board members of statutory boards as well as members in expert commissions and participants in the consultancy process developed by IDA are always hand-chosen and invited by an administrative body of the state. Hence, the state administration clearly picks representatives of certain subsystems and obviously, as the data show, regards the opinion of the economy overall as the most important. Nevertheless, as pointed out above, the scientific community as well as civil society and media are increasingly heard, especially by the statutory boards that are not directly involved in economic activities.

Scientific Community

Similar to the economy, the scientific community participates in the process of shaping political programmes via the consultation process leading up to the formulation of action plans as well as through representatives on the boards of directors of statutory boards. As discussed above, the scientific community mainly influences the process of policy formation with regard to 'soft topics' concerning the Singaporean k-society, such as education, research and the library network. However, it is also present in the consultation processes leading up to action plans of IDA regarding technologic and economic aspects of k-society.

As shown in diagram 5-3, the scientific community was present in the National IT Plan Working Committee with 2 out of a total of 12 committee members. In the IT2000 Committee 3 out of 20 committee members are institutionally embedded in academic institutions. Furthermore, the scientific community strongly participated in the consultation processes leading to the report "Library 2000" with 4 (out of 20) members on the Library 2000 Review Committee. With slight changes, the committee adopted the consultation process developed by IDA leading up to the action plan "IT 2000". Yet,

the majority of representatives of the economy was replaced by representatives of the scientific community, civil society and media. Similarly, the planning process leading up to the recent master plan of NLB, entitled "Library 2010", accommodated the slightly changed version of this consultation process. The scientific community was present with 4 out of 14 committee members. In the planning processes Remaking Singapore, Creative Industries Development Strategy and the Economic Review Committee, the scientific community was less present with merely 1 and with regard to the ERC 2 representatives.Furthermore, representatives of the scientific community are members of the board of directors of statutory boards, as shown in diagram 5-4 and diagram 5-5. Concerning statutory boards contributing to Singapore's k-society, the scientific community is represented on the boards of A*Star (8 out of 19 members), ISEAS (9 out of 21) and NLB (3 out of 13), but they are not on the boards of IDA and EDB.

Similar to Germany, the scientific community is not actually organised in unions or associations representing the interests of the scientific community. Hence, members of the scientific community generally participate as senior experts in committees assigned with the formulation of action plans or on the boards of directors of statutory boards. They only secondarily represent the interests of the scientific community as a subsystem of society. Hence, even the existing participation in consultation processes and the boards of directors of statutory boards cannot be interpreted as fully representing the interests of the scientific community as a subsystem.

Civil Society

Civil society, represented by non-governmental organisations, cultural associations and foundations participates much less in the processes of policy formation than members of the economy and the scientific community representatives. Although the channels for communicating their interests are the same as the ones used by the economy and the scientific community (committees assigned with the conceptualisation of action plans and boards of directors of statutory boards), representatives of the civil society rarely take part in the process. Several reasons include: (a) expertise of civil society groups is not considered as relevant by the administrative bodies of the state organising the consultation processes or committees and hence they are not invited; and (b) civil society in Singapore is less organised, meaning only few

tightly organised groups exist representing the interests of civil society, which leaves the state bodies with a limited choice to select from.

Nevertheless, there were three non-governmental groups involved in the consultation process leading to "Library 2000", and one in the process up to "Library 2010" of the National Library Board (diagram 5-3). Furthermore, one representative of civil society was a member of the Remaking Singapore Main Committee and two representatives participated in the Economic Review Committee. In the consultation processes leading to action plans of IDA, groups representing the civil society did not take part.

On the board of directors of statutory boards contributing to Singapore's k-society, civil society is most represented at the Institute of Southeast Asian Studies with 2 out of 21 board members. Furthermore, civil society has one representative on each of the boards of EDB, IDA, and NLB, as shown in diagram 5-4 and diagram 5-5.

Media

One more subsystem of society aiming to influence policy formation is the media. Yet, one has to bear in mind that the media in Singapore is, until now, controlled by the government overlooking Singapore Press Holdings Limited (SPH), which publishes 90% of the print media in Singapore.[26] Furthermore, the Newspaper Printing Presses Act legally enables the government to enforce media censorship (Ooi, 2000: 183-188). Overall, the role of the media in Singapore might best be described as a mouthpiece of the government in order to inform and educate the public.[27] The situation in Singapore, with the media being controlled by the government but at the same time also taking part, to a limited extent, in the policy formation processes via commit-

[26] Furthermore, SPH owns a 40% stake of MediaCorp Press Ltd Pte which publishes Singapore's only "free" newspaper "Today".

[27] This was re-affirmed on the eve of Singapore's second political leadership transition by Prime Minister Designate Lee Hsien Loong, on 06 January 2005: "The media should report news accurately and fairly, in order to inform and educate the public. It should adopt a national perspective on issues, educating Singaporeans on the reality of global competition, or the need for healthy habits during the SARS outbreak. But it should avoid crusading journalism, slanting news coverage to campaign for personal agendas. This way, the media helps the public to decide and judge issues for themselves and provide a valuable channel for them to voice news and opinions" (Lee, 2004).

tees, consultation processes and the membership on the boards of directors of statutory boards, is rather unique.

As illustrated above, the media participated in the consultation processes leading up to the action plan "IT2000" with one representative in the IT2000 Committee. In the Library 2000 Review Committee, three representatives of the media were present. In the Library 2010 Review Committee, the media was represented by two employees of SPH. In the planning process for remaking Singapore, the Remaking Singapore Main Committee, two representatives of the media participated.

Furthermore, representatives of the media are members of the boards of directors of statutory boards. As illustrated in diagram 5-4 and diagram 5-5 above, two representatives of the media are members of the board of directors of NLB and one representative sits on the board of ISEAS.

Discussion

In Germany, as well as in Singapore, five subsystems are engaged in the processes of constructing k-societies – state, economy, scientific community, civil society and media. Focusing on the construction of k-societies by state governments, the remaining four subsystems engaged in the process are assessed merely with regard to their influence on the activities of the state.

In Germany, the degree to which the state activities towards k-society are actually influenced by the interests voiced by the remaining subsystems is rather low. The final recommendations formulated by commissions, for example, do not necessarily enter the policy-making of the government or the conceptualisation of action plans. The degree to which the recommendations influence political decision-making depends on the content of these recommendations as well as on the position of the chairman of each commission within the government system and therefore his ability to position the final report effectively.[28] While the government debate clearly determines the thematic focus of the commissions by stating their work tasks and having representatives of the *Bundestag* forming the biggest membership group in most commissions, the work of the commissions (progress/final reports and rec-

[28] This is discussed in section 8.2.1 with regard to the chairman of the enquete-commission "Future of the Media in Economy and Society" becoming permanent secretary in BMWI.

ommendations) does not necessarily influence the government debate. Officially the purpose of study, government and enquete-commissions is the penetration and preparation of a certain topic to assist the government debate, decision and policy-making. Nevertheless, commissions are frequently installed as a form of legitimating certain politics, by arguing that they are based on the broad and deep knowledge produced by a commission. The progress and final reports as well as recommendations formulated by the commissions are often hardly discussed by the German *Bundestag* and rarely lead to the formulation of certain policies. The outcomes of these commissions are often drowned by everyday politics, which at that moment capture the public eye. This is especially true for the instrument of study and enquete-commissions, which analyse, discuss and prepare certain topics for the German *Bundestag*. To what extent their work is heard after submitting the final report depends on a multitude of circumstances, such as the individuals and their future positions involved in the commissions, the competition posed by other topics and the point of time of publication within a legislative period (4 years). With regard to government commissions, this is slightly different, since they generally report to the same government (parties in power) that installed them and which is interested in the topic. Government commissions are far smaller than enquete-commissions and generally present their outcomes much quicker. Furthermore, all members are selected by the government. Conflict along the lines of party politics, which is common in enquete-commissions does – in government commissions – generally not hinder the work progress as much.

Hence, it can be argued that theoretically, the work of these commissions should influence, enrich, structure and guide government debate. Yet, in reality it seems, that the actual influence of commissions of the federal government on policy formation is restricted and heavily depends on coincidences and the 'at the right time, at the right place'-factor.

In contrast to Germany, it seems that in Singapore, the degree to which the activities of the state are actually influenced by the interests of the remaining subsystems is much higher. The channel of having representatives of the remaining four subsystems on the board of directors of statutory boards, for example, includes these subsystems into the decision-making processes of the state, since the statutory boards are part of the government. Furthermore, most action plans of the Singaporean government are installed by the board of directors of the statutory board implementing them. While in Germany the action plans generally state already existing activities in order to legitimise politics, in Singapore these plans are actual planning documents.

Hence, activities are planned and outlined in these plans before they are implemented. The boards of directors of the statutory boards, under which these action plans are implemented, comprise representatives of the state, economy, scientific community, and also civil society and media. Consequently the subsystems, besides the state, actually participate in the decision-making processes. The board of directors of each statutory board becomes an arena for political decision-making in cooperation with the four remaining subsystems. While in Germany, all subsystems in interaction with the state can merely act as advisory bodies in commissions, in Singapore the representatives of the remaining four subsystems actually become decision-makers once they are members of the boards of directors of statutory boards. It can therefore be argued that the subsystems are given far more influence on the construction process than in Germany. Furthermore, as discussed in chapters 8 and 9, the final reports of expert committees regularly become government action plans once they are passed by the minister cabinet or parliament (depending on who established the commission). Hence, the boundary between advisory and constructive activities is far less pronounced than in Germany. The recommendations formulated by committees seem to be heard in Singapore generally straight away and are implemented in the form of action plans or the founding of a statutory board executing the recommendations (e.g. in the case of NLB). This is partly due to the fact that the work of these expert committees only lasts for one to two years and the committees report directly to the same government which installed them. The committees are generally small in size (10 to 20 members), their work scope is result-oriented and the given time span is limited. Furthermore, the consultation process designed by NCB leading up to "IT2000" involves the subsystems economy, scientific community and media, and not the civil society, in the conceptualisation of the action plan. This clearly stands in contrast to the planning procedures in Germany, where the subsystems besides the state are not involved in the conceptualisation of government programmes but merely in their implementation. It therefore once more indicates that the interests of the subsystems besides the state are heard by the state to a higher degree than in Germany.

This higher degree of influence on state activities is nevertheless a mutual experience, meaning the subsystems besides the state are able to influence state activities and, at the same time, the state highly influences the activities of these subsystems. As outlined in chapter 9 in more detail, the inter-linkage between some subsystems and the state is mutual. As such, the close inter-linkage between the state and the scientific community is institutionalised via the research agencies A*STAR and ISEAS, as well as the two main

universities of Singapore, which are statutory boards of the government. Furthermore, the state, until today, controls most of Singapore's media. Consequently, the state has strong, decision-making influence in these subsystems but at the same time grants these subsystems influence on its statutory boards and the conceptualisation processes of action plans. Based on this, one can argue that the close interaction, structured by seemingly permeable boundaries between the state and the remaining four subsystems in Singapore contradicts Luhmann's characteristics of autopoietical systems that act completely independent from all other subsystems. Close, institutionalised interaction and permeable boundaries as in the case of Singapore cannot be assessed by looking at the relationship between the subsystem state and the remaining four systems – economy, scientific community, civil society and media – in Germany. While the four subsystems besides the state influence the decision-making of the state in Singapore, the state also influences their activities and decision-making procedures. It is a mutually influencing of each other. Nevertheless, the state clearly is the dominating subsystem, since the main institutions of some of the other subsystems are actually statutory boards of the government (i.e. universities and research centres), and the media is largely controlled by the state. In comparison, the subsystems besides the state in Germany, actually match Luhmann's picture of the autopoietical systems. Here, each subsystem interacts with the state and the state with each subsystem via channels of structural coupling. Yet, each subsystem remains independent and its actions can merely be irritated by differing suggestions, but not guided by the interests of another subsystem.

Chapter 6

A Political Vision as a Means to Legitimise Action

In both countries under investigation, the vision of an unstoppably emerging k-society was, at some point in time, drawn to justify economically focused government programmes, action plans and initiatives, that were said to monitor, guide and guard this apparent development. By doing so, it was actually these programmes and action plans that fostered ICT development and the production, dissemination and economic exploitation of knowledge and information. Hence, it was these programmes that brought about the envisioned and, often described as unstoppably emerging k-society into existence. Economy-focused politics were therefore justified with the vision of a self-emerging k-society. This vision, originally first created by members of the scientific community (outlined in chapter 2)[1], was strengthened and spread further by the government programmes and action plans using it as form of justification. These programmes strengthen this vision by identifying apparent indicators for the rise of a k-society and spread it further in order to legitimise their own existence.[2]

As outlined in chapter 2, scholars such as Bacon, Comte, Marx, Freud and Pareto emphasised the possibility of knowledge being influenced by ideology, religious beliefs or traditional hierarchical orders, basically by socially constructed 'truths' that structure reality (Maasen, 1999: 12). Later on, Berger and Luckmann (1984) pointed to reality being socially constructed and knowledge being nothing more than what everyone in society regarded as knowledge. Hence, social truth constitutes what we believe it to be. In tandem with this, this book aims to show that k-societies are socially constructed rather than emerge by themselves. As mentioned previously, the social subsystems state, economy, scientific community, civil society and less media have co-operatively engaged in (a) constructing the vision of a self-arising k-society and (b) actually creating these k-societies. Yet, the empirical focus of

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[1] As outlined in chapter 2, most scholars working on k-society implicitly or explicitly subscribe to the notion of k-societies emerging due to developments in the information and communication sector, the growth of the service sector and the high profit margin of knowledge intensive goods.

[2] The following four chapters are based on the government activities of Germany and Singapore which directly contribute to the creation of the k-society-vision and stage of development. These activities are listed in table 8-1 and table 9-1.

this book rests on the activities of the German and Singaporean states in creating this vision and stages of development called k-societies. Consequently, this chapter illustrates the construction of the vision of a self-emerging k-society in the government programmes and action plans of Germany and Singapore that aims to create these k-societies. These government programmes legitimise their own existence by drawing the picture of an arising k-society that apparently needs to be monitored, guided and guarded. This vision of a self-emerging k-society is therefore, in this book, defined along the lines of Berger and Luckmann (1984: 100ff). The two authors distinguish four levels of legitimation, which can overlap empirically. The first level of legitimation is reached when a system of linguistic objectivities of human experience is passed on. The structure of family relationships legitimises certain behaviour, for example. A certain type of behaviour of a nephew to an uncle is legitimised by the family relationship. The second level of legitimation refers to tales and sayings, which legitimise certain behaviourisms such as 'the early bird catches the worm'. On the third level stand explicit theories of legitimation which offer reference-systems for institutionalised action. Berger and Luckmann refer to theories and systems of nepotism, in which the younger members of the clan are granted entrance by passing initiation-rituals. Here, fulltime 'legitimators', generally the elderly of the clan, theorise the existing modes of legitimation. This results in a science of legitimation – e.g. science of nepotism – which loses its touch to reality and becomes 'pure' theory. The fourth level of legitimation is constituted by symbolic sense-worlds, that is to say, by referring to other realities than everyday-life. This symbolic sense-world can legitimise historical, present and future action. All aspects of the present institutional order are integrated into this comprehensive system of reference, which forms a world in itself because every human experience is now taking place inside this sense-world. The crystallisation of these symbolic sense-worlds takes place due to objectivations, sediment formations and accumulation of knowledge. They are consequently social products with history, the function of which can only be understood when one assesses the history of their construction (Berger/Luckmann, 1984: 98-104). This is done in the present study with regard to the vision of a self-emerging k-society. This vision is consequently understood in this book as a legitimating construct that bridges symbolic, institutional and structural differences. It acts as a leading idea, as a symbolic sense-world, which predicts a different future and legitimises all activities that state to guide, guard and monitor this leading idea, the self-emergence of k-society. Empirically it can hardly be grasped. Instead, merely its function can empirically be assessed by analysing its history of construction and usage. This is the

aim of this chapter: to illustrate the construction and utilisation of the vision of a self-emerging k-society by the government programmes and action plans that claim to monitor, guide and guard the self-emergence of this k-society, yet by doing so, actually create it.

In both countries, Germany and Singapore, the k-society terminology created by members of the international scientific community was adopted by the national governments, which formulated the aim to construct k-societies as stages of social and economic development. Yet, the theoretically and categorically defined concepts connected to these terms were not adopted but instead – as will be shown in chapters 8 and 9 – the terms were redefined by activities aiming at the realisation of country-specific k-societies. The k-society definitions inherent in the political programmes and activities focus far more than the theoretical k-society concepts (outlined in chapter 2) on the development, utilisation and spread of information and communication technologies, on the ICT infrastructure and ICT applications. Topics such as knowledge production (e.g. R&D), equal access to knowledge, or the economic exploitation of knowledge are far less approached by these government programmes.

The looseness of the terms labelling k-society, resulting from the multiplicity and interchangeable use of the terms by the scientific community as well as from the redefining of these originally academic terms by the political programmes of national governments, contributed and accelerated the construction of the vision of a self-emerging k-society. Furthermore, this vision was used in both countries of investigation at some point in time in order to legitimise political action towards the realisation of k-society.[3] In Germany, the simple reasoning for ICT development by pointing to its economic relevance was replaced in the mid 1990s by the vision of a self-emerging k-society as a form of legitimising government programmes. In Singapore, the vision of a self-emerging k-society was, from the early 2000s onwards, replaced by pointing to the economic relevance of ICTs, knowledge production and creativity. In both countries, the utilisation of this vision as a form of legitimation for future political action contributed to the further construction and spread of the vision. The change in legitimising government programmes and the utilisation of k-society as a vision, while simply pursuing sustainable economic growth, both in Germany and Singapore, nevertheless illustrates the empirically empty character of the vision. It illustrates that the

[3] This stands in line with Costanza's statement that "creating a shared vision is the most effective engine for change in the desired direction" (2000: 1).

vision of a self-emerging k-society is not based on empirically graspable facts but that it is constructed as a vision which predicts a different future and therewith legitimises all action towards this future. It is a vision under the mantle of which government programmes pursue economic growth. Cultural, social and political well-being of society clearly is of lower priority in these programmes. The definitions of k-society inherent in these government programmes clearly focus, in both countries, on the economic relevance of ICTs. Definitions of k-society emphasising the importance of knowledge production, dissemination and economic exploitation or the closure of digital divides as discussed by the scientific community (outlined in chapter 2) are widely neglected in the government programmes of Germany, but also to a lesser extent, in the case of Singapore. Hence, the visions of self-emerging k-societies as well as the actual k-societies created by these programmes should be more suitably termed 'ICT-economies' and 'ICT-societies' rather than 'information society' as labelled in Germany or 'knowledge-based economy' as labelled in Singapore.

The Image of a Self-arising German Information Society

Until the mid 1990s, k-society terminology is not yet used in government programmes and final reports of commissions contributing to a German k-society, meaning terms such as 'information society', 'information economy' or 'knowledge society' cannot be found in these documents. Instead, the development and spread of ICTs is described as necessary for economic growth. In the final report of the "Commission for the Extension of the Technical Communication System", published in 1976, the extension of the telecommunication networks is stated as a necessity for further economic and social development:

> "For the advantage of the economic and social system of the Federal Republic of Germany, the extension of the telecommunication networks […] should have high priority" (KtK, 1976: 1, translation by the author).

Similarly, the government concept "Information Technology – Concept for the Support of developing Microelectronics and ICTs", published in 1984, argues in favour of the development of ICTs by pointing to the competitiveness of Germany:

> "The ability to develop modern ICTs in time and apply those along the needs of the market […] is an elementary factor for the competitiveness of

> highly developed industrial societies" (DBr, 07.06.1984: 3, translation by the author).

Interlinking economic competitiveness and ICTs with the well-being of society, the document states:

> "The well-being of our society fundamentally depends on a competitive economy. For this, the challenge of the information technology has to be accepted" (DBr, 07.06.1984: 3, translation by the author).

In the "Future Concept Information Technology 2000", published in 1989, ICTs are even labelled as key technology for industrial competitiveness:

> "The information technology is a key technology for industrial competitiveness: It fundamentally influences production processes and products in economic sectors, on which the export strength of the Federal Republic of Germany rests, as for example the electro technology, mechanical and production engineering or the car industry" (DBr, 19.10.1989: 4, translation by the author).

In these statements, the fostering of ICT development and usage is regarded as crucial to economic prosperity. Hence, the search for economic growth is openly formulated and emphasised in order to justify ICT support. This nevertheless changed at the beginning of the 1990s, when k-society terminology was increasingly used in order to legitimise political action.

For the first time, the terms 'information society' as well as 'information economy' were used in the final report of the enquete-commission "Future of the Media in the Economy and Society – Germany's Road into the Information Society", from 1995 to 1998. From 1995 onwards, the government programmes and commissions legitimise their own existence by pointing to the apparently arising and/or already existing k-society, mainly labelled 'information society'. Hence, the search for economic growth that was until now openly stated in order to legitimise the government activities in this area is replaced by the picture of a self-emerging k-society. The conceptual ideas behind the various k-society-labels incorporate the development of ICTs, by continuously mentioning it as a corner stone of k-society. This is the time in the German history of k-society when the idea of a German k-society is constructed as a vision. The following government programmes are legitimised by drawing the image of an – by itself – arising German k-society, or by arguing that k-society has already become reality. Yet, it is these government programmes that actually construct the German k-society, as outlined in chapter 8. It is these government programmes that construct what they state to be answers to. The enquete-commission "Future of the Media in the Economy

and Society – Germany's Road into the Information Society" states in its final report:

> "Following all predictions, the information economy will be the biggest and probably the only growth market. […] For Germany it is a question of existence, to not miss the technological progress. An industrial nation that wants to remain competitive on the markets of the future cannot forgo the information and communication technologies" (DBt, 22.06.1998c: 2, translation by the author).

The commission – as the commissions and government programmes before – regards ICTs as key technologies for future economic development. At the same time it underlines the importance of using technology for social development:

> "The information and communication technologies offer enormous economic possibilities to our country and to the whole world. Nevertheless, technology must not be an end in itself, but instead has to help improving the life of the people" (DBt, 22.06.1998c: 2, translation by the author).

In the first action plan of the German government specifically aiming at the construction of a German k-society – "Info 2000: Germany's Road into the Information Society", published in 1996 – then Federal Minister of Economy, Dr. Günter Rexrodt, states:

> "The leading industrialised countries, and therewith also the Federal Republic of Germany, are – with the arrival of the 21st century – about to take a leap in their economic-technological development towards an information society. This development is not a vision, but already under way" (BMWi, 1996: 7, translation by the author).

The emerging of the 'German information society' is, according to this statement, a fact, not a vision. By stating this, the idea of an 'information society' is used in order to legitimise the government action plan which by itself contributes to the construction of this 'information society'. The federal minister attempts to prove his point, that 'information society Germany' is no vision but already under way, by stating: "Today, worldwide more personal computers are bought than cars." While this might be true, one should not ignore the fact that the action plan which he is trying to legitimise actually aims at further fostering exactly this development: the spread of ICTs. Hence, the early stage of a technological development is used for constructing a vision of a new form of society and economy. This vision is then used to legitimise the conscious further developing of the technological development that was initially used for constructing the vision. Furthermore, this statement clearly expresses that the then Federal Minister of Economy regards the

number of personal computers traded as an indicator for k-society. He therewith clearly defines k-society with a technological focus, rather than by emphasising the production, dissemination and availability of knowledge, cultural or social aspects, i.e. the fostering of a diverse knowledge producing critical culture or the closure of the digital divide. The definition of k-society inherent in the German government programmes creating it will be discussed in chapter 8.

In the sequential action plan, "Innovation and Jobs in the Information Society of the 21st Century", published in 1999, the vision of an 'information society' is used as a means to fight unemployment. The action plan states in its opening paragraph:

> "But the unemployment can only be reduced, if our country successfully copes with the transition from an industrialised to an information society"[4] (BMWi/BMBF, 1999: 6, translation by the author).

The action plan justifies its existence by pointing to the possible dangers in the 'information age' ahead:

> "Not a single existing country can be assured that its position, gained during the industrial age concerning income and employment, can be maintained in the information age" (BMWi/BMBF, 1999: 6, translation by the author).

Consequently it is the job of each government to ensure that the country's economic position is well maintained. In order to do so, action plans are released in an attempt to deal with the dangers and opportunities of the apparently emerging k-societies. Here, the vision of an unstoppably arising 'information age' combined with the threat of unemployment is used for legitimising an action plan that focuses mainly on the economic aspects of a German k-society; one which would foster the creation of what apparently emerges by itself and is the reason for the action plan: the 'information age'. The action plan formulates aims and lists programmes that engender the further spreading and application of ICTs, as well as the production, dissemination and marketing of knowledge, as outlined in chapter 8. Hence, it constructs what is used as a reason for its existence.

Nevertheless, this role of the state, to act through its action plans as an eager constructor of the German k-society, is continuously ignored in these documents. By ignoring the constructive role of the state as well as its

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[4] This statement is further explained by arguing: "Additional employment is created in many economic sectors at the moment merely temporarily; long-term forms of it can mainly be found in the service sector. The modern information and communication technologies are here part of the driving engines."

programmes, the vision of a self-emerging k-society is further strengthened since k-society in these programmes is characterised as self-arising, not constructed. In the opening paragraph of the progress report to this action plan – "Information Society Germany – Innovation and Jobs in the Information Society of the 21st Century", published in 2002, the publishing ministries state:

> "The information society in Germany has developed itself impressively in the past three years." (BMWi/BMBF, 2002: 5, translation by the author.)

The vision of a self-arising 'information society' is further kept up. In line with this, the current action plan "Information Society Germany 2006", published in 2003, states once again: "In Germany, the information society is reality since long" (BMWA/BMBF, 2003: 5, translation by the author). This statement is explained by stating: "Since the year 2001 there are more mobile than residential phone lines in Germany", which once again inherently defines k-society as a form of society that is mainly characterised by the high usage of ICTs.

The action plan regards 'information society' as a fact and therefore calls the vision of it into existence. Interestingly, this action plan in its first paragraph also points to the UN-Summit of the Information Society in 2003 and 2005. It argues that this summit underlines the importance of knowledge and innovation for global development and wealth (BMWA/BMBF, 2003: 5). The apparent global development is used here to legitimise the national government's activities in this area and thereby this action plan.

Further on in the action plan, the government lists certain aims to be reached and programmes to be implemented (see chapter 8). Just as in the previous action plans, it states on its first page that the 'information society' in Germany has already come into existence, while at the same time listing the programmes that makes this apparently already existing 'information society' become a form of reality. As such, the factual description of k-society as well as the programmes leading to it mutually support each other and together construct 'information society Germany' as the vision of a future society.

An exception forms the chapter of the working group "Knowledge Society" in the final report of the enquete-commission "Globalisation of the World Economy – Challenges and Answers", active from 1999 until 2002. Here, the working group does not paint the emergence of a k-society as a fact but states in the opening paragraph that this rise of a global k-society is a commonly assumed hypothesis:

> "Since some time, a new hypothesis dominates the social theories, according to which our society is experiencing a transition from an industrialised to a knowledge society. The consequences of this transition are often compared to the transition from the agrarian to the industrialised society in the 19th century." (DBt, 2002: 259, translation by the author.)

The working group backs the government action plans by stating that the development of ICTs is generally regarded as the initiator of this transition (DBt, 2002: 259). Furthermore, the working group speaks of a global k-society rather than merely a German k-society and thus legitimises government action plans, although not subscribing to the factual description of k-society which is common in the action plans.

All government action plans contributing to the construction of a German k-society legitimise their existence by stating that what they are about to construct, actually already exists, but has to be developed further in order to ensure economic prosperity. The earlier action plans refer to the development of ICTs and their economic relevance in order to legitimise their aim to develop these technologies further, build the required infrastructure and spread their use. The later action plans draw the picture of an unstoppably self-emerging or already existing k-society that carries opportunities and dangers. The legitimate reason for the existence of these action plans is consequently to ensure that the opportunities of this k-society are used for economic and social development. Completely neglected in all government action plans is the fact that it is these action plans which actually create this k-society. These action plans do not merely react to existing developments but instead foster them. Yet, by ignoring their own constructive strength, the action programmes contribute to the creation of the vision of a self-emerging k-society. This vision then again legitimises the action plans and underlines their apparent necessity. Hence, the action plans create (a) the vision of a self-emerging k-society and (b) the actual k-society as stage of social and economic development. The German government, in its programmes and action plans, contributes to the construction of the k-society-vision by strengthening and spreading it in order to legitimise economy-focused political action. As shown by the statements above, the government programmes legitimise their own existence by describing the activities launched as economic necessity. These programmes do not point to the cultural or social necessity of the creation of k-society, but mainly focus on economy-friendly activities.

The Singaporean KBE as a Matter of "Bread and Butter"

In contrast to Germany, the government of Singapore legitimises the earlier action plans by pointing to the apparently unstoppable emergence of a k-society that leaves the state in the position to merely monitor and harness this development in an economically and socially lucrative manner. The later action plans decreasingly use the image of an arising k-society but instead merely point to the apparent economic relevance and even necessity for survival of the investments in ICTs and knowledge production. Hence, the vision of a self-emerging k-society is replaced by the simple statement of searching for economic growth by investing in ICTs and knowledge production, although all of these action plans do exactly this: they construct k-society. The former vision of a self-emerging k-society is replaced by the simple reasoning of aiming for economic growth, which in fact was also the main aim of the earlier programmes. Yet, in the earlier programmes this search for economic growth was legitimised by pointing to the vision of a self-emerging k-society. Similar to Germany, social, cultural and political well-being of society is of minor priority in these government programmes.

While in Germany, the constructive character of the action plans is not at all acknowledged in the plans themselves but merely by one enquete-commission, the Singaporean government seems to be more open in acknowledging its own role as a constructor. Furthermore, the apparent necessity of investing into ICTs and constructing some form of k-society for the economic survival of Singapore is far more emphasised than in Germany. As I discuss in chapter 9, the definition of k-society inherent to these programmes focuses on the economic relevance of ICTs and their infrastructure, as is also the case in the German government programmes. Yet, in the later programmes, Singapore increasingly emphasises the importance of creativity, local knowledge production, dissemination and the closure of the digital divide. Hence, the former inherent definition of k-society as ICT-economy and ICT-society increasingly opens up for a definition of k-society as creative economy and knowledge society. Nevertheless, this change in definition is not backed by a legal infrastructure enabling citizens to voice their opinion and knowledge freely. I elaborate upon this in chapter 9. The aim of this section is to outline the construction and usage of the vision of a self-emerging k-society in government action plans, which predicts a future society and by doing so legitimises economy-focused political action towards this future.

In the Civil Service Computerisation Programme (CSCP) Seminar Proceedings from 1984, Philip Yeo, then Chairman of NCB states that the reason for launching the CSCP in 1981 was "to help Singapore move into the information age" (NCB, 1984: 7). In this statement, he actually acknowledges the constructive role of the programme and at the same time formulates the clear aim to move into the 'information age'. Dr. Tan Chin Nam, then General Manager of NCB, stresses the potential of ICTs for economic development in production and service as reasons for launching the CSCP:

> "Computerisation can bring about higher productivity, new capabilities and new levels of service. It can also provide better support for policy analysis and decision making." (NCB, 1984: 23)

In the National IT Plan of 1985, the impact of ICTs on Singapore's society is described as a fact:

> "The impact of IT will be all pervasive with significant social and cultural changes taking place in Singapore's society" (NCB, 1985: v).

This is followed by justifying the existence of the "National IT Plan":

> "Currently, Singapore has the components of an IT infrastructure and industry but in the absence of a national IT plan, they are not well integrated. IT is too critical to our future economic and social well-being for its development to be left to a fragmented arrangement with different agencies tackling separate segments. It is therefore important that a new consolidated IT strategy be introduced so as to achieve the full spectrum of IT potential."

The statement above clearly illustrates the function of the action plans launched: to plan and construct social and economic reality. It is based on the belief that the national government, the state, is able to plan and create a particular type of reality. It clearly relates to Berger and Luckmann's theory on the social construction of reality (1984) and indirectly expresses the core of this book: the constructed character of k-society.

The circle of stating the emergence of k-society as an unstoppable fact while actually fostering this emergence and therewith consciously creating this k-society with the same action plan, as done by the action plans of Germany, is also drawn in "A Vision of an Intelligent Island – The IT2000 Report", published in 1992. The IT2000 Committee states:

> "[A] new force is shaping our lives. We call it the information age. Information technology will largely alter the way we live – or rather, the way we go about living in the coming decades. Information is the currency of the new age. Just as gold, silver and other precious metals are regarded as valuable commodities, so now is information" (NCB, 1992: vii).

ICTs and information are regarded as the key drivers of the emerging k-society, here termed as an 'information age'. And the report aims at the further development and spread of these key drivers in order to turn Singapore into an 'intelligent island'.

Besides the apparently arising 'information age', the report justifies the existence of the action plan by referring to a statement by then Prime Minister Goh Chok Tong. According to Goh Chok Tong, Singapore is forced

> "to run on the fast track of economic development … or face being left behind … It is [Singapore's] lot in life that we continue running in the fast lane to keep up with changes in the world economy" (The Straits Times, 27.09.1991, qtd. in NCB, 1992: x).

This belief of Singapore in having to develop faster and economically perform better than other industrialised countries in order to prevent being left behind in development, can be found in many government documents aiming at the construction of k-society. Often, this aim is supported by government rhetoric describing the investment in ICTs and knowledge production as a matter of 'bread and butter', meaning as necessary for the survival of Singapore as a nation state. This was also pointed out by several interview partners. The Executive Director of the A*STAR-institute Genome Institute of Singapore reasons:

> "As far as the Singaporean Government is concerned, [KBE] is the only route not to success but to survival. In the US you basically say, if I just exist, if I just dig a hole in the ground and put some seeds in, I will eat. The situation in Singapore is, if I don't succeed, I will not eat" (E. T. Liu, 04.02.05, interview with the author).

The Director of the Educational Technology Division in the Ministry of Education supports this statement and refers to the degree to which the need for economic development is felt in Singapore compared to other countries:

> "We are very small and it is a question of survival more than anything else. Countries like Germany or the USA are big, have natural resources and fertile grounds for agriculture. So maybe the sense of urgency, the hunger is not as critical as in Singapore. For us it is a question of national survival. We either move or we die" (Koh Th. S., 30.03.05, interview with the author).

Hence, Singapore's government decided to actively construct k-society. The then Prime Minister, Goh Chok Tong, refers to the constructive strength of the "IT2000 Report" by stating: "the [IT2000] plan (…) showed that because the country dared to dream, it will become a reality" (The Straits

Times, 27.09.1991, qtd. in NCB, 1992: x). Here the then Prime Minister of Singapore acknowledges the constructive power of the government document and agrees with the idea that the future can be envisioned, planned and consciously shaped.

In "Library 2000", published in 1994, the Library 2000 Review Committee regards the attempt "to be a learning nation" as "Singapore's response to the emerging knowledge economy, massive information explosion and rapid knowledge obsolescence." The committee justifies the action plan's aim to extend the library infrastructure by pointing to its possible impact on economic success:

> "[Singapore's] long-term sustainable competitiveness depends on our capacity to learn faster and apply knowledge better than other countries" (Library 2000 Review Committee, 1994: 3).

In the sequential action plan "Library 2010", published in 2005 in order to further extend and diversify the library system, the National Library Board underlines the urgency of its action by stating:

> "Singapore is a society in a hurry. Our lack of natural resources and our small domestic market means that we have no buffer against changes in the outside world. We have only our skills and our adaptability" (NLB, 2005: 3).

In "Infocomm21", published in year 2000, the government regards the vision of an 'intelligent island' drawn by "IT2000" as 'largely become reality' (IDA, 2000: 4). Yet, according to "Infocomm21", the plans for national ICT development drawn in "IT2000" cannot sufficiently assure Singapore's economic future. Instead, "Infocomm21" states:

> "If Singapore is to retain its leading edge, Singaporeans will have to 'think global, act local', move at 'internet speed' and compress 'time-to-market'" (IDA, 2000: 5).

The action plan "Infocomm21" is Singapore's strategic response to this challenge. The sequential action plan "Connected Singapore", published in 2003, points to "the need for Singapore to develop new sources of growth, including new areas involving creative inputs, like design and the arts" (IDA, 2003a: 7). In contrast to the former action plans, "Connected Singapore" justifies its own existence by arguing that ICTs remain as an engine of growth and actually refers to a number of expert sources such as publications of the World Economic Forum and OECD (IDA, 2003a: 4). It does not refer to the vision of a self-emerging k-society to legitimise its content fostering ICTs but instead actually acknowledges that ICTs were consciously developed and spread. It therefore acknowledges the constructed character of one aspect of

the Singaporean k-society: of the development of ICTs and the ICT-infrastructure defining k-society as ICT-economy, as discussed in chapter 8. The report states:

> "Infocomm has become an integral way of life in Singapore. Our people, businesses and government have harnessed its potential and reaped enormous benefits" (IDA, 2003a: 2).

While the earlier action plans and especially "IT2000" were strongly using the vision of a self-emerging k-society or Singapore as an 'intelligent island' for legitimising their existence, this is less ostensible in the later action plans. Plans such as "Infocomm21" and "Connected Singapore" focus mainly on the economic relevance of ICTs and knowledge, creativity and information as justification for their existence. They are far less envisioning in character than the earlier action plans. The Director of the Arts and Heritage Division in the Ministry of Information, Communication and the Arts explains this change to a lesser use of the k-society vision as a means of legitimation:

> "For a while we were very careful not to put the term 'KBE' into our speeches anymore because we had said it so many times: 'The Knowledge-based economy will be this, that and that.' But it got too much" (Koh L.-N., 30.03.05, interview with the author).

Possible further reasons, besides an overuse of the term 'KBE', could also be the damaged image of the vision of a self-emerging k-society as a consequence of the dot.com crash and the following economic downturn in Singapore. Furthermore, in 1999 the traditional ICT promoter, the National Computer Board, merged with the regulating agency, the Telecommunication Authority of Singapore. According to several interview partners, this affected the promoting and driving character of the board negatively, as elucidated in section 8.1.4.

Interestingly, the constructive power of the action plans and therefore the constructive power of government action and intervention in social reality are acknowledged by some action plans and statements of government representatives in Singapore. Hence, the Singaporean government – unconsciously – empirically backs the concept of Berger and Luckmann (1984), stating that reality is socially constructed. Reality is therefore shaped and created by collective actors in society. The future reality that shall be constructed is predicted and its construction legitimised and accelerated by a vision. This was confirmed by my informants by pointing to the vision of a Singaporean KBE. The Permanent Secretary of the Ministry of Information, Communications and the Arts, Dr. Tan Chin Nam, refers to its visionary character as follows:

> "The whole IT-knowledge-based economy is part of an overall vision of a better Singapore. […] It was based on a vision that said, we have to embrace technology. If you want to have a better life, better quality of living, better economic growth, then IT will have to be embraced in such a way that it will give us a national comparative advantage" (Tan Ch. N., 02.03.05, interview with the author).

The Chairman of A*Star and Co-Chairman of the Economic Development Board explains the need for a vision as follows:

> "You must have a dream! Whether it is the Holy Grail or some other dream. […] If a leader cannot give a dream: "Follow me!" What is there to follow? Who is the lamp? […] So you need people who create a dream and believe in the dream and sell the dream" (Ph. Yeo, 11.02.05, interview with the author).

The Director of the Arts & Heritage Division of the Ministry of Information, Communications and the Arts points out:

> "Each time a document like 'The Next Lap' comes out, one effect is to get people enthused and say, "Wow, I am going to reach for the next plane!" This was the same with KBE." (Koh L.-N., 30.03.05, interview with the author).

Consequently, the Singaporean government was well aware of the potential of a k-society vision for the construction of k-society as stage of development. The above interview data suggest that the vision of a self-emerging k-society was created, strengthened and spread in order to be able to use it as, *firstly*, an accelerator by predicting and convincing Singapore citizens of a future reality as well as, *secondly*, a form of legitimation of government action towards this future. When people share in a common vision, combined forces facing little or no objections enable a much faster and more efficient implementation than if criticism has to be answered and a picture of a possible future discussed.

The earlier action plans of the Singaporean government envision a self-emerging k-society and by doing so contribute to the construction of the vision, while at the same time conduct programmes that foster the creation of k-society as stage of social and economic development. The later action plans do not use the vision of a self-emerging k-society anymore, but instead merely point to the apparent economic necessity of their activities. Nevertheless, their activities continue to create a k-society, while the notion of it as a vision is decreasingly employed.

Discussion

After the theoretical, categorically defined k-society concepts and attached terminology were developed by members of the scientific community, the terminology – but not the concepts – were adopted by national governments. The vagueness surrounding the k-society terminology originating from the interchangeable usage of the different terms, as well as the lack of one widely-accepted, empirically based definition of k-society resulted in a rather blurry picture of k-society. Furthermore, the majority of the scholars working on k-society subscribe to the notion of k-societies being self-emerging. The combination of (a) vague k-society terminology, (b) blurry picture of k-society, and (c) notion of k-society being self-emerging provided a fertile ground for the construction of a vision. In Germany and Singapore, the construction of this vision of a self-emerging k-society was then enormously accelerated by the political programmes constructing k-societies as stages of social and economic development. These programmes and action plans point to the self-emerging k-society in order to justify their own existence. Yet, by doing so, they construct, strengthen and spread the vision. Reasons for constructing this vision are that it offers the possibility to (a) legitimise political activities towards the realisation of this vision of k-society and to (b) accelerate the processes of constructing k-societies by combining each nation's strengths under this shared vision. Consequently, in both countries of investigation, the national governments successfully built on the fertile ground provided by the scientific community for the construction of the vision of a self-emerging k-society.

Comparing the two countries with regard to the time in history when the k-society-vision was mainly constructed and used, the following can be said. In both countries, over the years, a change took place in the way the government programmes and action plans contributing to the construction of k-societies are legitimised. In Germany, the first action plans – in the 1980s – mainly refer to the development of ICTs as well as its economic relevance, while at the same time putting up programmes doing exactly this – developing and spreading ICTs further. From the mid 1990s onwards, the German action plans envision a k-society that unstoppably arises and hence should be guided and monitored by the action plans. In Singapore, the trend runs in the opposite direction. Until the early 2000s, the Singaporean action plans refer to the apparently arising k-society and its economic impact as a means of justifying their existence. Yet, from the early 2000s onwards, the action plans merely refer to the economic relevance of the development and usage of

ICTs, knowledge production and creativity in order to legitimise themselves. Some possible reasons include the damaged image of the vision of a self-emerging k-society as a consequence of the dot.com-crash and the following economic downturn in Singapore as well as the merger of the National Computer Board with the Telecommunication Authority of Singapore in 1999.

Yet, in both countries, this ability to replace one means of legitimising government action plans with another, and especially the ability to create and, just as suddenly, replace the vision of an emerging k-society as form to legitimise government action, clearly shows, that the vision of a self-emerging k-society is exactly this: an empirically hard to grasp vision, which mainly and merely acts as a symbolic universe, as an ideological impetus for development. It is a leading idea constructed by social actors, here the focus lies on the state, in order to predict a different future and to legitimise action towards this future. Hence, the vision of a self-emerging k-society is, in its construction and existence, supported by its lack of clarity, i.e. what this vision is, how it can be realised, and whether it should be realised. As shown above, the political programmes – in both countries of investigation – until today refer to this leading idea by predicting the self-emergence of k-society and therewith legitimise their own existence. The empirical emptiness of the k-society-vision as it is used in the political spheres of Germany and Singapore supports its usage as mode to legitimise political action, and – one might state – might be most fruitful to society as a vision, not as an actual form of reality. Assessing the textual foci of the government programmes and action plans (outlined in more detail in chapters 8 and 9), it becomes obvious that in Germany and Singapore, the k-society-vision is used in order to legitimise mainly economy and technology-focused political action. Activities fostering the cultural, social and political well-being of society are of much lower priority in the government programmes and action plans constructing country-specific k-societies. While the German government programmes constructing k-society nearly exclusively focus on activities fostering the economic and technological development of Germany, in Singapore, the more recent government programmes (since the early 1990s) increasingly emphasise topics such as the production and availability of knowledge or the narrowing of the digital divide. Nevertheless, also in Singapore, the majority of political activities towards k-society are concerned with long-term, sustainable economic growth. As outlined in chapter 9, Singapore's government launched various programmes focusing on the arts and cultural scene of Singapore's future k-society. Yet, the main motivation behind these programmes is not the development of arts, but rests on the assumption that a vibrant arts and cultural

scene fosters the creation of an economically successful k-society in the long-term. Yet, at the same time, critics of the overall technology and economy-focused definition of k-society of the Singaporean government are calmed by pointing to these arts and culture-focused activities.

Nevertheless, it has to be underlined that activities with a cultural, social or political focus are far less legitimised by the vision of a self-emerging k-society. Meaning (a) the definitions of k-society offered by the German and the Singaporean governments are largely technology and economy-determined in character, and (b) the need to legitimise the political actions by drawing a k-society-vision is obviously felt strongest by the two governments with regard to their economy and technology-focused programmes. Political action which emphasises the arts and cultural activities, are simply legitimised by pointing to their contribution to long-term economic growth, rather than to the k-society-vision. The construction and utilisation of the k-society-vision seems merely necessary in order to justify economy and technology-focused government programmes.

Inherent to these government programmes, k-society is defined process-related and partly rather different to the categorical definitions originally offered by the scientific community. This will be shown in chapters 8 and 9. Hence, the fact that the k-society terminology is rather vague in relation to the existing, multiple concepts and that the k-society-vision is empirically not graspable is very much part of the discourse in the political sphere.

Chapter 7

K-Society Terminology in Germany and Singapore

Three main terms can be identified which are used to describe what is summarised in this book under k-society in Germany's and Singapore's political spheres: 'knowledge society', 'information society' and 'knowledge-based economy'. Although multiple attempts to define and distinguish these terms from one another are present in the scientific community (chapter 2), they are – until today – often used interchangeably without any clarification concerning their individual meanings. In the following, I will outline how these three concepts are perceived and employed in the political spheres of Singapore and Germany. Furthermore, I will discuss potential reasons of preference towards one or another term as rationalised by my informants. While Singapore mainly uses the term 'knowledge-based economy'[1], Germany's politicians seem to prefer the term 'information society'. Nevertheless, 'knowledge society' appears rather regularly in government publications, speeches and newspaper articles, especially in Germany but also, to a smaller extent, in Singapore.

'Information' versus 'Knowledge Society' in Germany

Past Development

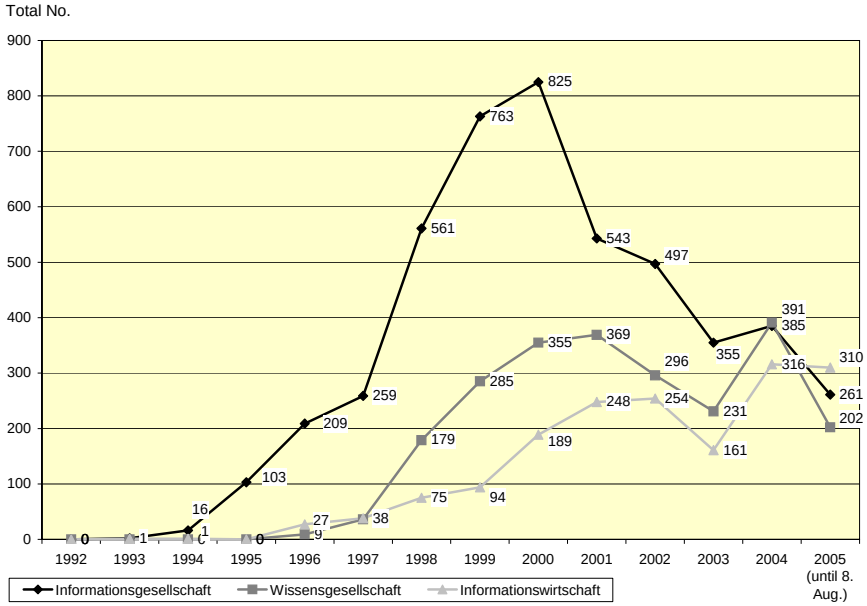
The notion of an arising k-society, originating from the academic circles of USA and Japan of the 1950s and 1960s, reached Europe around the beginning of the 1970s. Yet, the concepts 'information society' and 'knowledge society' and their associated terminology in Europe merely played a minor role in the scientific community and were marginally entering political discourse.

Before assessing the terminological usage in the political sphere, an insight into the usage in the public sphere shall be given. A rough search for the three terms, *Informationsgesellschaft, Wissensgesellschaft, Informationswirtschaft*,

[1] Instead of 'knowledge-based economy' the simpler term 'knowledge economy' is sometimes used. Due to their similarity in meaning, their usage is here assessed under the term 'knowledge-based economy'.

used to describe the new kind of economy or society in Germany was conducted in the database 'Factiva'. The inception and trajectory of the terms are illustrated in the diagram below.[2]

Diagram 7-1: Terminology since 1992 – In total numbers



Source: Compiled by the author from German newspaper data registered with Factiva on 08 August 2005.

As illustrated by this search, the term 'information society' (*Informationsgesellschaft*) is the overall most frequently used term in German newspaper

[2] All major German newspapers connected to Factiva were searched. Yet, it is important to note, that Factiva does not store all newspaper articles but merely a selection put together by Factiva. Hence, this search only gives a rough idea of the terms' inception and use. Furthermore, it assesses the usage of the terms in the public, not merely in the political sphere, such as in federal administrative bodies. The search was conducted on 08.08.2005 for the time span from 01.01.1985 to 08.08.2005. Illustrated is the usage in diagram 7-1 from 1992 onwards, since the terms were first recorded in the newspaper articles stored by Factiva in 1993.

articles. While the term 'information economy' (*Informationswirtschaft*) came up slightly earlier, it was later on used less often, but gained popularity since 2003. Interestingly, the terms focusing on information, not knowledge – 'information society' and 'information economy' – were first used in the public sphere. The term 'knowledge society' (*Wissensgesellschaft*), which is academically much older than the remaining two, became popular in the public sphere three years later and did not reach the popularity of the term 'information society'. Since the change of the century and the dot.com crash the usage of the terms has heavily decreased. On the other hand, the usage of the term 'information economy' increased in 2003 and remained steady from 2004 to 2005. This trend in the public sphere in favour of the term 'information economy' supports the described commercialisation of the dominant definitions of knowledge and information in Germany (chapter 4). Seemingly, economic growth in a time of economic downturn becomes increasingly the centre of attention.

In the political sphere (such as political programmes, statements and publications of the federal government), the history of the terms[3] can be redrawn as follows. In 1972, the Federal Ministry of Education and Science of Germany published the German translation of the Japanese report "Japan's Technological Strategy", which emphasised the importance of creating a k-society, here named 'information society', in Japan. Hence, the activities of other countries in this field were monitored and the topic was of relevance to German politics at that time (BMBW, 1972). Nevertheless, only with the beginning of the 1980s, the term 'information society' advanced in the political sphere of Germany. In March 1986, the federal government used the term 'information and communication society' in an answer to an inquiry of the Green Party of the German *Bundestag* (DBt, 05.03.1986: 2). Yet, the usage of the term 'information society' is overshadowed until the beginning of the 1990s by discussions on cable television, the privatisation of the broadcasting services and the cabling of the republic by the conservative party under Helmut Kohl as Chancellor (Kübler, 2005; Kleinsteuber, 2003).[4] With the

[3] Yet, the idea of increasingly using data processing as well as information and communication technologies is much older and originates from the first calculators developed for industrialising processes. Especially, during World War II, the potential of these technologies was realised by many countries and their development pushed.

[4] Possibly, the use of the term 'information society' connected to the privatisation of the broadcasting services is part of the reason, why the term – even after it was brought to the forefront of federal politics by the labour party under Gerhard Schröder in the end 1990s – is also accepted by the conservatives (Kübler, 2005: 63).

development of the interactive videotext, the concept of k-society became increasingly present in public and political discourse. As stated by the German magazine *Wirtschaftswoche* in 1983, "the interactive videotext was the conditioning drug, it was the precursor to the information society" (04.02.1983: 48; translation by the author). Most studies about the German k-society at that time took a technologically determined approach. In 1981, for example, the expert commission "New Media" of the state *Baden-Württemberg* discusses the consequences of the new media technologies on our everyday life (Expertenkommission Neue Medien, 1981a, 1981b, 1981c). In 1983, again financed by the state government of *Baden-Württemberg*, the expert commission on the "Future Perspectives of Societal Development" discusses the path to k-society out of three perspectives: social sciences, informatics and computer technology as well as educational sciences and pedagogy (Kommission Zukunftsperspektiven gesellschaftlicher Entwicklungen, 1983). Interestingly, the expert commission points out, that the sociological discourse on k-society has developed since the 1950s. This is one of the very rare moments in the political career of the term 'information society' in Germany that the political sphere actually refers to academic debates on the topic. As pointed out by Kleinsteuber (2003: 21), the term 'information society' was generally used in association with progress and economic growth; as a catchword with little (or no) substance, emphasising a technological determinism, popular in the 1970s and 80s, without relating to the academic roots of the term. Furthermore, politics encouraged researchers through specific research funding to argue in favour of ICTs as instruments leading to economic growth, employment and modernity. Hence, research programmes encouraged technologically determined research and discouraged by means of discrimination, criticism of the politicised vision (Kleinsteuber, 2003: 22). Up to what extent, criticism was discriminated, cannot be commented on here. An example of an exception to the technologically determined views on k-society forms the report "The Development of the Information Society out of the Perspective of the Federal Republic of Germany", published by the state government of *Hesse* in 1984 (Kübler, 2005: 65). According to the authors Reese and Lange, the development of ICTs should not form the centre of attention. Instead, the closing of the digital divide which opens up due to limited access to ICTs by some groups of society should be emphasised. Only the closure of the digital divide would enable the utilisation of ICTs for fighting unemployment. Merely focusing on the development of ICTs without looking at the usage of these by society would not lead to the envisioned results. In 1989, the *Fraunhofer* Institute of System Technology and Innovation Research (ISI) published a study for the Office of the Federal Chancellor (*Bundeskanzleramt*). This study

scrutinised statistical data interpreted as indicators for a transformation from industrial to information society, referring to the labour market, the technological and social development, as well as the educational sector. The study concludes that, even though vast technological development is taking place, one could not speak of a transformation of society towards k-society but instead of an informatisation of industrial society. The study argued that several centuries ago, industrial society was also not called steam engine, electricity, train or car society (Schröder et al, 1989: 24).

In spite of such criticism, the term 'information society' became increasingly popular in the public and political sphere, possibly further accelerated by the internet boom and eCommerce hype in the 1990s. On the level of the federal government the term was next used in 1996 by the Technological Advisory Board of the federal government (*Technologierat*) in its report "Info 2000: Germany's Way into the Information Society" (BMWi, 1996). It was followed up by a progress report one year later (BMWi, 1997). Furthermore, the topic was assessed by the enquete-commission of the German *Bundestag* "Future of the Media in Economy and Society – Germany's Way into the Information Society", which was formed on 05 December 1995 with Siegmar Mosdorf (SPD) as chairman. The results of the commission's work are published in a final report in 1998 (DBt, 1998), as outlined in chapter 8. By now, the term 'information society', not 'knowledge society' has established itself in the German political sphere. Yet, the nearly hegemonic position – as called by Kleinsteuber (2003: 22) – of the term 'information society' is not absolute. At the end of 1998, the *Heinrich-Böll*-Foundation, the political think tank of the Green Party, established a working area entitled 'Knowledge Society' and looked mainly at social aspects of the topic.

In 1999, the Federal Cabinet assigned the Federal Ministry for Economics and Technology as well as the Federal Ministry for Education and Research with the task of conceptualising the action programme "Innovation and Jobs in the Information Society of the 21st Century" as an all embracing strategy for the German government (BMWi/BMBF, 1999). Closely connected to this action programme and its progress report, published in March 2002 (BMWi/BMBF, 2002), is the eGovernment project of the federal government. BundOnline, launched in 2000, continues the government trend to use the term 'information society' on its internet portal (www.bundonline.de) as well as in all internet-applications made available.[5] With the information

[5] In September 2000, BundOnline is further backed by a 10-point-programme, named "Internet for Everyone – 10 Steps on the Way into an Information Society",

campaign "Germany spells itself with .de", started in 2002, BundOnline is complemented by a summary of the online services of the federal, the state governments as well as the municipalities on one internet portal (www.deutschland.de). The dominantly used term on this internet portal is again 'information society', not 'knowledge society'. In 2003, the current action programme of the federal government "Information Society Germany 2006" is published, once again emphasising the term 'information society' in its title (BMWA/BMBF, 2003).

Nevertheless, in many of these reports, action programmes and initiatives the term 'knowledge society', and to a lesser extent, 'information economy' are also mentioned, although the term 'information society' clearly dominates by being part of the titles. In the action programme "Innovation and Jobs in the Information Society of the 21st Century", for example, the term 'information society' was used 138 times, the term 'information economy' 18 times and the term 'knowledge society' 6 times. In its follow-up report published in 2002, the term 'information society' was used 169 times, while 'information economy' was used 7 times and 'knowledge society' only once. In the current action programme "Information Society Germany 2006" published in 2003, the term 'information society' is used 139 times, 'knowledge society' 6 times and 'information economy' merely 3 times. So is the term 'information society' the dominant term in the German political sphere until today? This is topic of the following paragraph.

Present Usage and Understanding

Kuhlen (2004: 6) mentions that the term 'knowledge' is increasingly replacing the term 'information' in topics such as information management, information society, and information economy. As an example, he points to UNESCO and several non-governmental organisations that choose to use the term 'knowledge society' rather than 'information society' in connection with the UN-Summit of the Information Society in 2003 (Geneva) and 2005 (Tunis). He interprets this risen usage of the term 'knowledge society', as an attempt to increasingly focus on the humanistic side of knowledge and information after many promises associated with the term 'information society'

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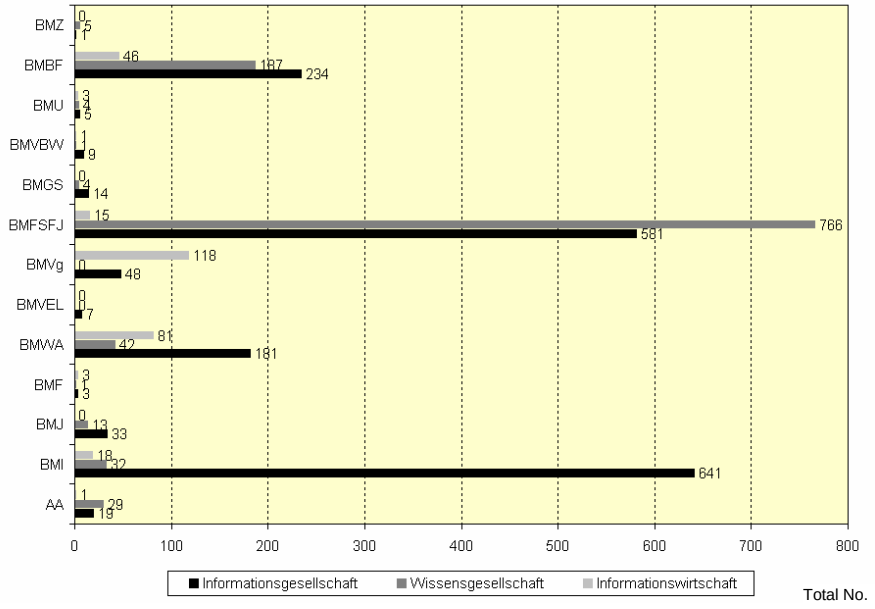
introduced by then Chancellor Gerhard Schröder at a congress of the private-public-partnership initiative D21. It concentrates on the equipping of public institutions such as schools, libraries and administrative bodies with free internet access as well as the offering of computer and internet courses for all groups of society.

have not been fulfilled. Referring to the political sphere in Germany Kleinsteuber states that "the term 'information society' is (…) clearly on the march back [and] other terms such as 'knowledge society' or 'media society' fight its former hegemony" (2003: 22). According to Kleinsteuber, it is a normal development of terms that experience a hype in the political debate until they are disposed as "rhetoric rubbish" (2003: 22).

Whether this statement is valued, and to what extent k-society terminology is today used in the political sphere of Germany was assessed by conducting a brief search for the terms 'information society', 'knowledge society' and 'information economy' (in German) on the websites of all federal ministries. It yielded the frequency of usage shown in diagram 7-2 below.[6]

Diagram 7-2: Terminological Preferences in Federal Ministries of Germany – In total numbers



Source: Compiled by the author from German government website data on 25 May 2005.

[6] The abbreviations of the names of federal ministries are decrypted in the list of abbreviations at the beginning of this book.

Apart from the Federal Ministry for Families, Seniors, Women and Youth (BMFSFJ), all other ministries prefer the term 'information society' to 'knowledge society'. Nevertheless, only two ministries (BMVEL, BMVg) do not use the term 'knowledge society' at all. The term 'information economy' is merely used by BMVg more often than 'information society'. Apart from the BMVg, the term is used infrequently. Hence, the term 'information society' still clearly dominates, but the term 'knowledge society' does play a role in the language of the federal administration of Germany. These findings confirm the assessment of terminology used in the major action programmes of the German government outlined in the section above. All major action programmes bear the term 'information society' in their titles, but also use the terms 'knowledge society' and 'information economy' to a lesser degree than 'information society' in their texts. Due to minimal usage of the term 'information economy' by the ministries as well as the fact that it is often used interchangeably with 'information society', it will thus not be addressed in the further analysis. With regard to the usage of 'knowledge society', the Federal Ministry of Education and Research (BMBF) in 2003 published a conference report of the national conference on the EU-action programme "Europe on its Way to a Knowledge Society". In this conference report, the term 'knowledge society' dominates with being used 8 times, while the term 'information society' surfaced merely once employed by state secretary Dr. Uwe Thomas, BMBF in his opening statement: "Ten years ago, one spoke of the information society, but since information is not enough, we have to move on to the knowledge society" (BMBF, 2003: 8; translation by the author). Is this statement of Thomas valued? Are we moving on to using the term 'knowledge society', rather than 'information society'?

The Head of the Department "Conceptual Questions and International Matters concerning the Information Society" (*Referat "Grundsatzfragen und internationale Angelegenheiten der Informationsgesellschaft"*) in the Federal Ministry of Economics and Labour (BMWA), overseeing the k-society activities of the federal government, explains the ambivalent use of the two terms 'information society' and 'knowledge society':

> "The term 'knowledge society' is surely the more comprehensive term. One can argue about the exact meaning and this is not unimportant. (…) But [the ministry] takes the more pragmatic approach and says, until now, the term 'information society' is more commonly used. Everyone understands it everywhere. One could also say 'information and knowledge society' and in longer explanations, we always use the term 'knowledge society' as well. But we see it rather from the pragmatic side and say 'information society', eve-

> ryone understands that" (B.-W. Weismann, 12.10.04, interview with & translation by the author).

BMWA is, together with the Federal Ministry of Education and Research (BMBF), in charge of the k-society-topic in Germany. Concerning the coordination of the German representation at the UN-Summit for the Information Society in 2003 and 2005, BMWA was solely in charge. Hence, the above statement, referring to the term 'knowledge society' as the more comprehensive one, has to be understood as a move towards this term rather than sticking with the term 'information society'. Nevertheless, 'information society' is regarded as more pragmatic and easier to grasp. The Head of the Department Internet (*Referat 511, Internet*), BMBF explains the preference for the term 'information society' by emphasising the aspect of federalism in the German system:

> "The term 'knowledge society' emphasises the aspect of education and educational politics in Germany being under the right of the states. In order to prevent a discussion on the federal system and the distribution of rights between the states and the federal government, the federal ministries prefer to use the term 'information society'" (F. Schlie-Roosen, 04.11.04, interview with & translation by the author).

Since a discussion on the distribution of rights in a federal system can easily hinder the advancement of certain political topics, it is a valid reason. Yet, it is questionable whether the pure choice of words actually hinders or encourages such a discussion. The Head of the Department Information, Publication, Editing (*Referat LP 4, Information, Publikation, Redaktion*) of the Federal Ministry of Health and Social Security (BMGS) also refers to the term 'information society' as implying the ability to be measured:

> "The measures that lead to an information society can be realised within one election period [4 years] and their fruits can be harvested at the next election, as for example the interlinking of companies or the propagation of broadband. A knowledge society requires years of investments into education that only pay-off centuries later" (J. Zweig, 30.09.04, interview with & translation by the author).

Further reasons stated by my informants for using the term 'information society' rather than 'knowledge society' include the following: (a) out of habit – it was the first term that came up and people got used to it; (b) 'information society' is the more comprehensive term; (c) all societies are information societies; (d) 'information society' is multidimensional while 'knowledge society' is one-dimensional – more government programmes can be attributed under 'information society'; (e) information is knowledge in

action – the central product is information, not knowledge, since information, not knowledge can be traded; (f) 'knowledge society' is a societal state one step further up than 'information society' which Germany has not yet reached.

Looking at the mainly pragmatic, and the few conceptual reasons for the term 'information society', one has to state *firstly* that the interviewed actors who are responsible for the government programmes towards a German k-society use the terms 'information society' and 'knowledge society' interchangeably and without precisely defining them. Hence, the language used is vague. *Secondly*, none of the mentioned reasons singly play a decisive role for one or the other term, but merely in combination with others.

Reasons stated by my informants for using the term 'knowledge society' rather than 'information society' include the following: (a) the term 'knowledge society' is more comprehensive than 'information society'; (b) the term 'information society' is outdated – it's not about information or ICTs but about the processing of knowledge; (c) information is merely one part of knowledge – an increase of knowledge, not just information is responsible for the social changes taking place.

Interestingly, some reasons mentioned for the term 'information society' were also mentioned for the term 'knowledge society', such as the aspect concerning which term is more comprehensive. Therefore it seems that no clear reasons for the usage of either of the two terms exist. For 21 of 36 experts interviewed in Germany, representing federal government ministries, research institutes, political think tanks and private-public-partnership initiatives the question about the terms 'information society' or 'knowledge society' seemed more like a terminological one of low importance for policies and government programmes. Although both terms are used during everyday work, the question of terminology, the differences between the two terms and their exact meanings is of lower or no importance to these 21 informants. 26 of the 36 informants prefer to use the term 'information society' referring to Germany, yet 4 of these 26 think that it should be called 'knowledge society' in the future. Only 3 informants actually argued in favour of using the term 'knowledge society' at the present moment. The remaining 7 of 36 informants did not show any preference.

Looking at the conceptual differences outlined by my informants in distinguishing the two concepts, it becomes obvious that no precise definitions of the terms 'information society' and 'knowledge society' can be identified. The criticism raised by Kleinsteuber that these terms, by using them as catchwords in the political sphere, were hollowed out and lost the few defin-

ing specifications identified by the academic field, consequently has to be supported. Yet, this does not mean that the federal government does not precisely define what shall be created. The opposite is the case as illustrated in chapter 8: the government precisely defines what type of k-society shall be constructed. Yet, it is a process-related definition inherent in the programmes creating k-society, while the multiple terms labelling these concepts are used interchangeably, as shown above.

Only 7 of 36 informants argued conceptually for the usage of one or the other term. 12 informants gave pragmatic reasons such as easier to grasp, longer tradition in the political sphere, more comprehensive, etc. Informants generally agreed on the emphasis on ICTs as drivers of societal change as the only aspect defining the term 'information society' and conceptually distinguishing it from 'knowledge society'. The term 'knowledge society' was generally regarded as focusing on social, educational and emancipatory aspects of this transformation. More detailed definitions of what shall be constructed were not stated. The Head of the Department "Conceptual Questions and International Matters concerning the Information Society", BMWA, takes a technological-deterministic approach and defines 'information society' in the following manner:

> "We count all areas to the information society, in which ICTs as enabling technologies can enhance productivity. That's what we mean, when we talk of an information society" (B.-W. Weismann, 12.10.04, interview with & translation by the author).

The Head of the Institute for Education in the Information Society regards information as the central product:

> "The central product is not knowledge, since one can't trade it, but it is information. Knowledge is anchored in the brain of a person. It is impossible to trade it. But information can be written down. Then they become data and when a person accesses them, they again become information. I don't agree when the term knowledge is used in such an exposed way. Without knowledge in society, no society would have survived. But the ability to exchange information as the basis for the knowledge resulting from them emerged only with the information and communication technologies. That is the main difference" (W. Hendricks, 19.10.04, interview with & translation by the author).

He cautions that one should not ideologically overload the term 'knowledge society' by suddenly emphasising the importance of knowledge for society, which in real terms has always been the case. Furthermore, he points out the simple reason for staying with the term 'information society':

Once it entered the name of a department, work area or institution, one simply cannot change one's rhetoric to the term 'knowledge society' that easily.

The Head of the Information Science Department, University of Constance also points to information being at the centre of the transformation assessed:

> "I prefer the term 'information society' because it views information as knowledge that is relevant to action, as knowledge in action. While 'knowledge society' – in my view – is a strongly conservative term which aims at the autonomy of human beings" (R. Kuhlen, 26.11.04, interview with & translation by the author).

In contrast, the head of the sector Knowledge Society in the *Heinrich-Böll*-Foundation is in favour of the term 'knowledge society' (HBS, 2006). The *Heinrich-Böll*-Foundation concentrates on the aspect of non-substitutable knowledge in the value chain and the processes of negotiation between the bearers of this knowledge (people) and the users (economy/state). Information here is seen as a form of explicit knowledge. Yet, the main concern of the foundation is how knowledge, which cannot be made explicit, can enter the value chain (A. Poltermann, 18.10.04, interview with the author). The head of the Knowledge Centre at Accenture Germany, regards the three concepts 'communication society', 'information society' and 'knowledge society' as part of a phase model. While the 'communication society' forms phase one in this model, the 'information society' is phase two (Germany's current phase). The ultimate phase is the 'knowledge society' which Germany should aim for (S. Falk, 25.10.04, interview with the author).

Interestingly, the interviewees can be grouped according to whether they mainly argue pragmatically or conceptually for or against 'information society'. The representatives of the government administration, the ones who are actually in charge of publishing government programmes and action plans, mainly argue pragmatically (i.e. 'information society' is the oldest term, is easier to grasp, easier to explain to the voter, does not lead to a discussion on the federal system, ICT-investments pay off faster than into education, etc). The ones who argue conceptually are mainly representatives of the scientific community (universities, research institutes, political think tanks). An exception is one representative of the economy and one of the state administration (BMWA) who take very technologically determined positions towards k- society. This divide of two groups, comprising roughly government administration versus scientific community, underlines what has been argued before: the actors in the political sphere hardly at aöö refer to the academic, categorically defined concepts of 'information society' and 'knowledge soci-

ety'. Instead, the academic terms were used without the conceptual foundation attached to them by members of the scientific community. Yet, this terminological vagueness, as argued in chapter 6, might be very much part of the discourse: it created a fertile ground for the construction of the vision of a self-emerging k-society.

As to whether the term 'information society' in Germany is being slowly replaced by 'knowledge society' it can be argued as follows. The term 'information society' is established to such a high degree, has entered so many names of institutions and departments, as well as so many titles of books, studies, reports and programmes, that it seems unlikely that 'knowledge society' as a term will take over completely. It appears plausible that organisations and groups increasingly choose to use the term 'knowledge society' in order to emphasise social and educational aspects. Yet, the term 'knowledge society' does not completely replace the term 'information society'. The increasing awareness that ICTs do not alone lead to a new form of society is responsible for a slow demise of the term 'information society'. The analysis of the German and Singaporean government k-society programmes nevertheless reveals an ongoing strong technological and economic focus in defining k-society inherent to the actions taken. This will be shown in chapters 8 and 9.

'Knowledge-based Economy' versus 'Information/Knowledge Society' in Singapore

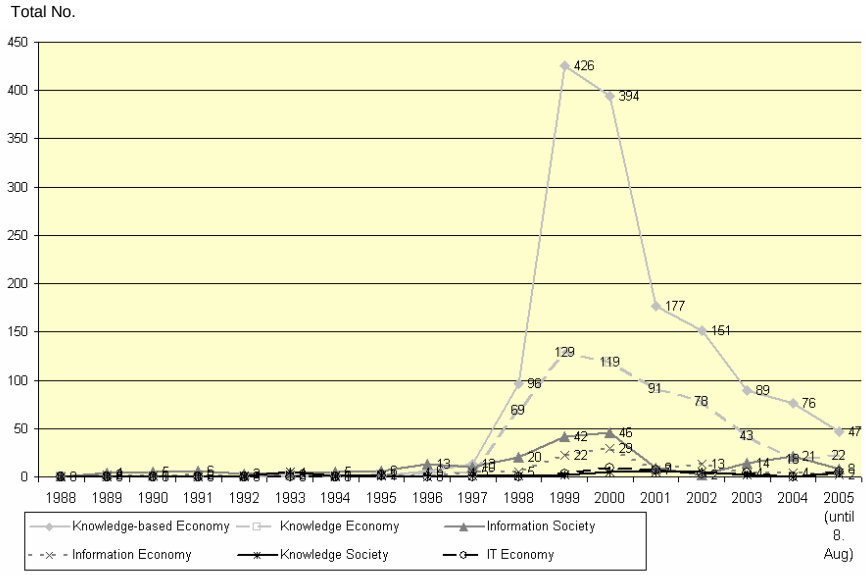
Past Development

As one informant mentioned, "in Singapore, KBE started when the government started talking of it" (Institute for Infocomm Research, 22.02.05). Accordingly, the usage of different k-society-terms in the public as well as the political spheres of Singapore is outlined in the following.

A rough search of six different terms used to describe the new kind of economy or society in Singapore – 'knowledge-based economy', 'knowledge economy', 'information society', 'information economy', 'knowledge society' and 'IT economy' – in the database 'Factiva' outlines the trajectory of the terms in diagram 7-3 and diagram 7-4 below.[7]

[7] All major Singaporean newspapers connected to Factiva were searched. Yet, it is important to note, that Factiva does not store all newspaper articles but merely a

Diagram 7-3: Terminology since 1988 – In total numbers



Source: Compiled from Singaporean newspaper data registered with Factiva on 08 August 2005.

In Singapore, the term 'knowledge-based economy' advanced as the most commonly used term in the public sphere. Nevertheless, its usage has decreased heavily since the change of the century and the dot.com crash. Furthermore, there have been several other terms that became popular, but not as popular as 'knowledge-based economy'. Some of these terms were actually used years before the term 'knowledge-based economy', which is slightly better illustrated in diagram 7-4.

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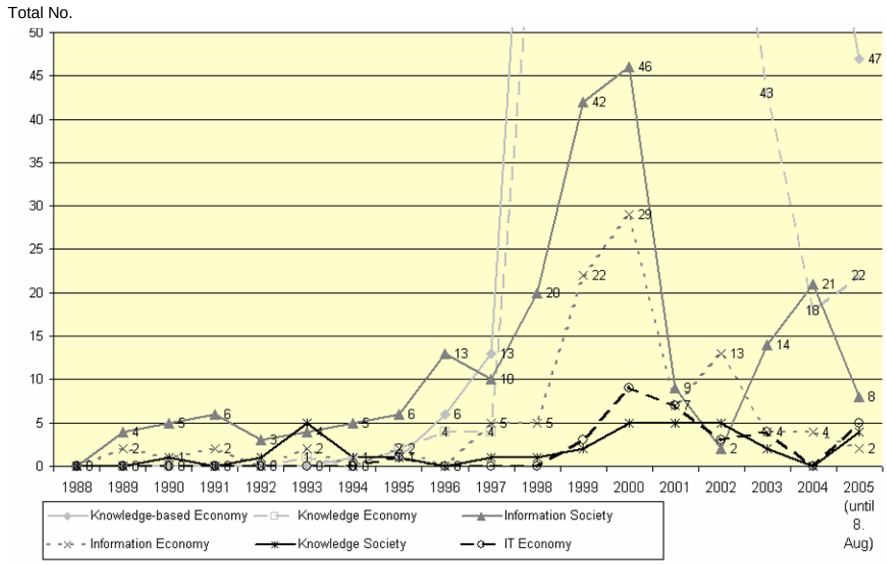
selection of the more important ones, rated by Factiva. Hence, this search only gives a rough idea on when a specific term was first used and how frequently. Furthermore, it assesses the usage of the terms in the public not the political sphere. The search was conducted on 08.08.2005 for the period spanning from 01.01.1985 to 08.08.2005. Illustrated is the usage in Diagram 7-3 and Diagram 7-4 from 1988 onwards only, since the terms were first recorded in the newspaper articles stored by Factiva in 1989.

Diagram 7-4: Terminology since 1988 – A Multiplicity of Terms – In total numbers



Source: Compiled from Singaporean newspaper data registered with Factiva on 08 August 2005.

While the term 'knowledge-based economy' appears to be the most commonly used term in the public sphere since mid 1994 (see diagram 7-3), the terms 'information society' and 'information economy' seem to have entered newspaper articles and political statements the earliest in 1989 and therefore seem to be the oldest terms used. These terms were followed closely by the term 'knowledge society' which first appeared in 1990 but from then on was only rarely used. In 1993, the term 'knowledge economy' is mentioned for the first time and is until 2005 the second most frequently used term behind 'knowledge-based economy'. The term 'IT economy' seems to be a rather recent term and used infrequently.

Overall, the terms focusing on economy, not society – 'knowledge-based economy', 'knowledge economy' and 'information economy' – are the more popular ones. It can therefore be concluded that they are seen by Singaporean politicians[8] and journalists to be the most appropriate terms in the Singaporean context. The terms emphasising information, not knowledge –

[8] In many of these articles, the terms are used due to quoting politicians' speeches. Hence, the terms are spread by journalists but were not originally chosen by them.

'information society' and 'information economy' – were nevertheless used the earliest in the public sphere. In the following, the terms 'knowledge-based economy' as well as 'knowledge economy' shall, due to their conceptual similarity, be discussed together under the term 'knowledge-based economy'. The term 'IT economy' will not be addressed any further, due to minimal usage. The usage of the term 'knowledge society' will only be discussed when its usage in a certain programme or action plan emphasises its importance. The above shows that the terms 'knowledge-based economy' and 'information society' appear to be the mainly used terms in Singapore and hence the focus lies on them.

Regarding the usage of the terms in the political sphere, it is pertinent to point out that the Singaporean government and its administration do not have a single major action plan or programme which bears the term 'knowledge-based economy' or any of the other terms in its title. This is not to say that the Singaporean government does not have action plans focusing on the creation of a k-society, but rather, the opposite is the case. The Singaporean government was, after Japan, one of the first governments embarking on the step-by-step creation of a k-society: in Singapore mainly named 'knowledge-based economy'. In 1980, the Committee on National Computerisation, formed by the then Minister of Trade and Industry Goh Chok Tong, submitted the "Report on National Computerisation" to the government, which recommended to focus on developing manpower, skilled in computer programming (Committee on National Computerisation, 1980).[9] The computerisation of the public service was planned and accomplished by the Civil Service Computerisation Programme (NCB, 1984, 1985, 1987, 1992b, 1997). In 1985, the government set up a working committee to produce a National Information Technology (IT) Plan, which offered an integrated IT policy for the next five years. It was in this "National IT Plan", where the term 'information society', interestingly not 'knowledge-based economy', is mentioned as the "vision of Singapore" by stating: "despite the anticipated social problems, Singapore cannot avoid becoming an information society" (National IT Plan Working Committee, 1985: 25/30). In 1992, NCB published the plan "IT 2000: A Vision of an Intelligent Island", which focused on the creation of a National Information Infrastructure (NII), linking computers in every home, office, school and factory (NCB, 1992a). In this plan and its associated political discourse, the vision of a Singaporean knowledge-based economy

[9] In 1981, the government sets up the National Computer Board (NCB) as a statutory board of the government, subordinated to the Ministry of Finance, in order to implement the plan.

(KBE), as it was to be mainly called later on, was drawn under the phrase "Singapore as an Intelligent Island".[10]

By the late 1990s, the term 'knowledge-based economy' had emerged as a frequently used term in speeches of politicians, newspaper articles and press releases. On 25 August 1997, for example, PM Goh Chok Tong was quoted by the Straits Times to have emphasised the importance of intellectual capital "if Singapore wanted to produce for a global market and be a successful knowledge-based economy" (Straits Times, 25.08.97). In 1994, the government publishes the action plan "Library 2000" in order to raise the general level of education in society. In the introductory chapter the then Prime Minister Goh Chok Tong is quoted out of his National Day Message of 1993, emphasising that "the future, belongs to countries whose people make the most productive use of information, knowledge and technology. These are now the key factors for economic success, not natural resources" (Library 2000 Review Committee, 1994: 3). Further on in the action plan, the term 'knowledge economy' is mainly used.

The infrastructural development is pushed further by the master plan "Infocomm21", published in 2000 by the Infocomm Development Authority (IDA), a merger of the National Computer Board and the Singapore Telecommunication Authority (IDA, 2000). Here, the term 'knowledge-based economy' is mainly used. In 2002, the Ministry of Trade and Industry publishes an economic survey of Singapore entitled "Mapping Singapore's Knowledge-based Economy", in which the different sectors, contributing to KBE are outlined. Aiming at a definition of Singapore's KBE, the report refers to a definition given by the Asia-Pacific Economic Committee and being adopted by the Singaporean government: "A knowledge-based economy is an economy in which the production, distribution, and use of knowledge is the main driver of growth, wealth creation and employment across all industries" (APEC Economic Committee, 2000, qtd. in Toh/Tang/et al, 2002).

Continuously aiming for the diversification of Singapore's economy, the government, also in 2002, embarks on the development of creative indus-

[10] This label was originally given to Singapore by the British Broadcasting Corporation (BBC) in a documentary on Singapore's achievements in August 1990 (Ling, 2000/2001: 22). Yet, it was gladly accepted by the former British colony and used for labeling the freshly painted national vision.

tries[11] as an economic sector. In 2003, IDA publishes "Connected Singapore" which aims at the involvement of creative industries into the infrastructural and technological activities of IDA (IDA, 2003a). Yet, this plan did not make use of any of the assessed terms. In 2005, Singapore's government publishes "Library 2010" which aims at developing public libraries into the third most important place in the lives of Singaporeans, following home and work (NLB, 2005). This master plan stays in the terminological tradition of the last century and makes use of the term 'knowledge-based economy', rather than 'information society' or 'knowledge society'.

Each of these action plans focus on concrete, sectoral aspects, such as on the further development of the national information infrastructure, the development of a vast library system, as well as in more recent years, the fostering of an art and heritage scene in order to raise the level of creativity in Singapore's society. Each of these sectors forms an important pillar for k-society. Nevertheless, none of these action plans actually use any k-society-term in their titles, although most state their contribution to the 'Singaporean knowledge-based economy' on the pages 1 to 5. The Director of the Arts and Heritage Division in the Ministry of Information, Communication and the Arts explains:

> "There is no official KBE-manifesto, there is no KBE-plan, but the intent to become a knowledge-based economy is clear. In fact, because we talk about it so much, it gets internalised, at some point we don't need to talk about it anymore" (Koh L.-N., 30.03.05, interview with the author).

Therefore, the very popularly used terms 'knowledge-based economy' as well as 'knowledge economy', less 'information society', of the 1990s, seem to appear less attractive in the 2000s. This will be discussed in the following paragraph.

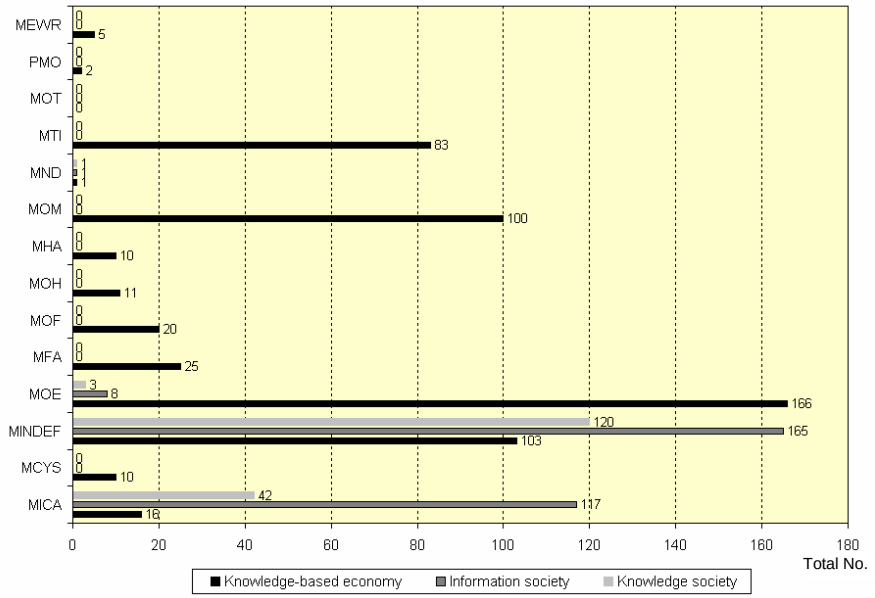
Present Usage and Understanding

In Singapore, the same terminological search as conducted on the websites of the German federal government ministries was also

[11] According to the Creative Industries Development Strategy Singapore, 'creative industries' can be defined as "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property" (Workgroup on Creative Industries, 2002: 2). This definition is borrowed from the UK Creative Industries Taskforce, Creative Industries Mapping Document, 1998.

conducted on the websites of the Singaporean ministries[12], extended by the term 'knowledge-based economy'.

Diagram 7-5: Terminological Preferences in Singaporean Ministries – In total numbers



Source: Compiled from Singapore government website data on 25 May 2005.

Interestingly, the Ministry of Information, Communications and the Arts as well as the Ministry of Defence seem to use the term 'information society' more frequently than the term 'knowledge-based economy'. Nevertheless, all other ministries show a clear preference for the term 'knowledge-based economy'.

The Chairman of A*STAR and Co-Chairman of the Economic Development Board explains the use of the term 'knowledge-based economy' rather than 'information society' or knowledge society' as follows:

[12] Missing are the data from the Ministry of Law, due to a problem with the search function on its website.

> "If we have a good economy and people have good jobs, you can do anything you like. Society derives from there. Economy is the key to any society. When people are hungry, there is no society, there is no culture, there is no poetry, and there is no architecture. So you start with economics. When people are employed and active, the rest will follow" (Ph. Yeo, 11.02.05, interview with the author).

The Chief Executive of the National Library Board explains the preference of the term 'knowledge-based economy' as follows:

> "In Singapore, we are driven by economics. The 'knowledge society' is the long-term goal, yet at the moment our focus is on KBE. The KBE plugs you and the Singaporean market directly into a global system, the international market. The 'knowledge society' is far more complex and deeper. Also it is harder to grasp" (N. Varaprasad, 11.02.05, interview with the author).

Underlining the urge of Singapore to develop into a KBE, the Deputy Director (Industry) of the Institute for Microelectronics (IME), a research institute belonging to A*STAR, states:

> "KBE is a matter of bread and butter. If you have a very knowledgeable society that cannot translate that knowledge into bread and butter, it doesn't help. It must be more than knowledge for knowledge sake, but more knowledge for some application, for bread and butter, for life, for survival!" (Lim Th. B., 18.02.05, interview with the author).

These statements are summarised by the following of a representative of the School of Communication & Information, Division of Journalism and Publishing at the Nanyang Technological University:

> "The Singaporean government sees KBE as a means to gain economic growth rather than for its intrinsic value" (Ch. George, 08.02.05, interview with the author).

As 'intrinsic value' the informant above labels what others call 'knowledge for knowledge sake', meaning to create a KBE for the enlightenment of the citizens by fostering the production and dissemination of any kind of knowledge. Yet, the opposite is the case. A KBE is created in order to economically profit from the production and dissemination of certain, economically viable knowledge.

None of the 45 informants in Singapore argued for the usage of the terms 'information society' or 'knowledge society'. The term 'knowledge-based economy' seemed to be the most widely accepted term. Nevertheless, my informants did not state any conceptual reasons for adopting this term. Rather, it seems that it is used by the interviewed actors, since it is dominantly

used by the government. A possible reason for the government choosing this term is the implied contribution of 'KBE' to economic growth, which forms the main basis of legitimacy for the government. As part of the government's rhetoric it was adopted by the remaining engaged subsystems of Singapore society, without scrutiny of its exact meaning. Only the following conceptual reasons were given. The Chief Executive of the National Library Board defines 'KBE' as follows:

> "KBE is an economy in which the main engines of growth depend on creating new goods, services and businesses, not on just manufacturing the ideas of others. Knowledge is required for the design of products, markets, financial products, advertising, movies, etc. Therefore, in the KBE it's less about making than about creating" (N. Varaprasad, 11.02.05, interview with the author).

The Permanent Secretary of the Ministry of Information, Communications and the Arts refers to different societal and economic stages in the past, in order to outline how he defines KBE:

> "It is a continuance, an evolution. In the past it was the agricultural age, the industrial age and now the post-industrial age or the information age. But information is only one aspect. (…) What follows is the knowledge aspect, the knowledge-based economy. (…) And I think, it is even more than knowledge. It has got to do with creativity, with the ability to integrate value, to do value differentiation and therefore value innovation, which is now what we are embarking on" (Tan Ch. N., 02.03.05, interview with the author).

The then Chairman of A*STAR and Co-Chairman of EDB, who is regarded as one of the main drivers of KBE in Singapore since the 1970s, states:

> "To me, key to KBE is talent. It is not complex, but it simply means young talent. When you have a young talent, it will grow old. So focus on the seedlings and it will become trees! And when they are trees, they are already there" (Ph. Yeo, 11.02.05, interview with the author).

A director of the Institute for Infocomm Research (who prefers to remain anonymous) perceives the term 'KBE' from a rather critical perspective: "KBE is like art: don't ask me what it is, I will tell you, when I see it!" Asked about the difference between 'KBE', 'knowledge society' and 'information society', he answers: "To me they are all words used by blind people to describe the colour pink." Asked after, which of the three concepts appears to be most appropriate to him in the Singaporean context, he answers: "That would be purple then!" (22.02.05, interview with the author).

In my understanding, these last statements best outline the loose usage of the term 'KBE' by the Singaporean actors constructing it. KBE is used as a catchword without precisely defining it. However, it will be shown in chapter 9, that the activities creating this 'KBE' actually define it very specifically. Hence, the language used by political actors is very vague. Yet, the launched activities constructing the uniquely Singaporean k-society as form of social and economic reality define it very precisely, not categorically – as done by the scientific community, but process-related. By using the term without clarifying its specific meaning, the users of the term continuously contribute to the construction of a k-society-vision, as outlined in chapter 6.

Why the term 'knowledge-based economy' was chosen for creating this vision, rather than 'knowledge society' or 'information society' can be answered, based on the research conducted, by referring to Singapore's urge to economically develop from a less developed to an industrialised country. Since independence, economic growth has been the basis of legitimacy of Singapore's government. The term 'knowledge society' implies the empowerment of people through knowledge, a rather democratic idea. In comparison to this, the term 'KBE' relates to the general focus on economic growth, it can easily be explained to the public and does not pose any form of political threat to the government. The creation of a 'knowledge society' would require the government to support people movements for a self-empowered society based on knowledge. A well-organised, empowered through knowledge, civil society nevertheless could pose a political threat and the fostering of it is therefore not the utmost priority of the Singaporean government. The creation of a 'KBE' nevertheless remains in the tradition of aiming for economic growth, which legitimises the power of a government that developed Singapore from a less developed into an industrialised country and therewith answered the physical needs of Singapore's citizens.

Discussion

In Germany the term 'information society' is mainly used, and to a lesser extent 'knowledge society' and 'information economy', although they have become increasingly popular. While the term 'information economy' is used with a similar meaning as 'information society' (focus on technological aspects) but underlining the contribution to economy, the term 'knowledge society' emphasises mainly social aspects. The usage of the different terms in Germany is generally connected to specific groups of actors. While represen-

tatives of the economy, as well as the administrative bodies of the federal government which closely cooperate with the economy, tend to use the technologically determined term 'information society', representatives of the civil society and administrative bodies cooperating with those as well as with the scientific community mainly use the term 'knowledge society'. Similar to Germany, in Singapore the terminological choice in the public corresponds to the usage in the political sphere. The mainly used term by all groups of actors and involved subsystems is 'knowledge-based economy'.

In both countries, the chosen k-society terms, which were originally created by members of the scientific community, are used without reference to the academic, categorically defined concepts behind them. Instead, the terms are used without clarifying their precise meanings. In both countries, the terminological preference evolved and was not consciously decided on. The stated reasons for one or the other term are mainly pragmatic, few conceptual in character. In Germany, the pragmatic reasons involved (a) 'information society' is older/longer used in politics; (b) easier to explain to citizens and voters; and (c) more tangible. These pragmatic reasons for the term 'information society' seemed to prevail and emerged as deciding factor in the political sphere. Nevertheless, today conceptual reasons increasingly stand in for the usage of the term 'knowledge society'. Main aspects mentioned include (a) knowledge, not merely information is becoming the main resource for production. Here often the human component of knowledge was emphasised, meaning that information has to be processed by the human brain in order to create value; (b) 'knowledge society' in opposition to the technological determinism often connected to 'information society'; (c) personal knowledge and education as liberalising aspects, meaning that the personal knowledge of everyone increasingly acts as an emancipator. Conceptual reasons for the usage of the term 'information economy' were not given. Yet, it appears to originate from an increased focus on economy and the legitimising of political action by pointing to its contribution to economic prosperity.

The terminological choice of Singapore, 'knowledge-based economy', was mainly justified by referring to Singapore's short history after independence and the urge to develop from a 'third' to a 'first world country'. Furthermore, economic growth was and still is the legitimising foundation of the one-party democracy. By focusing on economic growth, areas of societal development are neglected or consciously forgotten about, such as personal freedom, the right for free speech, arts and culture – all areas that carry potential for critical thinking, political and social unrest. As mentioned by Lane referring to his concept of a knowledgeable society, "free discussion must be

allowed on every topic" (Lane, 1966: 650). Following his thought would mean that the creation of this type of k-society is impossible in today's Singapore, even though liberalising tendencies are taking place. Nevertheless, Singapore's government actively constructs a locality-specific k-society, as shown in chapter 9 that is surprisingly similar to the k-society constructed in Germany. In both countries the focus lies on the creation of an ICT and knowledge infrastructure that will foster and ensure sustainable economic prosperity. The main difference between the k-societies constructed in Singapore and Germany nevertheless, can be traced back to the definitions of knowledge as well as structural realities present in both countries. Singapore today, differently from Germany, emphasises the conscious fostering of creativity and the development of creative industries. This is an aspect of k-society that is not pursued by Germany. Creativity is, in Germany, regarded as something that grows and develops due to a broad definition of knowledge that allows for fine arts, craft and music education at school, critical discussion as well as time and space for personal development, hobbies and recreation for the younger generation. In Singapore, the conscious fostering of creativity goes back to the mid 1990s when the government began to regard a lack of creativity as a hindrance to economic development. In Germany, a lack of creativity as hindrance to economic growth has not yet been a topic of federal politics. Instead, the existing infrastructure for the developing of creativity is increasingly endangered due to the rising focus on knowledge and knowledge production that is regarded as contributing to economic growth. As part of this development, fine arts, craft and music education in secondary schools are reduced, while school hours per day are increased affecting the recreational activities of youngsters in the afternoon.

The interviewed representatives of the acting subsystems involved in the construction of k-societies in Germany and Singapore did, as quoted above, not state one common definition of k-society in each country. Nevertheless, the launched political programmes and action plans (outlined and assessed in chapters 8 and 9) illustrate that very precise definitions of k-society exist inherent in these programmes. Hence, the country-specific k-societies constructed in Germany and Singapore are defined procedurally, meaning defined by the programmes creating them, rather than categorically as the academic concepts of k-society created by the scientific community. In order to assess these definitions and therefore find an answer to the question, what k-societies actually are, it is necessary to assess the political programmes and activities conducted in each country with regard to the definitions of k-society inherent in them. This is the focus of the following two chapters.

Chapter 8

Constructing a German K-Society

The activities of the German government listed in table 8-1 directly contribute to the creation of a German k-society. Therefore, they form the objective of investigation in this chapter.

Table 8-1: State Activities for a German K-Society

Year	Name of Initiative	Type	Initiator
1967-1970	1st Data Processing Programme (1. *Datenverarbeitungsprogramm*)	Research Programme	Federal Government
1971-1975	2nd Data Processing Programme (2. *Datenverarbeitungsprogramm*)	Research Programme	Federal Government
1974-1976	Commission for the Extension of the Technical Communication System (*Kommission für den Ausbau des technischen Telekommunikationssystems (KtK)*)	Independent Study Commission	Federal Government
1976-1979	3rd Data Processing Programme (3. *Datenverarbeitungsprogramm*)	Research Programme	Federal Government
1981-1983	New Information and Communication Technologies (*Neue Informations- und Kommunikationstechniken*)	Enquete-Commission	Federal Parliament
1984-1989	Information Technology. Concept for the Support of developing Microelectronics and ICTs (*Informationstechnik. Konzeption für die Förderung der Mikroelektronik, der Informations- und Kommunikationstechniken*)	Government Programme	Federal Government
1985-1987	Telecommunication System (*Regierungskommission Fernmeldewesen*)	Government Commission	Federal Government
1989	Future Concept Information Technology 2000 (*Zukunftskonzept Informationstechnologie 2000*)	Government Programme	Federal Government
1995-1998	Future of the Media in the Economy and Society – Germany's Road into the Information Society (*Zukunft der Medien in Wirtschaft und Gesellschaft – Deutschlands Weg in die Informationsgesellschaft*)	Enquete-Commission	Federal Parliament
1996-1998	Info 2000: Germany's Road into the Information Society (*Info 2000: Deutschlands Weg in die Informationsgesellschaft*)	Action Plan	Federal Government

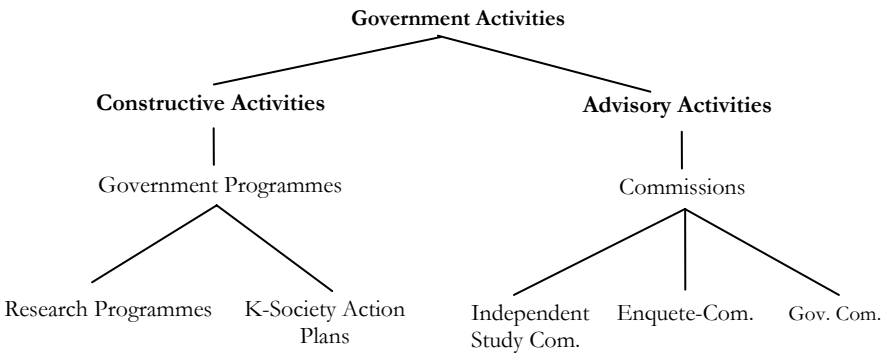
Year	Name of Initiative	Type	Initiator
1999-2003	Innovation and Jobs in the Information Society of the 21st Century (*Innovation und Arbeitsplätze in der Informationsgesellschaft des 21. Jahrhunderts)*	Action Plan	Federal Government
1999-2002	Globalisation of the World Economy – Challenges and Answers (*Globalisierung der Weltwirtschaft – Herausforderungen und Antworten*)	Enquete-Commission	Federal Parliament
2003-2006	Information Society Germany 2006 (*Informationsgesellschaft Deutschland 2006*)	Action Plan	Federal Government
2006-2010	Information Society Germany 2010 *(Informationsgesellschaft Deutschland 2010)*	Action Plan	Federal Government

The commissions and government programmes from the 1970s to early 1990s mainly focused on the technological and legal infrastructure that today forms the infrastructural foundation of the German k-society. Yet, the creation of a German k-society was not formulated as a political aim in these documents. It was only from the mid 1990s onwards that the programmes and final reports concerned with the German k-society bear the term 'information society' in their titles. With regard to the content, the action plans published from the mid 1990s onwards, incorporate all former three categories of initiatives – research programmes, technological as well as legal infrastructure programmes. This incorporating character is also expressed by the term 'action plan' as most of them are called.[1]

Overall, the activities listed above can be analysed according to (a) their function, as well as (b) their content, meaning the definitions of k-societies inherent to them. According to their function, the activities have to be sorted as illustrated in diagram 8-1.

[1] A representative of the Federal Ministry for Education and Research explains in an interview: "The organisation of the government and its administration does not necessarily represent reality but is based on some bureaucratic considerations. Each department is in charge of certain areas and conducts programmes such as either research programmes or programmes focusing on the technological infrastructure. But if you talk of an information society, all these programmes are too limited. So when the first programme for the information society was published, the fact that it was supported by several ministries was already a success. You can change reality only step by step and up to a certain point" (F. Schlie-Roosen, 04.11.04, interview with & translation by the author).

Diagram 8-1: Functional Differentiation



The German government activities towards k-society can be split into constructive and advisory activities. The advisory activities are the final reports formulated by commissions working for the German government. These commissions are (a) independent study commissions assigned by the federal government made up of external experts; (b) enquete-commissions[2] by the German *Bundestag* consisting of members of parliament and external experts; as well as (c) government commissions made up of members of parliament. Additionally, each commission is supported by a secretariat and invites further experts, representatives of the scientific community, economy and civil society to expert hearings and for composing advisory statements. The work done by these commissions is advisory in character. Hence, each commission is asked to submit an interim or progress report and to conclude its work with a final report which is submitted to the German *Bundestag* or the federal government, depending on the different types of commission. Yet, the degree up to which these reports and the recommendations formulated actually influence policy making strongly depends on varying circumstances as shown below.

Contrary to the final reports of commissions (advisory activities), the constructive activities are actual programmes and action plans of the German government. The action plans comprise a multitude of single activities, initiatives and programmes that aim at the creation of a German k-society.

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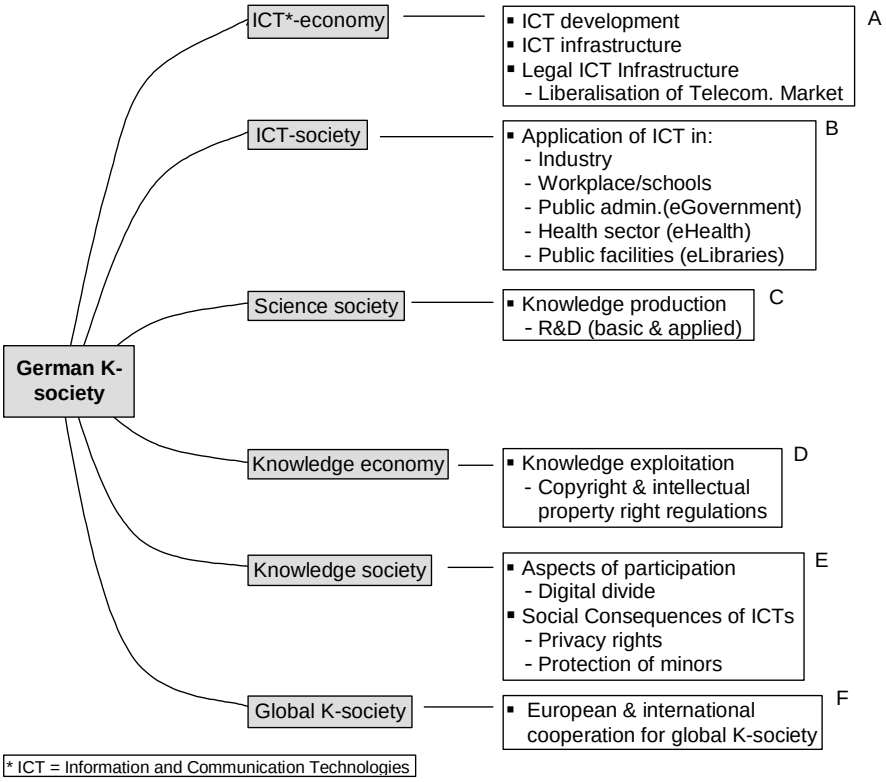
[2] For details on enquete-commissions of the German *Bundestag*, see Heyer/Liening, 2004 and Rössler, 2002: 56-58.

These constructive activities can be grouped according to the definitions of k-society inherent in each of them. This textual differentiation is illustrated in diagram 8-2. The addressed topoi are listed in the right column of the diagram. Each group of topoi defines k-society differently which is expressed by the different labels attached (middle column). Hence, the construction of six different types of k-societies (sub-k-societies) is pursued. All six types together constitute the German k-society.

Diagram 8-2: Typology of the German K-Society



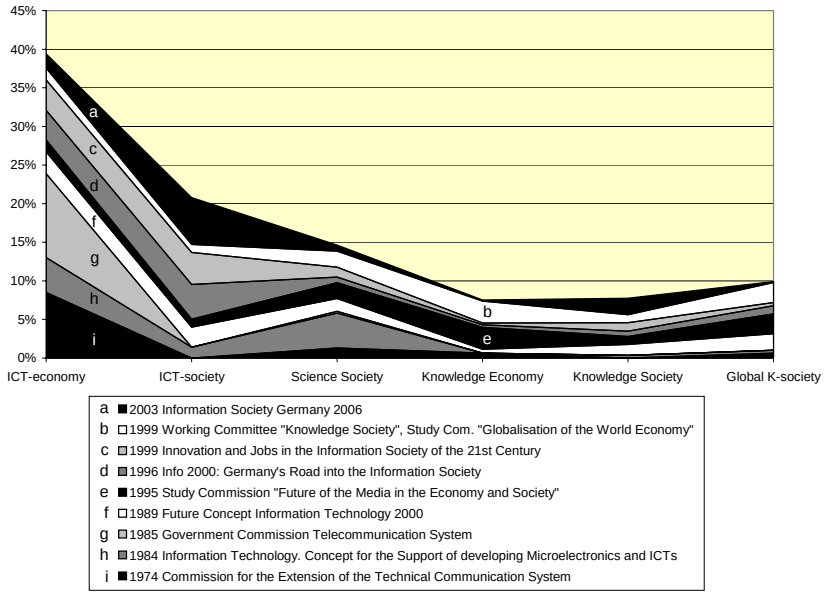
The activities summarised under the topics in box A *firstly* aim at the development of information and communication technologies (ICTs). These activities include the data processing programmes of the German government

conducted in the 1960s and 70s. *Secondly*, they aim at the building of an ICT infrastructure, meaning the cabling of the entire country. *Thirdly*, it includes legal aspects such as the liberalisation of the telecommunication market, internet security, digital signatures or online banking. Hence, the topoi in box A address issues concerning the development of the technology, as well as the technological and legal infrastructure in order to use these technologies for economic growth. They are therefore constructing an ICT-economy. The activities falling under the topoi listed in box B encourage the application of ICTs in all aspects of private and professional life, meaning at the workplace, in schools and public entities such as libraries, hospitals or the public administration. They work towards the realisation of an ICT-society.The activities counted under the topoi in box C are programmes that foster research and development, hence the production of knowledge. These programmes are based on a definition of k-society that regards the production of knowledge as the main characteristic and precondition of k-society. These programmes can be categorised as defining k-society in terms of a science society. The activities addressing the topoi listed in box D aim at the financial utilisation and exploitation of knowledge, ideas, designs etc. These are activities that aim at securing intellectual property rights and copyrights in order to enable the marketing of knowledge as a commodity. These activities contribute to the realisation of a knowledge economy. The activities listed under the topoi in box E address the narrowing of the digital divide. Hence, these activities encourage all groups of society to use ICTs in order to fully participate in k-society to come. Furthermore, the activities listed under the topoi in box E analyse social consequences of ICTs such as their effect on the upbringing of the younger generation. The study of the social consequences of ICTs is precondition to increased ICT usage. These activities define k-society as stage of society in which every citizen is producing, using and furthering knowledge, supported by ICTs. These activities contribute to the realisation of a knowledge society. In box F, the listed topoi address the creation of a European or global k-society. These are activities such as the formulation of European standards on the construction of the technological and legal ICT infrastructures or the creation of European research networks. These activities are summarised under the label 'global k-society'.

The six types of sub-k-societies illustrated above help to sort and analyse the activities of the German government contributing to the creation of a k-society, by identifying the main foci of each activity. The recommendations formulated by the advisory activities as well as the constructive activities address all six definitions of k-society. Yet, the overall focus rests on the con-

struction of an ICT-economy and an ICT-society. This is followed by activities towards a science society. The activities addressing the creation of a knowledge economy, knowledge society or global k-society are far less pronounced, as shown in diagram 8-3.

Diagram 8-3: Thematic Shifts in Advisory and Constructive Activities[3]



Source: Composed by the author based on BMWA/BMBF, 2003: 77-90; BMWi, 1996: 113-118; BMWi/BMBF, 1999; DBr, 07.06.1984; DBr, 19.10.1989; DBt, 22.06.1998c; DBt, 2002: 259-308; Regierungskommission Fernmeldewesen, 1987: 2-8; KtK, 1976: 2-13.

In the following, the activities of the federal government of Germany will be outlined according to their function as well as to the definitions of k-society inherent in them. Furthermore, the shifts in focus, illustrated in the diagram above, will be discussed.

[3] The diagram is based on the recommendations formulated in final reports of advisory activities and the initiatives listed in the constructive activities towards k-society. The recommendations and activities were grouped according to their contents and the kinds of k-society constructed by them.

Advisory Activities

The advisory activities contributing to the construction of a German k-society comprise of independent study, government and enquete-commissions initiated by the federal government. The main differences between the three kinds of commissions are: (a) that enquete-commissions are constituted by and report to the German *Bundestag*, while study and government commissions are constituted by and report to the federal government (chancellor, president, minister cabinet); (b) that government commissions generally comprise equally of a few representatives of the state, economy, scientific community and civil society, while enquete-commissions are dominated by MoPs as members. The views of the scientific community, economy, civil society and media are nevertheless taken into account by having some of their representatives as members in the commissions as well as inviting some representatives of those subsystems as experts to public hearings. The third main difference is that (c) study and government commissions generally report to the same government that installed them, while enquete-commissions often, due to their long working periods, report to a different government setting. This generally influences how the recommendations of each commission are welcomed by the government they report to and therefore influence policy-making.

The following description of five commissions contributing to the construction of a German k-society on the level of the federal government will illustrate two main points: (a) that a shift in defining k-society took place from *first* focusing on the technological and legal infrastructure (k-society as ICT-economy) to, *second*, focusing on the application of ICTs in all areas of life (k-society as ICT-society) to, *third*, economically exploiting knowledge (k-society as knowledge economy); as well as (b) that the extent to which the recommendations formulated by commissions influence policy-making heavily depends on the specific circumstances, personalities involved and the competition posed by other newsworthy topics.

The German ICT-economy

All k-society-activities of the federal government contain some parts that focus on the technological development of ICTs as well as on the technological and legal ICT infrastructure. Hence, all assessed activities contain some aspects that define the German k-society as an ICT-economy. Never-

theless, it is the activities of the 1970s to early 1990s that mainly focus on these topoi and define k-society out of a strictly technological and economical perspective.

On 02 November 1973, the Federal Minister for Post and Technology Horst Ehmke (SPD) constitutes "The Commission for the Extension of the Technical Communication System" (*Kommission für den Ausbau des technischen Kommunikationssystems (KtK)*) in order to shape the future communication system (Klumpp, 2001). As stated by the then Federal Chancellor Willy Brandt in a press statement:

> "Innovations in the field of information distribution and communication increasingly influence the technical-economic development, but also the life of the people. For the extension of the technical communication system, the federal government will, in cooperation with the state governments, the academia and the industry develop their suggestions. Concerning the development of the communication technology, the federal government takes on a special role" (W. Brandt, 18.01.1973, qtd. in KtK, 1976: 14, translation by the author).

The commission begins its work on 27 February 1974 headed by Prof. Dr. Eberhard Witte, TU Munich. Its final report (*Telekommunikationsbericht*) is published in January 1976 (KtK, 1976). According to this report, the commission emphasises the extension of the telecommunication network, including the further development and implementation of electronic letter and image transmission (facsimile and videotext). The commission does not regard the need for broadband connection networks (*Breitbandvermittlungsnetze*) and for dual cable TV (*Zweiweg-Kabelfernsehen)* as necessary, but instead points to the high costs in building the infrastructure and the lacking need to use these technologies. The commission merely suggests, testing the acceptance of broadband connection networks in pilot projects in several German cities (KtK, 1976: 2-13). The overall 17 recommendations can be sorted according to the topoi addressed into six groups, each defining k-society differently as illustrated in diagram 8-2 – as ICT-economy, ICT-society, science society, knowledge economy, knowledge society or global k-society.[4]

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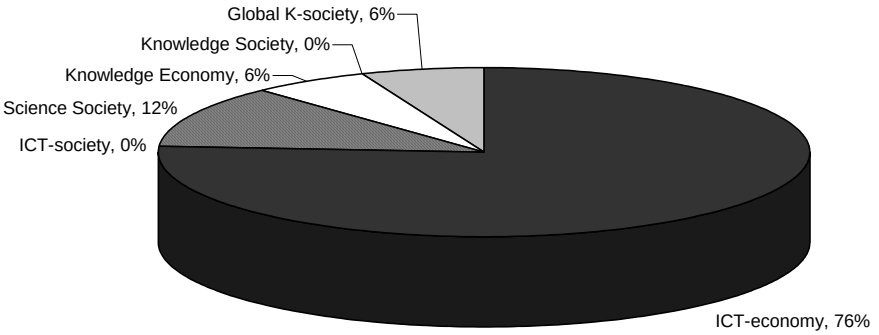
[4] The reactions of the two main parties in the German *Bundestag* – CDU/CSU and SPD – towards the final report of the commission illustrate the extent of media politics in Germany being discussed as a potential threat to the democratic structure and the right of freedom of the press. While CDU/CSU strongly argues for the liberalisation of the communication sector, emphasising the freedom of press and media, SPD disagrees by pointing to the aspect that the German information, media and press system is internationally regarded as one of the freest systems of the time. Instead,

Diagram 8-4: Categorised Recommendations of the "Commission for the Extension of the Technical Communication System"
- in % -



Source: Composed by the author based on KtK, 1976: 2-13.

Technologically, the discussion on the extension of the communication system focuses in the early to mid 1970s on dual cable TV and broadband network technology. At the end of the 1970s, electronic telecommunication moves increasingly into the centre of attention. Main technologies, often summarised under the term 'new media' are in the late 1970s up to late 1980s: (a) teletext as well as telex, the transmitting of text information together with the TV signals; (b) the interactive videotext, the transmitting of text information through the public telephone network; (c) cable text, the transmitting of text information through a broadband cable of a cable TV-station; (d) the facsimile, the transmitting of text and graphic through the public telephone network; (e) the dual way cable TV; and (f) technologies based on microelectronics (Vöge, 1986: 103-139; SPD, 31.01.1978: 4-5; CDU, 04.10.1979: 1-5).

The Commission for the Extension of the Technical Communication System (KtK) is soon to be followed by the implementation of the pilot projects as well as by commissions in the states, since media politics in Germany

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SPD assumes that CDU/CSU are hoping for some party-political advantages if future cable TV is controlled by a few financially entrenched interest groups. This line of argumentation can be found in numerous press statements from the mid 1970s to early 1980s (CDU, 27.01.1976; SPD, 27.01.1976; SPD, 31.01.1978: 1).

is, to a large extent, under the right of the states (Wilke, 2004: 36).[5] Consequently, the state governments establish a decentral framework for future media development (Späth, 1979: 28), and several form their individual expert commissions.[6] On the level of the federal government, the discussion is increasingly used for party politics.[7] To ease the growing conflict between the parties, the German *Bundestag* decides on 09 April 1981 unanimously through all parliamentary parties the formation of the enquete-commission "New Information and Communication Technologies (ICTs)" (*Neue Informations- und Kommunikationstechniken*). The Head of the Commission and later Federal Minister for Post and Telecommunication, Dr. Christian Schwarz-Schilling, CDU describes the developments leading up to the founding of this commission in an interview with the author as follows:

> "Two reasons led to the founding of the commission: First, the SPD wanted to delay decisions in this sector that long were over-due, since the SPD fac-

[5] According to paragraphs 30 and 70 of the federal basic law (constitution) of Germany, the legislative competence is with the state governments in all areas that are not specifically assigned to the federal government by the basic law. This is the case in the area of the broadcasting and radio system.

[6] The state government of Baden-Württemberg, for example, constitutes an independent expert commission "New Media" (*Expertenkommission Neue Medien* – EKM) on 07 February 1980. The EKM focuses on the usage and implementation of the 'new media' in the state of Baden-Württemberg under economic, social and political aspects. In its final report, published in February 1981 (EKM, 1981a, 1981b, 1981c), the commission suggests a three-phase-model, in order to test new technologies for the transmittance of data in some areas of Baden-Württemberg: in phase one, regional networks shall be connected and further extended; in phase two, the choice of different TV and radio channels shall be extended and municipal or private information, distribution and retrieval systems introduced; in phase three, a broadband network based on fibre optics shall be erected for 500 to 1000 participants. In this broadband network, various forms of individual and mass communication shall be tested (EKM, 1981a: 23-24). In 1983, again financed by the state government of Baden-Württemberg, the expert commission on the "Future Perspectives of societal Development" discusses the path into k-society out of three perspectives: social sciences, informatics and pedagogy (*Kommission "Zukunftsperspektiven gesellschaftlicher Entwicklungen"*, 1983).

[7] On 27 March 1981, the commission "Questions concerning the Media (*Medienfragen*)" of SPD passes an action programme concerning the new technologies in the media, entitled "New Media" (*Aktionsprogramm zu den neuen Techniken im Medienbereich*) (SPD, 1981: 1-8). The programme states that SPD does not intend to fall for the "ideology of inherent necessity", consciously spread by "certain" interest groups, but is supporting technologies that further social development (SPD, 1981: 2).

> tion was unsure about how to decide these. Secondly, the SPD desperately wanted to keep the chair in the study commission "Energy Politics" and hence wanted to form another study commission chaired by CDU. By creating a chair for the CDU, the SPD was able to continue to chair the Energy-commission, which was of great interest at that time to nuclear politics etc" (Ch. Schwarz-Schilling, 15.09.05, interview with & translation by the author).

He further states, that he "strongly argued against the founding of this commission since it was merely a way of gaining time and putting important decisions off." Yet, the founding of the commission is decided and Dr. Schwarz-Schilling asked to assume chairmanship. In the respective German *Bundestag* document the task of the commission is described as follows:

> "The Commission is asked to outline the problems of the new information technologies with regard to legal, especially constitutional, socio-political, economical, financial, technological and organisational aspects as well as to the legal issue of privacy protection, nationally as well as internationally. Based on this, the commission shall formulate recommendations for decision-making" (DBt, 08.04.1981:4).

On 04 October 1982, a change in government takes place from SPD to CDU and Dr. Schwarz-Schilling, the chairman of the commission becomes the Federal Minister for Post and Telecommunication. The Member of Parliament Linsmeier becomes the new chairman of the commission on 28 October 1982. On 28 March 1983, the commission publishes an interim report and states the end of its assignment due to the change in government and a premature termination of the 9th legislative period (DBt, 28.03.1983: 2). Dr. Schwarz-Schilling describes the end of the commission:

> "I personally did not have any intentions to continue the work of the commission, since it firstly existed only due to the intention of SPD and secondly, because the work in the commission took far too long. As Federal Minister for Post and Telecommunication, I now had the possibility to act immediately and according to the opinions that I had won already before the work of the commission. […] But SPD did also not seem too interested in continuing the commission. Probably because they knew that there was now a federal minister who would do what he and the government considered to be right anyway. So they could only stop me through the parliament and political channels but not through the commission" (Ch. Schwarz-Schilling, 15.09.05, interview with & translation by the author).

The interim report is based on reports written by academic institutes, administrative bodies and civil society groups, on the outcomes of three public hearings, the experiences collected by members of the commission on

trips abroad as well as on some expert reports commenting the results. The discussed areas comprise technical aspects, the situation of the information and communication industry and the impact of ICTs on economy and society. The report can merely be regarded as a documentation of the work progress of the commission. An overall analysis as well as recommendations for policy decision-making is missing.[8] Asked about the reasons for not formulating any recommendations, Dr. Schwarz-Schilling explains:

> "We did not feel like formulating recommendations in long work sessions, because I had them in my head already. To formulate them in the commission would have cost a lot of time but we did not have any time. We had to technologically catch up with other countries instead. […] Recommendations of the commission would merely have been compromises and due to the fact that I was Federal Minister now, the battle field was no longer the commission, meaning theoretical, but actually in the practical politics."

When asked about the results of the commission for practical politics, he opines:

> "The work was very useful in a way, since it offered me a 1½ years intensive crash course on the topic before becoming federal minister. So when I became minister, I knew from the beginning exactly what I wanted and what I had to do."

Hence, the work of the commission entered politics not through the formulation of recommendations presented to the German *Bundestag*, but through its chairman who became Federal Minister for Post and Telecommunication. Out of this position he made use of the work of the commission, while deciding for himself, which recommendations he as a chairman would have given the Federal Minister for Post and Telecommunication, who now happened to be himself.

According to the newspaper "*Handelsblatt*" (Middeke, 30.03.1983), the interim report of the study commission is "a rather sad result"; "sad" since the report was not able to bridge the political differences and is, as such, open to interpretation out of any political perspective, according to the Ger-

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[8] The commission merely agrees on the following two aspects: 1. ICTs do not automatically result in certain economic, political and social consequences but their development and application can be guided and controlled by politics; and 2. political disagreements amongst members of the commission as well as the uncertainty surrounding the future development of ICTs prevented the formulation of actual policy recommendations. The statements in the progress report were not necessarily approved by all members of the commission and hence do not draw a coherent picture for future decision-making (DBt, 28.03.1983: 8-9).

man press-agency 'dpa' (Krüger, 31.03.1983: 2). After the change in government the study commission, as well as its interim report, seem to be forgotten by federal politics.

On 13 March 1985, the federal government forms the government commission Telecommunication System (*Regierungskommission Fernmeldewesen*), as had been announced in the government programme "Information Technology" in 1984 (DBr, 07.06.1984: 36). Prof. Dr. Eberhard Witte, TU Munich, becomes its chairman, who also had been the chairman of the "Commission for the Extension of the Technical Communication System" (KtK).[9] The stated aim of this commission is to analyse the situation of the German telecommunication market with regard to an increasing overlap of telecommunication and data processing, both relying on microelectronics as a technological base. The commission assessed how the USA, Great Britain, Japan and several other countries reacted to these technological changes, to what extent the regulatory policies in Germany required adaptations and how they would structurally affect the German Federal Post:

> "The commission is requested to outline a report on the tasks and possibilities in order to improve the tasks of the telecommunication sector. (…) It is the aim of this to support technological innovation at the best means possible, the development and preservation of international communication standards as well as the assurance of competition on the telecommunication market. The analysis shall concentrate on the following aspects: 1. Current and future tasks in the area of telecommunication with respect to national and international aspects; 2. scope, restrictions and structure of public engagement in the telecommunication sector; 3. organisational, economical and legal preconditions for a rational and demand-oriented fulfilment of state tasks by the German Federal Post; and 4. creation of general conditions by the state for a fulfilment of market-economic tasks" (Regierungskommission Fernmeldewesen, 1987: 9, translation by the author).

[9] Dr. Schwarz-Schilling, then Federal Minister for Post and Telecommunication describes the impulses leading to the founding of this commission: "When the idea was discussed and decided in the minister cabinet, I immediately supported it because I said that it is the right method of addressing the nearly unbridgeable discrepancies [concerning the liberalisation of the telecommunication market]. It was obvious, that I never would have got the agreement and support of the majority if I had immediately introduced [the liberalisation of the telecommunication market] into the political arena of the parliament. So the process of political conflict could begin in such a commission" (Ch. Schwarz-Schilling, 15.09.05, interview with & translation by the author).

The chairman of the commission describes the work in an email to the author as follows:

> "The ministries supported the work of the commission. Nevertheless, the commission was fortunately independent in its consultations and decisions. The coalition parties CDU/CSU and FDP as well as increasingly SPD supported the liberalisation process. The recommendations of the commission were realised step by step and completely. The Research Commission for Regulation and Competition in the Federal Ministry of Post and Telecommunication that emerged from the commission, contributed heavily to the legislative processes until 1998" (E. Witte, 17.09.05, email to & translation by the author).

On 16 September 1987, the commission submits its final report to the Federal Chancellor, then Dr. Helmut Kohl (Regierungskommission Fernmeldewesen, 1987). All but one of 47 of the commission focus on the liberalisation of the telecommunication market which was the task of the commission. The inherent definition of k-society is therewith clearly k-society as ICT-economy, as illustrated in diagram 8-2. The graphic illustration of the categorised recommendations can be found in Appendix J.

Describing the relation between the work of the commission and the Federal Ministry for Post and Telecommunication as well as the influence of the work on the politics of the ministry, Dr. Schwarz-Schilling states:

> "Of course we were closely interlocked with the process, having Mr. Florian, the ministry's permanent secretary supporting the commission. Also, I personally stood in very close contact with Prof. Witte, the chairman of the commission, in order to see, where the recommendations were heading. So when the recommendations were presented, I basically already knew, what was done and could prepare my policy-suggestions to the cabinet immediately. In September 1987, the recommendations were presented and in May 1988 the cabinet had already passed the policy-suggestions made by my ministry" (Ch. Schwarz-Schilling, 15.09.05, interview with & translation by the author).

Asked, whether the recommendations of the commission did actually enter the policy-suggestions of his ministry, Dr. Schwarz-Schilling replies:

> "Yes, they did. Some suggestions more, some less, since I had to judge for myself. With some I knew, politically I wouldn't get it through the parliament and we would just waste time and energy. But with others, I said, here the commission does not go far enough. I will be able to enforce more. It was a judgmental question but I would say we adopted ca. 80% of the commission's recommendations."

In the minister's aspiration to accomplish the restructuring fast and according to the recommendations of the commission (BMPF, 16.09.1987), he is backed by CDU/CSU in the *Bundestag* (CDU/CSU, 08.12.1987: 2). According to SPD, the recommendations of the commission mainly represent the interests of private enterprises. The task of the German Post and Telecommunication System, which is to provide all societal groups with the required infrastructure on a high qualitative level, could no longer be assured. Hence, SPD rejects the concept put forward by the commission (SPD, 13.10.1987: 3). On 02.09.1988, the federal government publishes its reform concept for the restructuring of the telecommunication market (DBt, 02.09.1988). In this concept, the government points to a liberalisation of the telecommunication market as well as the restructuring of the German Federal Post in order to secure the fulfilment of infrastructural tasks. The correspondent law is ratified on 12.05.1989 (DBr, 12.05.1989) and several more follow. The liberalisation process of the German telecommunication sector is only completed in 1998. When asked about the main contributions of the commission to the German k-society, Professor Witte, chairman of the commission outlines the liberalisation process in an email to the author:

> "The legal ties of the postal administration law (*Postverwaltungsgesetz*), the telecommunication facilities law (*Fernmeldeanlagengesetz*) and especially the basic law opposed to the privatisation and opening of the market for competition. After passing the post reform I (*Poststrukturgesetz*) in 1989, the changes of the basic law in 1994 and the final reform in the telecommunication law in 1996, all market segments of the telecommunication (the cable based phone service only in 1998) were open for private competition. The offer of telecommunication services (mobile telephone, fax, teletext, internet, email, LANs, MANs, broadband, cable tv, system solution for businesses, city networks, convergence of telecommunication and mass media) exploded in its variety, quality and multitude with at the same declining prices. The impacts of the liberalisation on the information society were much heavier than expected" (E. Witte, 17.09.05, email to & translation by the author).

While the liberalisation process can also be seen and described far more critically than this, especially with regard to job losses and further social hardship for the employees of the sector, it has to be acknowledged that it decreased prices by around 70% and furthered processes of convergence between the telecommunication and information technologies. These developments clearly contributed to a German k-society, if only by making the usage of ICTs affordable for the vast majority of citizens (Büchner, 1999; Schwarz-Schilling, 1993, 2002a, 2002b; Witte, 2002).

The German ICT-society

The focus on defining k-society for Germany as an ICT-economy, that is focusing on the technological, infrastructural and legal aspects shifted in the mid 1990s to an increased focus on the application of ICTs in private and professional life.

In its session on 07.12.1995 the German *Bundestag* decides the constitution of an all parties of the German *Bundestag* embracing enquete-commission entitled "Future of the Media in the Economy and Society – Germany's Road into the Information Society" (DBt, 07.12.1995: 6764). Siegmar Mosdorf, then Member of Parliament for SPD, becomes its chairman. The commission's tasks are outlined as follows:

> "The enquete-commission shall estimate future developments of the electronic media and information technologies in Germany and assess the impact of the new media on economy, labour market, society, environment, education and culture, politics and democracy. The commission is asked to outline the tendencies of the past ten years in the development of the electronic media, such as the concentration, commercialisation, Europeanisation, digitisation and mediatisation. This overview shall help to point out potential future developments with regard to varying assumptions concerning the change in the general political and economic conditions. On the basis of earlier studies of the Office for Technology Consequences of the German *Bundestag* (*Büro für Technikfolgenabschätzung*), the commission is supposed to analyse the political consequences that arise from an increased usage of the information technologies. Parliamentarian initiatives, that appear to be necessary in order to make full use of the possibilities of the information society while at the same time overcome its risks, shall be recommended and formulated by the commission" (DBt, 23.06.1995, translation by the author).

Although Siegmar Mosdorf was "concerned with preventing party-politically motivated conflicts within the commission" as stated by him in an interview with the author on 27.10.05, increasing dissent along the lines of party-membership affects the work of the commission.[10] Overall, the en-

[10] Due to party-politically influenced differences, the study commission does not agree on a mutual first interim report. Instead, a draft of CDU/CSU and FDP is passed and extended by the drafts of SPD, Union 90/The Greens as well as a statement of PDS. Main disagreement concerns the future of the dual broadcasting structure of Germany. While CDU/CSU and FDP argue that the position of the public broadcasting stations depends on the specific situation of the media landscape in the

quete-commission submits five interim and one final report to the German *Bundestag*.[11] They are followed by a final report, submitted to the German *Bundestag* on 22.06.1998 (DBt, 22.06.1998c). Here, the study commission outlines the expected changes due to ICTs in the areas of technology, economy, labour, education, citizens and state relations, society, as well as the environment and transportation.[12] The overall 71 recommendations in the commission's final report, grouped along the six types of k-society definitions, as outlined in diagram 8-2, draw the following picture:

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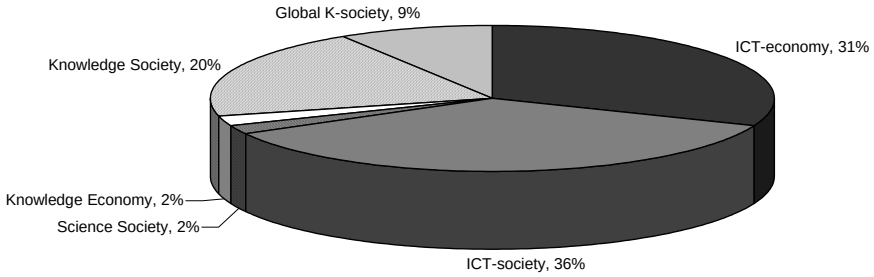
future, SPD favors the until now existing support for the public broadcasting stations. Furthermore, SPD does not agree with the statement of CDU/CSU and FDP that a regulatory body overseeing concentration processes in the media becomes redundant when the number of channels and hence competition increases.

In 1996, left wing academics, representatives of social and political institutions, organised as the "Initiative Information Society, Media, Democracy", aim to influence the discussion on the German k-society on the level of the federal government. At a congress held in Hamburg, the initiative publishes the "Hamburgian Statement of the Information Society" (*Hamburger Erklärung zur Informationsgesellschaft*) (*Initiative Informationsgesellschaft, Medien, Demokratie,* 1996). Here, the initiative heavily criticises: "Neoliberalisation and privatisation are not the golden path into the information society. The exclusive focus on 'chances, innovations and challenges' and the ignoring of 'problems, risks and hazards' are dangerous."

[11] Details on these interim reports are outlined in Appendix K.

[12] The commission regards state regulation as necessary in the following areas: (a) broadcasting, television and media services; (b) protection of intellectual property and copyrights; (c) information technological security; (d) data and privacy protection; (e) protection of minors and media pedagogy; (f) end consumer protection; (g) crime control, criminal law and data networks; (h) minority votes. These areas have been partly covered by the interim reports.

Diagram 8-5: Categorised Recommendations of the Commission "Future of the Media" - in % -



Source: Composed by the author based on DBt, 22.06.1998c.

Departing from the recommendations of the government commission "Telecommunication System", the recommendations of the enquete-commission "Future of the Media" focus on the application of ICTs (ICT-society) rather than on the liberalisation of the telecommunication market (ICT-economy). Nevertheless, the legal and technological infrastructure (ICT-economy) is of continuing concern. Besides this, the social consequences of ICTs (knowledge society) are addressed as the third most important topic. Less, but also addressed, are topoi concerning regional and international cooperation for a global k-society, research and development for a science society and the economic exploitation of knowledge for a knowledge economy.

The commission repeatedly stresses that the rapid development of ICTs makes an assessment of the current effects on economy, politics and society difficult, and a prediction of future developments nearly impossible. The severity of the changes taking place demand constant analysis and, accordingly, adaptation of policies. In order to do so, the commission suggests, to continue its work in the legislative period starting shortly after the submission of the final report to the German *Bundestag* (DBt, 22.06.1998c: 113). Unfortunately, the severity of the changes taking place results in rather hesitant conclusions in the final report. While pictures of the changes are drawn for the areas mentioned above, hardly any stringent recommendations for policy making are offered. The publishing of the final report is hardly taken

into account by the public.[13] In the, shortly after submission following, election campaign, the results formulated in the final report are used and interpreted by each political party differently. After the change in government from a coalition of CDU/CSU and FDP to a coalition between SPD and UNION 90/The Greens in summer 1998, the final report assists the new government to identify potential fields of action. When asked whether the commission's work also contributed to the conceptualisation of the soon to follow action programme "Innovation and Jobs in the Information Society of the 21st Century", one member of the commission and representative of the scientific community (professor of informatics at the University of Bremen and Scientific Director of the Foundation Digital Opportunities (*Stiftung Digitale Chancen*)) explains:

> "Yes, but merely because the chairman of the commission Siegmar Mosdorf, became the permanent secretary of the Federal Ministry of Economy and Labour, after the election. That was the connection. If anyone else had been the head of the commission, the final report would have just been another document. Nothing else. But due to the positioning of Mosdorf as permanent secretary in BMWA, many aspects of the work of the commission entered the government programmematic" (H. Kubicek, 12.11.04, interview with & translation by the author).

The channel of communication – as expressed in this statement – existed in connection with one person, the chairman of the commission who became permanent secretary. It was not an institutionalised channel of communication that exists for the final report of every study commission. Yet, it resulted in the fact that the work of the commission influenced the conceptualisation of the action programme "Innovation and Jobs in the Information Society of the 21st Century", published by the federal government in 1999. This is also confirmed by the chairman of the commission himself:

> "The lucky coincidence was that I, shortly after transmitting the final report, became permanent secretary in the Federal Ministry of Economics and was then responsible for the action programme. (…) From time to time you have cases where the results of a study commission enter political decision making (e.g. in the field of bio-ethics), but that it enters in such intensity and

[13] Nevertheless, newspaper critics judge the work of the commission quite positively by pointing out that the main parties of the German *Bundestag* (CDU/CSU and SPD) actually agreed in the main points which is rarely the case in enquete-commissions (Lölhöffel, 12.08.1998 in FR; Fricker, 12.08.1998 in Kieler Nachrichten). Even more regrettable it is that the commission hardly formulates actual policy recommendations but instead points to the restricted influence of the state on the development of ICTs and their effects on society.

> wideness is a special coincidence" (S. Mosdorf, 27.10.05, interview with & translation by the author).

Prof. Kubicek explains further, that the topic 'k-society Germany' was an opportunity for the new government to distinguish itself from the CDU/CSU and FDP coalition under Kohl who had been in power for 16 years. He states: "Under Kohl, this whole topic was of no relevance at all" (H. Kubicek, 12.11.04, interview with & translation by the author). He underlines SPD's role in the construction of Germany's k-society:

> "The SPD made use of the opportunity and said, we have to do, what the French, the British and the Americans are doing for years. And this was prepared by the study commission. Yet, if you look at the commission, you can see how the conflicts were lying between the parties with the focus on TV on the side of CDU/CSU and openness to computer and internet on the side of SPD."

The chairman of the commission and later permanent secretary in BMWA confirms this by stating:

> "The classical Ministry of Economics that we took over in 1998 was not concerned with the topic of an information society but with other topics" (S. Mosdorf, 27.10.05, interview with & translation by the author).

Hence, the k-society topic posed a possibility for the newly elected government to legitimise its actions by pointing to the economic relevance of the creation of k-society and therefore distinguish itself from the former government. This once again indicates the aspect of k-societies being created by social actors in society.[14] Referring to Germany's position in international comparison regarding the topic as well as clearly stating the intention of seeking economic growth through ICTs, Siegmar Mosdorf mentions:

> "We were lagging behind. The Scandinavians, Americans, and also Singapore were much earlier and many start-ups were formed in the ICT-area, while Germany had a very low start-up rate. So we had to identify future growth areas and this seemed to be one" (S. Mosdorf, 27.10.05, interview with & translation by the author).

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[14] Later on in the interview, Siegmar Mosdorf identifies a TV interview with Helmut Kohl as the key situation for a change in politics and the sudden focus on ICTs. He narrates: "Helmut Kohl was once asked after his opinion concerning the extension of the data motorway in a TV interview. His reply was that he first had to discuss this with the Federal Minister for Traffic. That's when we realised that change was necessary as soon as we gained power in 1998."

Based on these statements, one can argue that the work of the study commission was heard by politics due to three lucky coincidences: (a) the final report was published just before the elections; (b) the elections were won by SPD and Union 90/The Greens; and (c) the chairman of the enquete-commission became the permanent secretary in BMWT after the elections. He was therefore able to position the topic positively in the government agenda. Contrary to the government programme "Information Technology 2000" which – as political topic – drowns in the upheaval centred around re-unification in 1990 (DBr, 19.10.1989, discussed in section 8.2.1.), the final report of the enquete-commission "Future of the Media" is published just before the change in government and the chairman of the commission is able to use this moment to position the topic, and himself, well. Consequently, the outcomes of the commission actually entered the policy formation processes in the new legislative period. Hence, the impact caused by the outcomes of commissions and programmes seems to depend heavily on the arena of current, up-to-date and 'sexy' political topics. That is, the impact depends on the competition posed by political topics besides the final reports of commissions and government programmes.

The German Knowledge Economy

On 15 December 1999 the German *Bundestag* establishes, with an agreement of all parties in parliament, the enquete-commission "Globalisation of the World Economy – Challenges and Answers" (*Globalisierung der Weltwirtschaft – Herausforderungen und Antworten*) (DBt, 14.12.1999; DBt, 15.12.1999: 7183). It is the task of the study commission (a) to compose all factors enhancing the globalisation of the world economy; (b) to analyse its economic, social and political impacts; and (c) to formulate recommendations for the national and international community on how to shape future developments (DBt, 14.12.1999: 1). Hence, the focus of the commission clearly lies on the economic importance of globalisation. The enquete-commission is divided into six working committees of which one is named "Knowledge Society". This working committee is constituted on 28 May 2001 (DBt, 13.09.2001: 141).[15] Its tasks are to analyse the development of a German k-

[15] According to Altvater, a member of the commission from the scientific community, the late constitution of this working committee does not originate from a lower importance connected to its topic but from organisational reasons only (E. Altvater, 15.09.05, interview with the author).

society, its impacts on economy, society and politics, and aspects of participation such as digital divide and internet security. Furthermore, it looks at aspects of knowledge exploitation such as protection of copyrights (k-society as knowledge economy), application of ICTs in, for example, libraries (k-society as ICT-society), as well as knowledge production in Germany's research and educational system (k-society as science society). The working committee gives an insight into the activities of the federal government aiming at the creation of a German k-society and formulates policy recommendations for furtherance (DBt, 2002: 259-308).[16] Although the commission is established in agreement with all parties represented in the German *Bundestag*, its work is highly influenced by differences along the lines of party-politics. One member of the commission and representative of the scientific community who since then is active in state politics confirms this:

> "The wide spectrum of opinion in the enquete-commission and between the different political parties affected the work as well as the reports produced. The extensive volume of some reports affected their political usability later" (K.-H. Paqué, 28.09.05, interview with & translation by the author).

The final report of the commission, incorporating the interim report[17], is submitted to the German *Bundestag* on 12.06.2002 (DBt, 2002). In this final report, the working committee formulates 43 recommendations. Grouped along the six types of k-society definitions as outlined in diagram 8-2, these recommendations draw the following picture:

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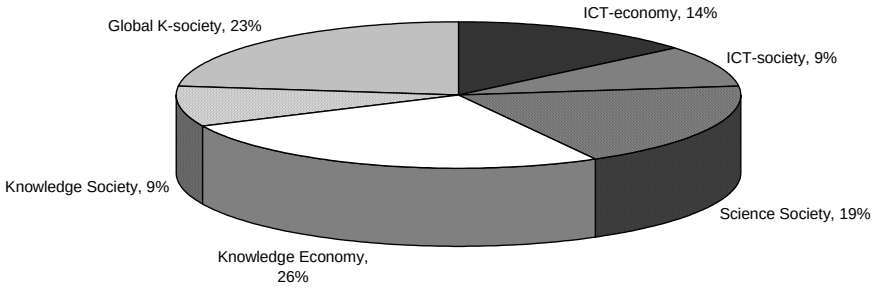
[16] At the time of submitting the commission's interim report to the German *Bundestag* on 13 September 2001, the working committee has conducted merely one public hearing on the topic "Chances and Risks of the Information Society" (DBt, 13.09.2001: 141).

[17] The final report distinguishes itself from the interim report in mainly three aspects (DBt, 2002: 47-48):

1. all six working committees of the commission report on their work and formulate recommendations for future policies. Furthermore the three topics on world population, sustainable development and gender equality are discussed;
2. at the end of each chapter, questions concerning globalisation which could not be discussed in enough detail within the limited time frame are stated;
3. the final report was, differently to the interim report, written after 11 September 2001. Nevertheless, a systematic analysis of the consequences of this terror attack for global security politics was not possible.

Diagram 8-6: Categorised Recommendations of the Working Committee "Knowledge Society"
- in % -



Source: Composed by the author based on DBt, 2002: 259-308.

Interestingly, the recommendations of the working committee "Knowledge Society" emphasise, *firstly*, the exploitation of knowledge (k-society as knowledge economy), and the legal impact of intellectual property rights and patents, their ownership and protection. *Secondly*, the recommendations concern regional and international efforts for moulding an international k-society (k-society as global k-society). On the national level, the production of knowledge, the promotion of research and development as well as the production of content specifically for ICTs (k-society as science society) is of second interest. The expansion of the technological and legal infrastructure (k-society as ICT-economy), the application of ICTs (k-society as ICT-society) as well as the closing of digital divides (k-society as knowledge society) seem to be of lower importance to the commission. Hence, this categorisation illustrates the change in focus from building the technological and legal infrastructure (ICT-economy) and enhancing the application of ICT (ICT-society) to the increased focus on knowledge production (science society) and the economic exploitation of knowledge (knowledge economy). It seems that the technological infrastructure and the liberalisation of the markets (legal infrastructure) have advanced during the 1980s and 90s and require much less attention by the state today. Instead, the state increasingly focuses on the activities listed in its action plans concerning the soft infrastructure, the production and the marketing of knowledge. The production of knowledge includes areas such as research and development, education and the fostering of creativity and innovativeness in the private sector. The field of marketing and economically exploiting knowledge focuses on the protection of intellec-

tual property rights, patents, as well as the transfer of R&D results into marketable solutions and products. Yet, it is important to note that the recommendations of this enquete-commission are only heard by few members of the German *Bundestag*. The advice given by these recommendations is not necessarily translated into constructive activities (action plans) of the federal government. Hence, the assessed focal shift in how k-society is defined is not necessarily also taking place in the constructive activities but merely in the advisory activities. Despite these recommendations, the action plan "Information Society Germany 2006", published in 2003, focuses again on the application of ICTs (k-society as ICT-society) rather than the production and exploitation of knowledge (science society and knowledge economy). Hence, the focal shift from ICT-society to knowledge economy is done by the advisory, but not by the constructive activities of the federal government.

The question whether the recommendations of the commission did enter the political decision-making processes, is answered by a member of the commission as well as working group 'knowledge society' and professor at the *Freie Universität* of Berlin by stating:

> "Hardly at all. That was the main disappointment. The final report was submitted to Mr. Thierse (Head of the German *Bundestag*) and furthermore the Federal President Mr. Rau was interested in it. (…) But it was very disappointing when the results were discussed in the German *Bundestag* and merely 20 to 30 MoP were present. The work was acknowledged by the several parties but there was hardly anyone present who was interested in it, although the final report even states that merely a small part of the work load was done and the commission should continue its job in the following legislative period. But the *Bundestag* was very little interested in it and the work of the commission was not continued, even though there wasn't even a change in government. But this had reasons concerning the chairmanship and the fact that the CDU/CSU did not agree with the critical work of the commission" (E. Altvater, 15.09.05, interview with & translation by the author).

This low impact of the commission's work on policy-decisions (the reasons for it are discussed below) is also confirmed by another member of the working group "knowledge society", representing the scientific community but having entered federal state politics himself since then:

> "Concrete influence on a political decision did the work of the commission surely not have" (K.-H. Paqué, 28.09.05, interview with & translation by the author).

Concerning the results produced by the working group "Knowledge Society" and the extent to which they entered the conceptualisation of the

following action programme "Information Society 2006", Altvater assesses limited influence. He outlines:

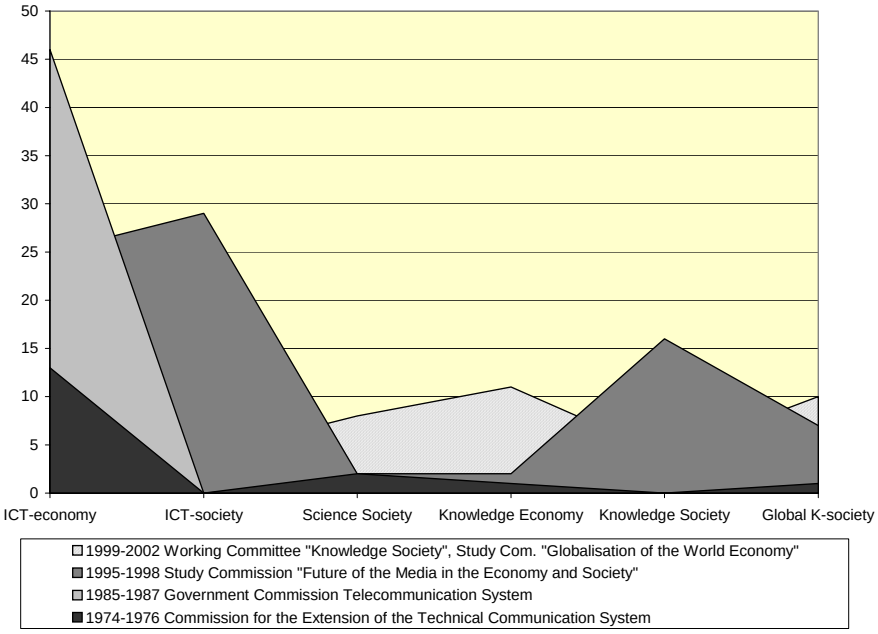
> "MoP Tauss's (SPD), who was one of the leading and active members of the working group probably could slightly influence the work of the *Bundestag* and of some of its committees along the lines of his technocratic understanding of a German information society. Yet, Ursula Lötzer (PDS), who was the chairwoman of the working group, didn't enter the new *Bundestag* (formed in 2002) and hence could not take any influence. Consequently not much happened."

Besides the impression that the work of the enquete-commission and especially the working group "knowledge society" did not actually impact much on the decision-making processes in the *Bundestag*, this statement also confirms the strong dependence of this potential influence on individuals and their personal careers. Several reasons can be identified for the little impact of the recommendations of the working group "knowledge society" on political decision-making. *First*, the critical views taken by SPD and Union90/The Greens in the commission resulted in disapproval on the side of CDU/CSU and FDP and consequently in a lowered interest on this side to discuss the results in the *Bundestag* or even continue the work of the commission after the elections in 2002. *Second*, the recommendations were overshadowed by the political tumult connected to the federal elections in 2002 and the commission's suggestion to be continued in the new legislative period was not implemented. *Third*, the chairwoman of the working group "knowledge society", Ursula Lötzer (PDS), did not enter the new *Bundestag* after the election and hence could not position the results produced in a more publicity effective way.

Discussion

The diagram below shows the shift from defining k-society as an ICT-economy in the 1970s and 80s to defining it as an ICT-society as well as a knowledge society in the 1990s. In the 2000s, the emphasis on the economic exploitation of knowledge contributed to a definition of k-society as a knowledge economy in the advisory activities of the German government.

Diagram 8-7: Thematic Shifts in Recommendations of Commissions - in %[18]



Source: Composed by the author based on DBt, 22.06.1998c; DBt, 2002: 259-308; Regierungskommission Fernmeldewesen, 1987: 2-8; KtK, 1976: 2-13.

Despite this focal shift, the technological infrastructure seems to require constant monitoring, maintaining and updating. The shift towards the exploitation of knowledge mainly for economic means is a rather recent change in focus. On an international level, this shift is accompanied by the UN-World Summit on the Information Society of which its second part took place in November 2005 in Tunis. Here, the governments of the world were discussing, besides other topics, intellectual property rights, patents and the application of knowledge for productive means. Both parts of the summit

[18] The diagram is based on the total number of recommendations formulated in each final report, sorted according to the type of k-society addressed, and calculated in percentage of the total number of recommendations in the respective report. The enquete-commission "New Information and Communication Technologies" is missing in the diagram, since it did not provide a final report or formulate any recommendations.

were heavily structured by the awareness that the access to ICTs, knowledge and information increasingly determines the competitiveness of national economies.

This shift in focus of the recommendations formulated in the final reports clearly represents a thematic shift in the government debate on k-society, seeing that the government debate clearly determines the thematic focus of the commissions by stating their work tasks and having representatives of the *Bundestag* forming the biggest membership group in most commissions. Nevertheless, the work of the commissions (progress/final reports and recommendations) does not necessarily influence the government debate. Officially, the purpose of study, government and enquete-commissions is the thematic penetration and preparation of a certain topic to assist the government debate, decision and policy-making. Nevertheless, commissions are from time to time installed as a form of legitimating certain politics. In other words, the installation of a commission indicates, that the German *Bundestag* or the federal government is doing something in this thematic area without actually doing anything concrete. Frequently, the progress and final reports as well as recommendations formulated by the commissions are hardly discussed by the German *Bundestag* or actually lead to the formulation of certain policies, as shown above. This is especially true for the instrument of study and enquete-commissions, which analyse, discuss and prepare certain topics for the German *Bundestag*. To what extent their work is heard after submitting the final report depends on a multitude of circumstances. With regard to government commissions, this is slightly different, since they generally report to the same government that installed them and who is actually interested in the topic. Government commissions are far smaller than enquete-commissions and generally present their outcomes much quicker. Furthermore, all members are chosen by the government. Conflict along the line of party politics etc. as is common in enquete-commissions generally do not hinder work progress as much in a government commission. With regard to the enquete-commissions concerned with the German k-society, one informant and the Head of the Information Science Department, University of Constance states:

> "I have been invited to several expert hearings of study commissions of the German *Bundestag* (e.g. "Globalisation of the World Economy"), but that doesn't really result in anything. You are merely a fig leaf. Everyone listens, you have the best arguments and everyone applauds, but it does not have any consequences. Instead the interests of lobby groups prevail" (R. Kuhlen, 26.11.04, interview with & translation by the author).

This view of merely being a fig leaf, without actually influencing the decision-making processes was also mentioned by Herbert Kubicek, a member of the enquete-commission "Future of the Media in Economy and Society". He argues that the study commission's work only influenced the conceptualisation of the action program "Innovation and Jobs in the Information Society of the 21st Century" due to the fact that its chairman, Siegmar Mosdorf, became permanent secretary in BMWT. Through this position, he was able to use the recommendations of the study commission for the action program directly. Kubicek mentions: "That was the connection. If anyone else had been the chairman of the commission, the final report would just have been another document. Nothing else" (H. Kubicek, 12.11.04, interview with & translation by the author).

Furthermore, Klumpp (2003: 32) states that the outcomes of the federal commissions concerned with the German k-society were generally drowned by everyday politics. The Commission on the Extension of the technical Communication Systems merely presented their findings at a press conference. The enquete-commission "New Information and Communication Technologies" was, after a change in government in 1982, dissolved in 1983 and the final report of the concept "Information Technology 2000" obtained hardly any public awareness. It was published in the autumn of 1989 (see section 8.2.1.) during which any political topics were drowned in the overwhelming news of the fall of the wall parting East and West Germany.

Hence, one can state, that the real influence of commissions of the federal government on policy formation is restricted and heavily depends on coincidences; a case of being 'at the right time, at the right place' factor. Theoretically, the work of these commissions should influence, enrich, structure and guide government debate. Yet, in reality it seems that their influence depends on aspects such as the individuals and their future positions involved in the commissions, which other political topics pose a competition of topics, at which point in time in a legislative period the recommendations are published and how they are perceived by the governing parties.

Constructive Activities

While in the advisory activities the definitions of k-society as ICT-economy, ICT-society and knowledge economy emerge as the three main foci, the constructive activities undergo a thematic shift merely from the technological and legal infrastructure (k-society as ICT-economy) as well as on

the application of ICTs (k-society as ICT-society). The remaining four versions of k-society definitions are addressed to a minor degree by some activities.

The action plans of the federal government which formulate the aim of creating a German k-society are conceptualised under the auspices of the Federal Ministry of Economy and Labour (BMWA) as well as the Federal Ministry for Education and Research (BMBF). Nevertheless, they incorporate all federal ministries and their activities that contribute to a German k-society. Once conceptualised, the programmes are passed by the minister cabinet and acknowledged by the *Bundestag* and *Bundesrat*. For the federal government and its administration, the programmes are generally a form of stocktaking, stating all currently conducted and planned activities of the federal ministries contributing to a German k-society. The programmes do not plan projects that are later launched and do not initiate activities.

The German ICT-economy

In the period from 1967 until 1979, the federal government of Germany financially supports three data processing programmes (*Datenverarbeitungsprogramme*). The first data processing programme (1967-1970) focused on the development of technology in opposition to the technology developed by US-American companies such as IBM. Yet, this focus on basic technological research (k-society as ICT-economy) soon changed towards applied research, the development of products as well as the application of existing products in the German industry (k-society as ICT-society). These aims are mainly pursued by the second (1971-1975) and third (1976-1979) data processing programmes.[19]

In administrative circles of the federal government today, these three data processing programmes are generally regarded as the 'beginning' of the German k-society as a topic. The Head of the Department Internet (*Referat 522, Internet*), BMBF explains:

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[19] Overall, Dierkes and von Gizycki (1986: 67) question whether the high investment of approximately DM2.423,5m, especially into the second programme, paid off. One of their main criticisms is that the focal shift from basic to applied research was too late and only took place when most commercial markets were already satisfied. As a very positive outcome of the second data processing programme, the authors mention the qualification of data processing professionals which corresponded with the requirements of the labour market at that time (Dierkes/von Gizycki, 1986: 68-72).

> "The first data processing programme was focusing on the development of technology but soon [2nd data processing programme] it was realised, that it was not about producing a German technology in opposition to IBM but it was about supporting the application of data processing technology in the German industry. That's when terms such as 'information society' and 'digital economy' first appeared" (F. Schlie-Roosen, 04.11.04, interview with & translation by the author).

Besides this aspect of overcoming the technological gap, national interests most likely played a role.[20] According to Sommerlatte (1982: 73), the Federal Ministry of Defence (BMVg) was strongly involved in the conceptualisation of the first data processing programme. This indicates a similar development in Germany as in the USA and also Singapore,[21] where the topic of computerisation was heavily emphasised by the Ministries of Defence (Witte, 2002: 3).[22]

Social consequences of data processing were not assessed at that time. As described by a professor of informatics at the University of Bremen and Scientific Director of the Stiftung Digitale Chancen, in 1977, Gerd Hofmann, a journalist, writes a letter to the Federal President asking, what they do regarding the social consequences of data processing. The Federal President passed it on to the then Federal Minister of Research, Volker Hauff (1978-1980, SPD), who assesses, that the Federal Ministry of Education and Research conducts the data processing programmes as well as a programme on human conditions for labour, but nothing on the social consequences of data processing such as protection of privacy etc. One interviewee narrates:

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[20] During the interview, Dr. Schlie-Roosen points to the book of Jean-Jacques Servan-Schreiber, entitled „The American Challenge" (*Die amerikanische Herausforderung*) from 1968, which, together with the Sputnik-Shock, the first man on the moon as well as the recession of 1966/67, enhanced the felt need to invest in major technological projects in order to keep up with competing countries.

[21] With regard to Singapore, this is outlined in chapter 9, section 9.3.2. With regard to Germany, Sommerlatte unfortunately does not state any references proving this.

[22] As mentioned in chapter 7, in 1972, the Federal Ministry of Education and Science of Germany publishes the German translation of the Japanese report "Japan's Technological Strategy" (BMBW, 1972), which emphasises the importance of creating an 'information society' in Japan. Hence, the activities of other countries in this field were monitored, even though the term 'k-society' was not yet used in German government programmes. This is also expressed by a report of the federal government to the German parliament on 05.04.1982 (DBt, 05.04.1982), in which the activities of the USA, Japan and several European countries such as France in the area of data processing and information technologies are reviewed.

> "That's when FM Hauff founded an external group comprised of one sociologist, one economist, one jurisprudent, one engineer and myself with the task to assess the social consequences of data processing. The reason for this was the nuclear energy debate at that time which nearly split the SPD. It was the political aim to prevent a repetition of this debate concerning information technology by assessing the possible consequences in time. We were assessing information disparities in society, basically what is summarised under 'digital divide' today. But with the beginning of the Kohl era in 1982, these topics were of no importance at all anymore to federal politics. The topic information society came back to Germany only by taking the detour over the USA together with the discussion on how to measure information society, initiated by Machlup and Porat. But until 1998, it was always the Federal Ministry for Research that was active in the field of the information society, never the Federal Ministry of Economics" (H. Kubicek, 12.11.04, interview with & translation by the author).

The above describes how the k-society-topic is closely connected and finds its origin in the data processing programmes of the federal government. Furthermore, the statement narrates, possibly influenced by personal political preferences of the interviewee, how the topic did not receive full attention during the era of Kohl. As the following sections show, the discussion during Kohl's leadership focused largely on the technological and legal infrastructures. Here, special focus was laid on the building of broadband networks and dual cable TV[23] rather than ICTs.[24]

On 07 June 1984, the federal government publishes its programme "Information Technology" as a "concept for the support of the development of microelectronics, the information and communication technologies" (*Regierungsprogramm Informationstechnik. Konzeption für die Förderung der Mikroelektronik, der Informations- und Kommunikationstechniken*) (DBr, 07.06.1984). The aim of this concept is to improve the competitiveness of the German ICT-sector.[25] In order to achieve this, the federal government relies on the cooperation with the economy, scientific community and civil society. The clear economic focus and hence the inherent definition of k-society as an ICT-economy, is supplemented by intensifying R&D (k-society as science society). Hence, the former exceptional focus on technology, as well as technological

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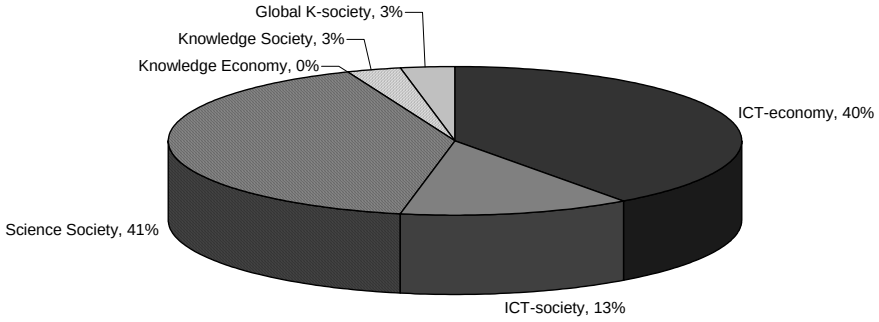
[23] For detailed information on the TV and media politics under the Federal Chancellor Dr. Helmut Kohl, see Kubicek, 1998.

[24] For detailed information on the liberalisation of the sector, see Büchner, 1999; Schwarz-Schilling, 1993, 2002a, 2002b; Witte, 2002.

[25] For details, see Appendix L.

and legal ICT infrastructure (k-society as ICT-economy) slowly opens up to the production of knowledge. This is also illustrated by the diagram below.

Diagram 8-8: Categorised Fields of Activity in "Information Technology"[26]
- in % -



Source: Composed by the author based on DBr, 07.06.1984.

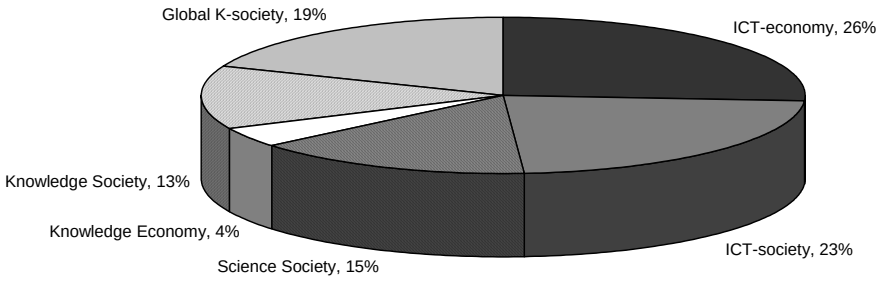
The government concept runs its course until 1988, without any evaluation or interim report. In early 1987, the Federal Ministry for Research and Technology establishes contact with several members of the German information and communication industry, in order to discuss the future concept "Information Technology 2000" (*Zukunftskonzept Informationstechnik 2000*) (Thomas to Zeidler, 25.02.1987). It is planned to be published in 1988, after being conceptualised in close cooperation between the federal administration and the economy. On 10 June 1987, the working group "Communication Technology/Entertainment Electronics", consisting of the main industry players publishes its report. Here, the economy calls for the Federal Government and the Federal Post as active players, to assure the competitiveness of the German communication and entertainment electronics (Arbeitsgruppe Kommunikationstechnik/Unterhaltungselektronik, 1987; FAZ, 12.09.1987). On 28 June 1988, several SPD-members of parliament formulate a query in to the Federal Minister for Research and Technology to evaluate the government programme "Information Technology" 1984 to 1988 before deciding on the concept "Information Technology 2000". Furthermore, the reports

[26] In this diagram, the fields of activity stated in the government programme were categorised according to the definitions of k-society addressed.

and recommendations provided by the German industry should be discussed with labour unions, social groups as well as the scientific community (DBt, 28.06.1988: 1-2). The query is rejected by the German *Bundestag* (DBt, 30.10.1990: 18599).[27]

On 19.10.1989, the federal government publishes its concept "Information Technology 2000" and dissolves the government programme "Information Technology" from 1984 without requesting a final report. In the concept "Information Technology 2000", the government formulates 6 main aims, as listed in Appendix M. The concept states the federal government's belief that ICTs can immensely contribute to economic prosperity and consequently to the financing of the social security system. It aims to improve the general conditions for this development by conducting activities especially in areas such as economy, research and technology, telecommunication, education and international cooperation. Due to the fast development of the ICT sector, the concept shall be continuously monitored and its applicability assured (DBr, 19.10.1989: 5). The diagram below illustrates the fields of activity stated in the programme, categorised according to their inherent definitions of k-society.

Diagram 8-9: Categorised Fields of Activity in "Information Technology 2000" - in % -



Source: Composed by the author based on DBr, 19.10.1989.

[27] This rejection had been recommended by the Committee for Research, Technology and Technological Consequences of the German *Bundestag* (*Ausschuss für Forschung, Technologie und Technikfolgenabschätzung*) (DBt, 25.10.1990).

The former focus on the technological and legal ICT infrastructure (k-society as ICT-economy) continues to exist, but increasingly activities aiming at the application of ICTs, rather than merely technology development and infrastructure, are incorporated. Furthermore, activities for the construction of a global or regional (European) k-society are conducted. Of lower priority, but nevertheless existent, are activities defining k-society as science society, knowledge society and knowledge economy.

This future concept "Information Technology 2000" can be called the first action programme of the federal government aiming at the creation of a German k-society by conducting activities involving most government departments. Merely the aim to create a k-society is not yet formulated but instead the focus lies on the development of the ICT industry. The aims stated in the concept are kept general, and partly rather vague. The publishing of the concept "Information Technology 2000" drowns in the political upheaval accompanying the process of re-unification of East and West Germany, as pointed out by Klumpp (2003: 32-33). In the years after unification it seems to be forgotten completely.[28]

The above outlined government programmes mainly focus on the creation of an ICT-economy as k-society, meaning on the development of ICTs as well as the creation of the legal and technological infrastructure. The application of ICTs, which characterises the ICT-society as well as R&D, and which stands for the definition of k-society as a science society were mentioned by the later government programmes, but did not yet become their main focus.

The German ICT-society

Inspired by the discussion in the European Union on k-society[29], the minister cabinet of Germany appoints, on 15.02.1995, the Federal Ministers for Economy, Post and Telecommunication, Interior, Education, Science,

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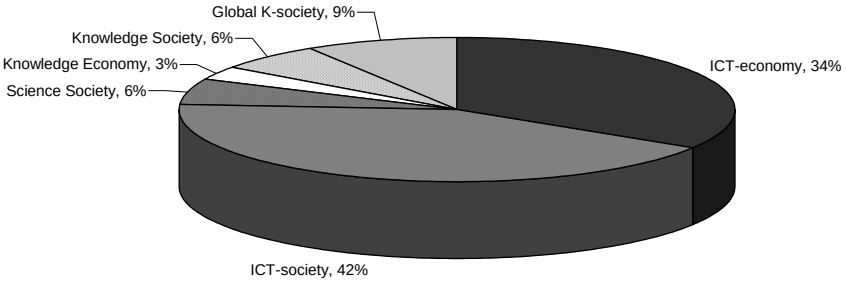
[28] Nevertheless, the raised awareness of the federal government for security in information and communication networks withstands the political upheaval of unification. On 24 October 1990, the German Parliament ratifies a law on the foundation of a Federal Office for Information Security (*Bundesinstitut für Sicherheit in der Informationstechnik* – BSI) (DBr, 23.11.1990).

[29] In 1994, the European Union publishes its first action plan for a European k-society, entitled "Europe's Way to the Information Society" (DBr, 17.08.1994). For details, see Appendix A.

Research and Technology as well as Transportation with conceptualising the action plan "Info 2000: Germany's Road into the Information Society" (BMWi, 1996: 14). On 13.02.1996, the federal government submits the first draft of "Info 2000" to the German *Bundestag* (DBr, 13.02.1996). On 10.10.1996 this draft is acknowledged by the parliament (DBt, 10.10.1996: 11549). The action programme shall be implemented by all departments of the government under the auspices of the Federal Minister for Economy. It mainly focuses on the application of ICTs for economic and social development, the expansion of the ICT infrastructure, as well as the further development of R&D in Germany. The realisation of these aims is pursued by a multitude of separate activities (BMWi, 1996: 113-118).[30] These activities, categorised according to the definitions of k-society inherent in them, meaning according to the topoi mainly addressed, are diagrammatised below.

Diagram 8-10: Categorised Activities of Action Plan "Info 2000"
- in % -



Source: Composed by the author based on BMWi, 1996: 113-118.

The former focus on the construction of an ICT-economy has now shifted to the focus on the application of ICTs, and therefore the construction of an ICT-society. Nevertheless, the legal and technological infrastructure pursued by activities, defining k-society as ICT-economy remains important. Activities defining k-society as science society, knowledge economy, knowledge society and global k-society exist, but are of much lower importance.

[30] For details on the aims and initiatives planed, see Appendix N.

As can be assessed in BMWi, 1996: 113-118, most activities stated are kept quite general without project names but merely indicating fields of action. Hence, their implementation and the progress made is hardly assessable. Nevertheless, this action plan has to be regarded as an achievement in so far that it is actually the first action plan of the federal government formulating the creation of a German k-society as its political aim. Nevertheless, it can be criticised, that it on one hand, it does not reflect the theoretical discussion since Lane, Bell and other scholars working on k-societies and, on the other hand, does not take in account the social reality of Germany with increasing structural unemployment, financial deficits of the public as well as decreasing economic growth (Kleinsteuber, 1997: 41-52).

On 17.10.1997 the action plan is followed by the progress report "Info 2000: Germany's Road into the Information Society" (DBr, 17.10.1997). In this report, the government points out that the development of k-society cannot be planned but merely accompanied by the state (BMWi, 1997:9). Furthermore, the progress report lists multiple activities that are conducted in order to implement the activities listed in the original programme. This process of implementation is illustrated in Appendix O.

Evaluating the importance of the programme "Info 2000" in federal politics at that time, a member of the study commission "Future of the Media in Economy and Society", professor of informatics at the University of Bremen and Scientific Director of the Foundation Digital Opportunities states:

> "Info 2000 wasn't a proper government programme. That was something that Jürgen Rüttgers [then Federal Minister for Education and Research] did in his research ministry but the political priority clearly was TV. Private TV, digital TV and interactive TV. That was Kohl's world and his priority. That the internet might arise as a medium, was merely a presumption at that time. All our discussions were circled around the question, how much public TV, we can afford. These were the actual political processes. That's how Germany lost 3 to 5 years which we are lagging behind other countries until today" (H. Kubicek, 12.11.04, interview with & translation by the author).

According to this statement, "Info 2000" was of rather low importance to overall federal politics at that time. This might also explain the little media coverage committed to the publishing of the final report.

After the change in government in October 1998, the new coalition government of SPD and UNION 90/The Greens builds on the work of the study commission "Future of the Media" as well as the government programme "Info 2000". Under the auspices of the Federal Ministry of Econ-

omy and Technology (BMWi) and the Federal Ministry for Education and Research (BMBF), the federal administration indulges in the conceptualisation of the action programme "Innovation and Jobs in the Information Society of the 21st Century". It is reported to the German *Bundestag* on 29.09.1999 (DBt, 29.09.1999).[31] Siegmar Mosdorf, the chairman of the enquete-commission, and now permanent secretary of the Federal Ministry of Economy and Technology, is, due to his new position, able to directly translate the work of the commission into the conceptualisation of the action programme "Innovation and Jobs in the Information Society of the 21st Century".[32] Overall, the programme heavily focuses on the application of ICTs in economy and society (k-society as ICT-society) as well as on the closing of inner-societal digital divides by fostering the ICT usage by all groups of society (k-society as knowledge society).[33] Additionally, this action programme formulates target marks in order to countercheck the progress done (BMWi/BMBF, 1999: 9-10), which – according to the Head of the Department "Conceptual Questions and International Matters, concerning the Information Society" in BMWA, former BMWT – is new to German government programmes.[34] Similar to the programme "Info 2000", "Innovation and Jobs in the Information Society of the 21st Century" lists a multitude of activities which are believed to lead to the accomplishment of the set aims (BMWi/BMBF, 1999). The activities, categorised according to the definitions of k-society inherent in them are shown below.

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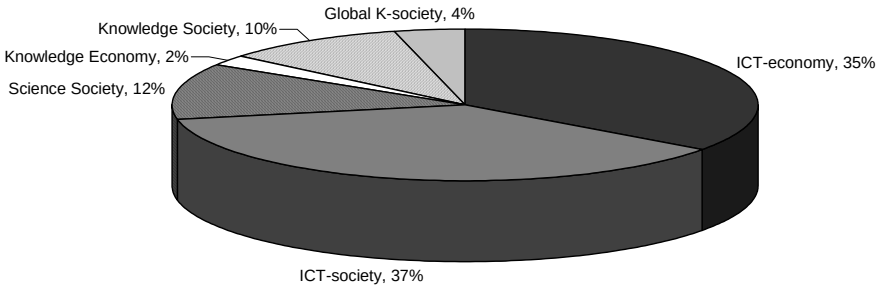
[31] The chairman as well as one member of the enquete-commission "Future of the Media in Economy and Society" confirm that the conceptualisation of the action programme was basically done in the enquete-commission (S. Mosdorf, 27.10.05; H. Kubicek, 12.11.04, interviews with the author).

[32] In an interview, the chairman of the commission values the importance of the work of the study commission: "The main topics addressed in the action programme – eGovernment, protection of minors, data and net security and cryptography – were discussed and conceptually prepared by the study commission beforehand." (S. Mosdorf, 27.10.05, interview with & translation by the author).

[33] The overall ten aims of this action programme are listed in Appendix P.

[34] This concept of target marks is later adopted by the European Union in its programme "eEurope – An Information Society for All", discussed in Lissabon, 23/24 March 2000.

Diagram 8-11: Categorised Activities of Action Plan "Innovation and Jobs in the Information Society of the 21st Century"
- in % -



Source: Composed by the author based on BMWi/BMBF, 1999.

The activities listed in the action plan clearly focus on the application of ICTs (k-society as ICT-society), the creation of the technological and legal infrastructure (k-society as ICT-economy), as well as much less on R&D (k-society as science society), and the closing of digital divides (k-society as knowledge society). Activities concerned with intellectual property and copyrights (k-society as knowledge economy) and international or regional arrangements fostering a regional/global k-society (k-society as global k-society) were of lower priority.

Four major activities that are part of the action plan, each defining k-society differently shall be mentioned here in more detail: *Bund*Online (BMI, 2003, 2004a), Internet for All, Knowledge Creates Markets (BMBF/BMWi, 2001) and IT-Research 2006 (BMBF, 2002). *Bund*Online (Federal Government Online), the eGovernment project of the federal government, is launched in September 2000 by the Federal Chancellor Gerhard Schröder. As expressed in its name, it focuses on making all internet-applicable services of the federal government available online and therefore stands in for a definition of k-society that focuses on ICT applications, hence k-society as ICT-society. The head of the project group *Bund*Online in the Federal Ministry of the Interior describes the impetuses leading to the conceptualisation of *Bund*Online 2005:

> "We saw the necessity to modernise the administration. The main reason was that we had to design the work processes more efficiently and to take them closer to the citizens by the means of IT-applications. It is an initiative of the federal government, not merely the BMI and is based on the realisa-

> tion of the government that we have to adapt our internal structures to the needs of the information society" (A. Reisen, 28.10.04, interview with & translation by the author).

As an initiative of the federal government *Bund*Online is fully financed by it, apart from online services of the states. This stands in contrast to many initiatives listed in the action programme which are often mixed financed by the federal, state and municipal governments; in some cases (e.g. electronic health card) partly even by the economy and civil society groups. On 29.08.2005 more than 376 services of the federal administration were online as stated by the then Federal Minister of the Interior, Otto Schily in his speech in order to celebrate the achievements and the end of the initiative (Schily, 29.08.2005). The chairman of the eGovernment Work Group of the industry association *Bitkom* criticises *Bund*Online in the following points:

> "*Bund*Online always speaks of cost reductions in administration due to eGovernment. But until today, I have not seen any documentation on how much and in which areas costs will be cut. Furthermore, I highly doubt that the project group *Bund*Online can tell you how many users monthly use certain services, who these users are etc. Hence, the activities are not evaluated with regard to their customer-orientation although one will only save costs if one actually includes the citizens into eGovernment solutions" (W. Kaczorowski, 22.11.04, interview with & translation by the author).

Similar criticism – the lack of evaluating online services with regard to their customer orientation – was also mentioned by the head of the Knowledge Centre of Accenture.[35] The harmonisation of the internet portals of the federal government, states and municipalities poses a continuing challenge to the German government.[36] Aiming at an increase of transparency and adaptation of the different public sites, the federal government embarked onto the information campaign "Germany spells itself with .de" in 2002, shortly after publishing the progress report to action programme "Innovation and Jobs". Aiming at complementing *Bund*Online, the online services of the

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[35] In international rankings, the German eGovernment project is generally ranked as lower middle range (Accenture, 2004). Despite this, a study conducted by the European Commission comparing the eGovernmnet initiatives of all countries of the European Union recently ranked *Bund*Online second after Denmark (Government Computing, 21.06.2005).

[36] The user-friendliness of some portals, especially, has to be improved and the order of content – where to find what – should follow one German-wide standard on all public sites.

federal administration, the states and municipalities are integrated on one internet portal (www.deutschland.de) (BMI, 2004b).

Also in 2000, the 10-point-plan "Internet for All" is launched. The information and education programme of the German government includes ten activities meant for raising the internet-savvyness of German citizens.[37] It therefore clearly defines k-society as society in which all members take part in the developments taking place, that is as a knowledge society.[38] In the subsequent action programme of the federal government "Information Society Germany 2006", the government aims to raise the number of internet users up to 75% of the German population above 14 years of age. Yet, as stated by c't aktuell and Heise online on 22.06.2005, merely 55.1% are online in 2005. The remaining digital divide is seen as a hindrance to economic development (Heise Online, 22.06.2005; c't aktuell, 22.06.2005).

In February 2002, the Federal Minister for Education and Research, Edelgard Bulmahn introduces the research programme "IT-research 2006" to the public (BMBF, 2002; Golem.de, 26.02.2002). With €1.5 billion, the federal government aims to sponsor IT-research in order to strengthen the position of Germany in future markets.[39] This focus on R&D clearly stands in for a definition of k-society as science society.

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[37] Amongst these ten activities is the introduction of internet licenses for unemployed certifying internet savvyness, tax freedom for private use of the internet, promotion of competition in local networks, state services online, promotion of eCommerce and improvement of IT-security. Furthermore one can mention the initiative "Schools on the Net" (*Schulen ans Netz*). It was founded in 1996 with the aim to equip schools with ICTs and internet access until 2001. After having achieved this, the initiative today focuses on the promotion of media competency amongst teachers. Another activity stated in the action programme is the initiative "Women on the Net". It is an initiative of BMBF in cooperation with the women's magazine "Brigitte", the Federal Office of Labour, the women initiative "Women give Technology new Impulses" and the German Telekom. It aims at promoting internet use amongst women. The initiative was started in 1998 and was awarded the "Public-private-partnership-award 2003" of the Initiative D21.

[38] On 07.02.2001, members of parliament of SPD and Union 90/The Greens request to implement the 10-point-plan faster than planned and complement it with eGovernment and eCommerce activities (DBt, 07.02.2001). The request is approved on 09.11.2001 (DBt, 09.11.2001: 19577).

[39] Besides the traditional sponsoring of high-technology research and development, the programme also sponsors software development in small and medium enterprises (SMEs). The industry rated the research programme "IT-research 2006" as very positive and necessary (Golem.de, 26.02.2002).

In March 2002, BMWT and BMBF publish the progress report "Information Society Germany – Innovation and Jobs in the Information Society of the 21st Century" (BMWi/BMBF, 2002; DBt, 07.03.2002). In this progress report, the federal government celebrates its achievements but also formulates new targets, mainly focusing on the application of ICTs in economy and society.[40] Concerning the implementation of the programme, a member of the commission "Future of the Media in Economy and Society" states:

> "The implementation was characterised by problems concerning the coordination and harmonising of different opinions in the ministries. Furthermore, there was a clear preference towards publicity-effective, one-off, straw-fire like activities than towards sustainable programmes. The main deficiency of the implementation process is until today that there are mainly one-off, big show events rather than sustainable programmes" (H. Kubicek, 12.11.04, interview with & translation by the author).

The criticism mentioned – lack of coordination and focus on straw-fire like activities – was supported by several interviewees. In all, 5 out of 36 interviewees in Germany mentioned the lack of coordination amongst ministries, 4 mentioned the focus on big, possibly less applied projects as well as on out-of-date topics such as the project "Elections In Electronic Networks" (*Wählen In Elektronischen Netzen* – W.I.E.N) which was still conducted at a time when political elections through the internet had already been rejected due to security and privacy issues.[41]

Nevertheless, the action programme succeeds in raising the awareness of ICTs within the state and its administration, economy and civil society. It incorporates all federal ministries, offers an overview of all at that time existing and planned federal government initiatives towards a German k-society and sets targets for future developments. It encourages the conceptualisation and implementation of new initiatives, offers an argumentative frame and differentiates the new government from the information and communication politics of the old government by strongly focusing on ICTs and their societal consequences rather than TV and broadcasting. Outside of Germany, the programme clearly acts legitimising, stating the initiatives of the federal government of Germany and corresponding with the aims of the European Union action plan "eEurope 2002" (EC, 2000b), and later, "eEurope 2005" (EC, 2002).

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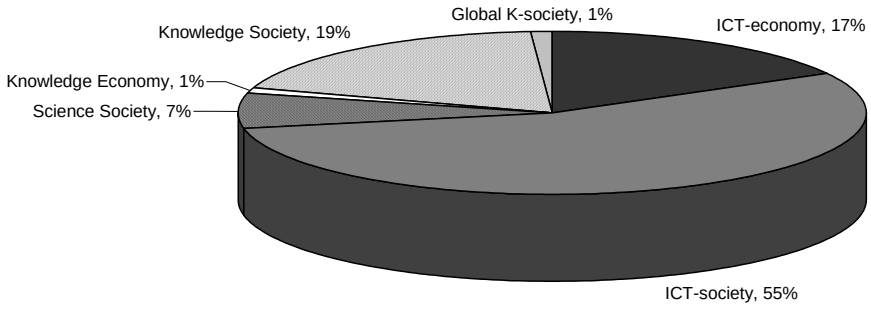
[40] For details, see Appendix Q.

[41] Criticism mentioned by the interviewees concerning the conceptualisation and implementation of these action plans is outlined in Appendix R.

On 03 December 2003 the action programme of the federal government "Information Society Germany 2006" is passed by the ministerial cabinet (DBr, 23.12.2003; BMWA/BMBF, 2003). As with the earlier action plans, "Information Society Germany 2006" comprises a multiplicity of separate activities and programmes (BMWA/BMBF, 2003: 77-90). Many of these activities evolved from the former action programmes "Info 2000" and "Innovation and Jobs" and are merely a continuation of those.[42] Additionally, a vast number of small activities, the installation of internet information platforms, competitions and awards were added to the list. Furthermore, a benchmarking system and the formulation of concrete aims are supposed to drive the initiation of new programmes in all ministries.[43] Grouped along the six types of k-society definitions as outlined in diagram 8-2, these activities draw the following picture:

Diagram 8-12: Categorised Activities of "Information Society Germany 2006" - in % -



Source: Composed by the author based on BMWA/BMBF, 2003: 77-90.

[42] A representative of BMBF explains: "The activities stated in the action programme existed already before it was published. But it is never the case that an action programme is published and then the government implements the activities stated in there. Instead, a programme is always a snapshot of the programmatic considerations at that time. Once it is published it acts as a guideline and legitimating basis, but the considerations and plans of course also change and develop further" (F. Schlie-Roosen, 04.11.04, interview with & translation by the author).

[43] For a detailed description of the new initiatives and targets, see Appendix S.

The activities of the action plan clearly focus on the application of ICTs. The dominant definition of k-society inherent in the action plan is therefore k-society as ICT-society. Further activities of the action plan focus on aspects of a knowledge society, an ICT-economy and a science society.

One of the few projects unique to this action plan is the electronic job card/health card which carries the electronic signature of the user.[44] The electronic signature cards are supposed to increase administrative efficiency especially within the social security and medical system. Furthermore they are supposed to accelerate the diffusion of eBusiness, by allowing for secure data exchange, as well as for financial interactions over the internet. Originally, the introduction of 40m electronic job cards and 80m electronic health cards[45] should have taken place by the end of 2005. Yet, due to the cost intensiveness of the project (FAZ, 26.05.2004), the government had to revise this aim in May 2004 and is now planning to introduce the job card in steps, beginning with unemployed and employees of the public sector in 2007. The introduction of 80m health cards is pushed back to the end of 2006 instead of 2005 (FAZ, 26.05.2004). Due to the changes concerning the introduction of eCards, one of the major innovations announced by the action plan does not take place. Hence, it is not surprising, that the current action plan is often described as a collection of separate initiatives and activities. The plan offers merely very few new ideas concerning the creation of a k-society. And it certainly does not offer a vision for the future.

In March 2006, the Federal Ministry of Economics and Technology, together with the Federal Ministry of Education and Research publishes the government programme "Information Society Germany 2010" which is a clear continuation of the earlier action plans (BMWT/BMBF, 2006). While the main focus of this government programme once again lies on the technological and legal infrastructure for ICTs (k-society as ICT-economy), on the application of ICTs (k-society as ICT-society), the programme also looks at the closing of digital divides (k-society as knowledge society) as well as technologically focused research (k-society as science society). There are no major

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[44] In the field of IT-security, the federal government together with the economy forms in April 2003 an "Alliance for Electronic Signatures" (*Signaturbündnis*). This alliance is supposed to provide the channels for distributing the electronic signature in Germany.

[45] The electronic health card project is conducted by the state, health insurances and associations as well as the chip card industry. It is an example for a project initiated and supported by the state but mainly progressed and financed by insurances, associations and the industry (mixed-financing).

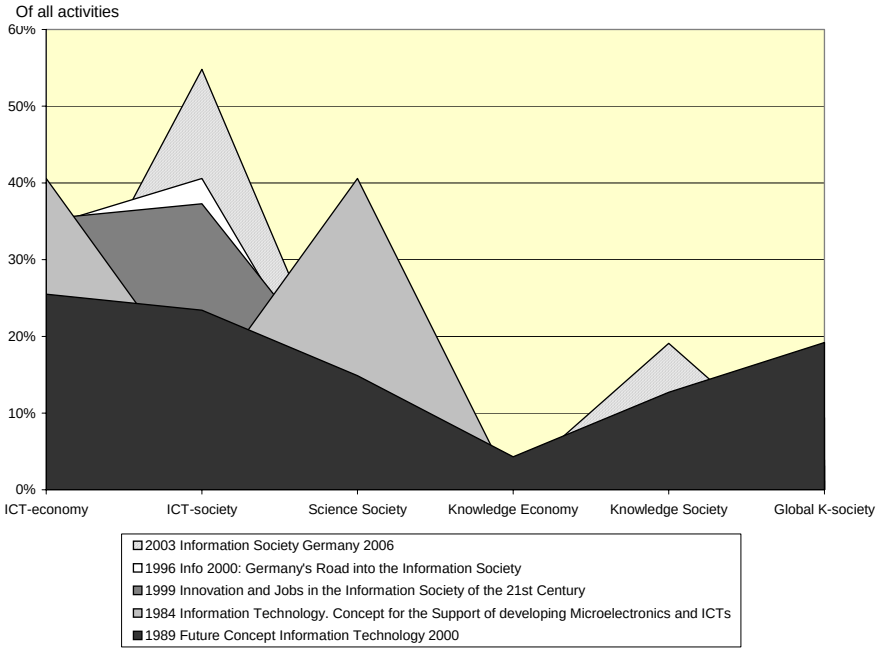
changes of focal shifts to be observed away from the k-society definitions inherent in the earlier programmes, but rather "Information Society Germany 2010" has to be regarded as nothing else than a mere continuation. The lack of interest enjoyed by this action plan goes so far that the publishing ministries did not even bother to design a front and back cover for the downloadable version.

Discussion

The programmes and action plans described above serve the following aims: (a) documenting all activities of the German government towards k-society; (b) encouraging federal, state and municipal government bodies for further action by stating aims and timelines; and (c) legitimising the construction of k-society by stating its economic necessity. Nevertheless, an all-embracing strategy towards a German k-society is not offered. "Info 2000" was heavily focused on technology development and application (ICT-economy and -society) but neglected the social consequences of these technologies, including topics such as, at that time, the upcoming digital divide within the German society. Furthermore, it did not incorporate all federal ministries, but was rather a separate project of the Federal Ministry of Education and Research, while the political priority of the government was clearly TV and broadcasting services. This changed with the change in government in 1998. The following action plan "Innovation and Jobs in the Information Society of the 21st Century" incorporates the expertise of the study commission "Future of the Media in Economy and Society" and includes all federal ministries. It lists a broad range of activities that are supposed to contribute to a German k-society. While focusing on the application of ICTs (ICT-society) as well as at the technological and legal infrastructure (ICT-economy) for economic development and growth, it also addresses social aspects. Overall, this action programme has to be regarded as successful. It offers multiple new perspectives on the topic, gives an overview of the existing activities, initiates further engagement and incorporates all sectors of the federal administration. Until today, this action programme forms the basis of the federal government's engagement for the creation of an information society. The following action programmes "Information Society Germany 2006" as well as "Information Society Germany 2010" mainly wrote the aims formulated in the former, further. Few new initiatives were added, but the initial push, that was communicated by "Innovation and Jobs in the Information Society of the 21st Century", seems to have vanished.

Sorting the activities of the German government along the lines of the topoi outlined in diagram 8-2, it becomes obvious that over time the textual foci changed. With regard to the definitions of k-society inherent in the activities creating it, the focus shifted from a very technological and economic definition of ICTs usage (ICT-economy) to the application of ICTs (ICT-society). The definition inherent in the action plans "Information Society Germany 2006" and "Information Society Germany 2010" includes these two, while focusing on increasing the participation in ICT usage and assessing the social consequences of ICTs (knowledge society). Besides these three mainly stated definitions of k-societies, the programmes furthermore include aspects of knowledge production (science society), knowledge exploitation (knowledge economy) and international activities for creating a global k-society (global knowledge society). These shifts are illustrated in the diagram below.

Diagram 8-13: Thematic Shifts in Activities of Action Plans
- in %[46] -



Source: Composed by the author based on BMWA/BMBF, 2003: 77-90; BMWi, 1996: 113-118; BMWi/BMBF, 1999; DBr, 07.06.1984; DBr, 19.10.1989.

The diagram above indicates the shift in definition from ICT-economy – being the most addressed type of k-society in the government programs of the 1980s – to ICT-society being the main topic of the action plans in the 1990s and 2000s. The definition of k-society as science society was especially emphasised in the 1980s but since then rather neglected by government programs. The most recent action plans "Information Society Germany 2006 & 2010" mainly focus on ICT application (k-society as ICT-society) and the inclusion of all members of society into the technological developments taking place (k-society as knowledge society). Interestingly, the

[46] For composing this diagram the activities listed under each action plan were sorted according to which type of k-society each activity addresses. Hence, each color in the diagram represents one action plan and how many percent of the activities listed in this action plan address each type of k-society.

topic of knowledge exploitation, that is turning knowledge into financial profit and therefore creating a knowledge economy, is until today hardly addressed by the action plans.

As outlined in section 8.2. a shift in defining k-society took also place in the final reports of the commissions of the German government. The definitions of k-society inherent in the final report of the 1970s and 80s match the picture of a k-society as ICT-economy. In the 1990s the focus shifted to defining k-society as an ICT-society as well as a knowledge society. In the 2000s, the emphasis on the economic exploitation of knowledge increasingly contributed to a definition of k-society as a knowledge economy in the advisory activities of the German government.

Overall, the recommendations formulated in the final reports of government commissions (advisory activities) as well as the activities listed in the government action plans (constructive activities) can be grouped according to their content into six categories. As illustrated in diagram 8-2, these six categories or six sub-k-societies are ICT-economy, ICT-society, science society, knowledge economy, knowledge society and global k-society. These six sub-k-societies together form the uniquely German k-society. Yet, the advisory and constructive k-society-activities of the German government address these six k-society-definitions, but to varying degrees. At different points in the process of construction, different definitions of k-society were emphasised. The degree to which each of these sub-k-societies is pursued nevertheless determines the exact character of the uniquely German k-society. Here, clearly the focus lies on the development of ICTs, technological and legal infrastructure (ICT-economy), as well as the application of ICTs (ICT-society). The fostering of research and development (science society) as well as the closing of digital divides (knowledge society) are constantly pursued topics, but to a far lesser degree. Interestingly, the economic exploitation of knowledge is hardly at all discussed in the government programmes but merely by the government commissions. A possible reason for the little coverage in the government programmes is that the topic of intellectual property and copy rights are heavily discussed on the level of the United Nations and the European Union. The outcomes of the discussions on these levels will additionally influence the definition of the German k-society. The international relevance of the construction of a k-society is also expressed by the activities of the German government, focussing on a global or regional (European) k-society, which have increased in recent times.

Consequently, it can be concluded that the German k-society – as defined in the government programmes constructing it – is composed of the six

sub-k-societies ICT-economy, ICT-society, science society, knowledge society, knowledge economy and global k-society. Special emphasis is given to k-society as ICT-economy and ICT-society. K-society defined as science society, knowledge society and global k-society is also addressed, but to a far lesser degree. K-society as knowledge economy is the least covered by government activities.

Chapter 9

Constructing a Singaporean K-Society

The activities of the Singaporean government listed in table 9-1 below contribute directly to the creation of a Singaporean k-society. Therefore, they form the objective of investigation in this chapter. Unlike the case of Germany, none of these activities bear a k-society term such as 'information society' or 'knowledge-based economy' in their title. Yet, most of these government reports refer to the Singaporean 'knowledge-based economy' (KBE), 'information society', 'information economy' or Singapore as the 'intelligent island' on their first few pages.

Table 9-1: State Activities for a Singaporean K-Society

Year	Name of Initiative	Implementing Authority
1981	National Computerisation Plan	Minister of Trade and Industry & Committee on National Computerisation
1981	Civil Service Computerisation Programme	Minister of Education & Civil Service Computerisation Group
1985	National IT Plan	National IT Plan Working Committee
1991	Founding NSTB / A*STAR	Minister Cabinet
1992	A Vision of an Intelligent Island – The IT2000 Report	National Computer Board
1994	Library 2000	Minister for Information and the Arts & Library 2000 Review Committee
1996	Singapore ONE	National Computer Board
1997	1st Masterplan for IT in Education	Ministry of Education
2000	Infocomm21	Infocomm Development Authority
2000	1st eGovernment Action Plan	Infocomm Development Authority
2002	2nd Masterplan for IT in Education	Ministry of Education
2002	Creative Industries Development Strategy	Economic Review Committee, Workgroup on Creative Industries
2003	Connected Singapore	Infocomm Development Authority

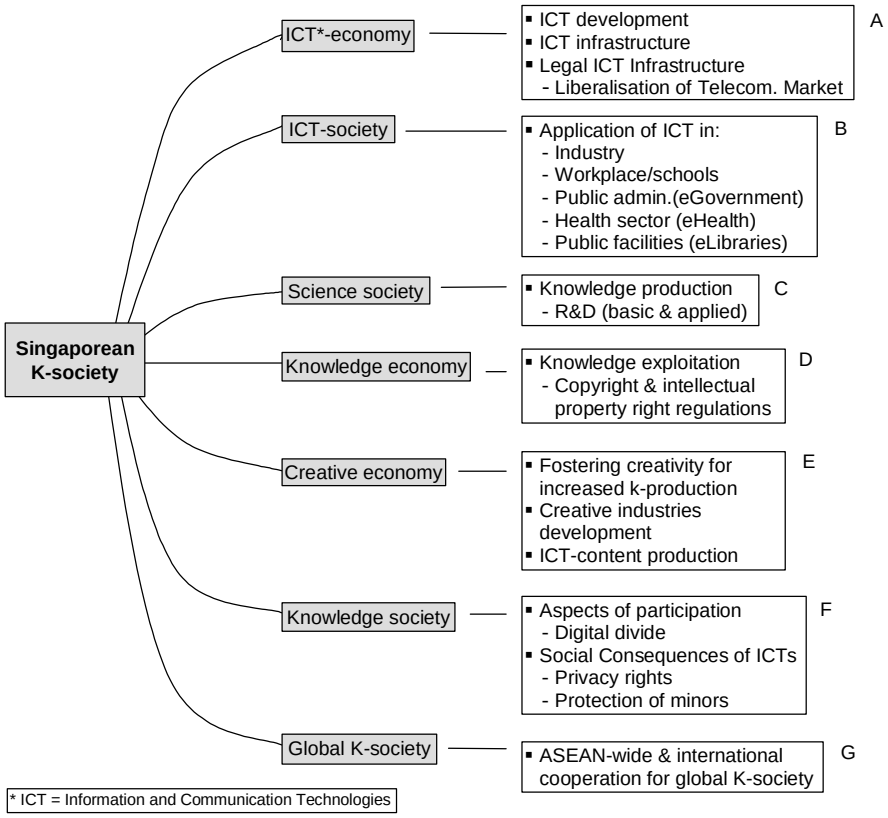
Year	Name of Initiative	Implementing Authority
2003	2nd eGovernment Action Plan	Infocomm Development Authority
2005	Library 2010	National Library Board
2006	Intelligent Nation 2015	Infocomm Development Authority

While in Germany, one has to distinguish between the works of advisory commissions (advisory activities) and the actual government programmes and action plans (constructive activities), government activities towards k-society in Singapore are all constructive in character. Some of these however, were the results of the work of commissions/committees (advisory activities) that were then passed by the minister cabinet or parliament as action plans and therefore became constructive activities.[1]

Textually the activities can be structured along seven inherent definitions of k-societies. Each plan and programme addresses specific aspects of k-society. The multitude of topoi addressed can be sorted into seven groups (right column in diagram 9-1), each contributing to a different kind of k-society (middle column in diagram 9-1). The arena of different procedural definitions of k-society inherent in the government programmes of Singapore constructs the Singapore-specific k-society. This arena of k-society definitions in the government programmes is illustrated in the diagram below.

[1] The commissions/committees of Singapore are listed in Appendix T. Each expert committee reports to the statutory board, ministry or minister cabinet that installed it, by submitting a final report which offers a number of policy recommendations. Similarly to Germany, these expert committees merely act as advisories but do not have any decision-making power. Their final reports, including their recommendations nevertheless can become government action plans, hence constructive activities, once they are passed by the minister cabinet or parliament, depending on who established the commission. Hence, the boundary between advisory and constructive activities is far less pronounced than in Germany.

Diagram 9-1: Typology of the Singaporean K-society



The typology of the Singaporean k-society differs from the one of the German k-society mainly in the addition of a seventh type of sub-k-society, the creative economy. Besides this, the topoi addressed and hence definitions of k-societies given by the Singaporean government activities draw the same spectrum as the German activities. Yet, the degree to which each of these sub-k-societies are pursued as well as the shift in focus varies in comparison to Germany.

The activities addressing the development of ICTs, the building of a technological infrastructure or the implementation of a legal infrastructure for ICT usage define k-society out of the perspective of ICTs enhancing economical growth (box A). It therefore is a very technologically and economi-

cally determined version of k-society pursued by these activities. It shall here be called ICT-economy. Activities focusing on the application of ICTs in all spheres of private and professional life (box B), define k-society as a form of society in which ICTs enhance social and economical development. Here, the focus lies on the usage of ICTs and the inherent definition of k-society is an ICT-society. Activities addressing the production of knowledge, meaning basic and applied research and development (box C), define k-society as a type of society in which science and scientific knowledge is of increasing importance. Hence, they are summed up here as constructors of a science society. Activities focusing on the financial exploitation of knowledge by addressing copyrights as well as intellectual property rights (box D) define k-society out of an economic perspective on knowledge. Therefore, these activities contribute to the construction of a knowledge economy. Activities fostering creativity as well as the attempt to develop creative industries (e.g. design & arts) and the aim to increase the local content production for ICTs (box E) regard creativity as the precondition to knowledge production. These activities define k-society by emphasising the role of creativity for economic as well as social development. They therefore contribute to the construction of a creative economy. Activities assessing the social consequences of ICTs as well as attempting to close the digital divide between social groups (box F) define k-society as a development in which everyone should participate. This inclusive definition contributes to the construction of a knowledge society. Finally, activities attempting to construct a k-society across the national borders, within ASEAN or internationally, regard k-society as a type of society that reveals its full potential only when being realised internationally. Generally, these activities aim for economic growth in Singapore, due to global linkages that are further developed based on ICTs. These activities contribute to the construction of a global k-society.

The Singaporean k-society, as it is defined and constructed by the Singaporean government, is composed of seven types of k-society, or one might speak of seven sub-k-societies. In sum, these seven types of k-society form the uniquely Singaporean k-society. Nevertheless, the government programmes, while addressing all seven k-society definitions, focus on mainly five, namely ICT-economy, ICT-society, science society, knowledge society and creative economy. Within this arena of differing k-society definitions a focal shift can be assessed over time. This is illustrated in diagram 9-2.

Diagram 9-2: Focal Shifts of Singapore's Government Activities

	ICT-Economy	ICT-Society	Science Society	Knowledge Society	Creative Economy	
1981	National Computerisation Plan	Civil Service Computerisation Programme				1981
1985	National IT Plan					1985
1991			Founding NSTB/ A*STAR			1991
1992	IT2000 Report					1992
1994				Library 2000		1994
1996	Singapore ONE					1996
1997		1st Masterplan for IT in Education				1997
2000	Infocomm21	1st eGovernment Action Plan				2000
2002		2nd Masterplan for IT in Education			Creative Industries Development Strategy	2002
2003	Connected Singapore	2nd eGovernment Action Plan				2003
2005				Library 2010		2005

In the 1980s to early 90s the focus of the government activities clearly laid on the building of an ICT infrastructure in conjunction with an appropriate legal infrastructure. The image of the society to be created, was the one of an ICT-economy. This primary focus on ICT and legal infrastructure was complimented by the application of ICTs in the public administration, with the first programme launched in the 1980s. The actual shift towards an ICT-society, nevertheless, only took place in the late 1990s, when programmes were launched, heavily emphasising the application of ICTs in private and professional life, educational facilities and the public service. In 1991, these ICT focused definitions of k-society were challenged by the founding of A*STAR. It derived from an increased awareness of the importance of local knowledge production. Here the image of the science society

moved into the government focus. In mid 1990s, these three definitions of k-society were complimented by the awareness, that a k-society requires the potential of every citizen. With the building of a vast library scene, the Singaporean government aimed to allow everyone to participate in the usage of ICTs as well as in knowledge creation and transmission. This definition of k-society can be called knowledge society. Finally, these four foci were further extended in the 2000s with emphasising creativity as well as the development of creative industries, which in application of ICTs shall contribute to Singapore's economic development. This belief in creativity subscribes to a k-society image as a creative economy.

These five main foci and produced images of k-society – ICT-economy, ICT-society, science society, knowledge society and creative economy – are the five main pillars of the definition of k-society of Singapore's government. This image is further influenced, as mentioned above, by definitions emphasising the knowledge economy and global knowledge society.

The Singaporean ICT-economy

In 1969, the government of Singapore requests the United Nations Development Programme (UNDP) to provide assistance in expanding the activities of the National Productivity Centre (NPC). The following UNDP report recommends that the government formulates a national computer policy and makes arrangements with the administration to facilitate electronic data processing (EDP) systems that would improve service to the public. Nevertheless, the recommendations of UNDP are not followed immediately. Singapore reached independence only four years ago (1965) and computers seem to be a rather cost intensive sector. Instead, Singapore's government chooses to follow the path taken by Japan, by focusing on the labour intensive electronics industry. Nevertheless, the Singaporean Ministry of Science and Technology monitors the increase of computer ownership and usage by conducting the survey "Computers in Singapore" in 1973 (Lui/Chia, 1974). According to the results of this survey, the first computers (meaning digital computers) in Singapore are installed in 1963.[2] In 1976, the Ministry of Science and Technology repeats the survey and assesses that between 1972 to

[2] From 1963 to 1969, an average of 2.14 units are installed every year; from 1970 to 1973, an average of 8.00 units (excluding replacements). In 1973, overall 38 establishments in Singapore own a total of 47 computers with a clear head start of the private sector.

1976 an average rate of 25 units per year are installed (Ministry of Science and Technology, 1976). Altogether 92 establishments possess 123 computers in 1976, as illustrated below.

Table 9-2: Computers by Sector and Ownership

Sector	1973				1976			
	Establishments		Computers		Establishments		Computers	
	No.	%	No.	%	No.	%	No.	%
Private Organisations	**28**	74	**34**	72	**79**	86	**106**	86
Public	**10**	26	**13**	28	**13**	14	**17**	14
Tertiary Educational Institutions	2	5	3	6	3	3	5	4
Government Deparments	3	8	4	9	4	4	6	5
Statutory Boards	5	13	6	13	6	7	6	5
Total	**38**	100	**47**	100	**92**	100	**123**	100

Source: Composed by the author based on Lui/Chia, 1974: 4;
Ministry of Science and Technology, 1976: 6.

According to these numbers, the former head start of the private sector increased further and lies far in front of the public sector. Yet, the numbers of the public sector might not entirely reflect reality at that time. The chairman of A*STAR (at the time of the interview) and so-called father of ICTs in Singapore describes the purchasing of his first computer as Director of the Logistics Department at the Ministry of Defence:

> "In 1976, I bought my first computer illegally and called it 'Small Business Machine' (SBM). Illegally because the Ministry of Finance had one computer and everybody had to submit their batch data processing work to the MOF computer office. To MOF, computers were expensive and no more money should be spent on that. So I couldn't buy a computer under the name 'computer' because the moment I bought it, my application to buy it would be reviewed and certainly rejected. That's why I just called it 'Small Business Machine' instead. And in December 1976/1977, I already had four machines; by 1978 I had more machines than all government departments together. The reason was that I needed them for logistics, for inventory control" (Ph. Yeo, 11.02.05, interview with the author).

Hence, the numbers for the public sector might have been slightly higher in actual fact than represented in the table above but – in 1976 –

probably nevertheless lower than in the private sector. This imbalance is addressed by Philip Yeo:

> "From logistics, I moved to other departments and up the ladder and put SBMs in everywhere. By 1978, I became Deputy Secretary of the Defence Ministry and in no time I had 300 computer staff, all military personnel, while the Ministry of Finance had only 35!"

Similarly to Germany (section 8.1.1) or the Arpanet in USA (Witte, 2002: 2), the origin of computerising the public service of Singapore lies with the Ministry of Defence (MinDef). From there, computerisation spread into all other government sectors and is increasingly adopted for civil purposes. When the National Computer Board was founded in 1981, most of its first employees and main drivers came from the Ministry of Defence. They include Philip Yeo, NCB's first Chairman, Dr. Tan Chin Nam, William Hioe and many more, who first serve in the Ministry of Defence, then NCB before moving on to other parts of the government service including EDB, A*STAR (Philip Yeo) or the National Library Board (e.g. Christopher Chia and Michael Yap). MinDef and NCB emerge as playing and learning grounds for technocrats that later move on into other sectors of the government service. The former Director of Xerox Singapore Software Centre and Member of Parliament (PAP) until April 2006, Wang Kai Yuen describes the drive originating in NCB and pushing the whole process towards a Singaporean k-society:

> "During the ICT-phase in the 1970s to 90s, the roadmaps, the vision were done and driven by thinkers in the government and NCB. IT2000, which came from NCB, was actually an incubator for many of the later blueprints. If you look at Library2000, for example, the first CEO, Christopher Chia came from NCB. So he was an NCB person, and then was sent to NLB. But his basis was already there and he drove Library2000. Library2000 is a very good example, but there are many more" (Wang K. Y., 12.04.05, interview with the author).

Besides the roles of the Ministry of Defence and NCB, this statement also indicates the strong role of the state as a key driver in constructing the vision of a Singaporean k-society and developing it further by first focusing on the technological infrastructure to second the 'soft' infrastructure, emphasising knowledge production and creativity.

In 1979, the Singaporean government recognises the need for computerisation "as an essential tool for competing against the rest of the world" (NCB, 1999: 2). The focus clearly lays on the technological and legal ICT infrastructure, hence the creation of an ICT-economy. Nevertheless, the need

to also apply these technologies is acknowledged in all five national IT plans which are to come. Parallel to the first national IT plan published, the "Civil Service Computerisation Plan" is launched, which focuses on the application of ICTs in the government service and hence stands in for a definition of k-society as ICT-society. Yet, the actual focus on applying ICTs (ICT-society) is to come in the mid 1990s.

National Computerisation Plan (1980 – 1985)

In the beginning of 1980, the Minister of Trade and Industry, then Goh Chok Tong forms the Committee on National Computerisation (CNC). It is the task of this committee to study, plan and oversee the development and growth of the computer services industry with the long-term aim to develop Singapore into a computer service centre. Two teams of the committee headed by Dr. Tony Tan, then Minister of Education, visit Hong Kong and the USA to study computer installations there. Furthermore, the CNC appoints the Civil Service Computerisation Group (CSCG) in May 1980 to study the needs of the civil service concerning ICTs. The final report of CNC is submitted to the government in October 1980 (Committee on National Computerisation, 1980). This report forms the first national IT plan, called "National Computerisation Plan" of Singapore. It recommends focusing on four main aspects in computerising Singapore (Neo/Soh, 1993: 2): (a) developing sufficient numbers of IT-professionals; (b) promoting and developing the computer software industry; (c) establishing a National Computer Board (NCB) as key coordinating government agency for the implementation of Singapore's IT policies; and (d) computerising the civil service rapidly and extensively. While (a) to (c) stand in for a definition of k-society as ICT-economy, (d) clearly emphasises the application of ICT and hence stands in for a definition of k-society as ICT-society. Following the recommendations formulated in the plan, the Singaporean parliament passes the NCB Act and establishes NCB on 01 September 1981 as a statutory board of the government, subordinated to Ministry of Finance. It furthermore assigns NCB with the implementation of the National Computerisation Plan. Philip Yeo, who was "unofficially already running NCB in the Ministry of Defence" (Ph. Yeo, 11.02.05, interview with the author) becomes the first chairman of NCB.[3]

[3] The permanent secretary of the Ministry of Information, Communication and the Art and general manager of NCB in the 1980s describes the beginning as follows: "In 1979/1980, the Ministry of Trade and Industry articulated very clearly that we had to

National IT Plan (1986 – 1991)

In late 1984, the government realises that the increasing convergence of computer and telecommunication technologies requires action to be taken on policy level. Therefore, in June 1985, the government sets up the National IT Plan Working Committee made up of officials from NCB, Singapore Telecoms, the Economic Development Board (EDB), and the Institute of Systems Science (ISS). Headed by Tan Chin Nam, then general manager of NCB, it is the aim to produce a National Information Technology (IT) Plan, presenting a new perspective and strategy for the development and utilisation of ICTs to the Committee on National Computerisation. This is done on 30 November 1985 with the "National IT Plan – A Strategic Framework". Although considered by the authors as an interim report, it forms the new National IT Plan (National IT Plan Working Committee, 1985: 57).[4] The committee analyses the situation of ICTs at that time in government policy, economy and society in Singapore, as well as states which key ICTs are most likely to play a role in future development. Furthermore, it looks at the effects of ICT on society, meaning at the work place, at home as well as at arising social problems such as computer crime, privacy and health hazards. Here, the committee actually speaks of the Singaporean k-society, using the term 'information society' (National IT Plan Working Committee, 1985: 25-30). With a clear focus on ICT in economy, the committee identifies ICT as "new bloodline for Singapore Economy" and recommends a "New National IT Drive" incorporating all components of the existing and to be developed, ICT infrastructure and industry into a National IT Plan. According to the committee, "IT is too critical to [Singapore's] future economic and social well-being for its development to be left to a fragmented arrangement with

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introduce automation and mechanisation. So that lead to the national computerisation effort in 1980 which came out with the recommendation that we needed a National Computer Board set up in order to drive the national computerisation. So the NCB was the first articulation of our national computer strategy. Subsequently we had the 'National IT-Plan', 'IT2000' and so on. All this was part of the general movement to embrace technology in order to make Singapore productive and competitive" (Tan Ch. N., 02.03.05, interview with the author).

[4] Defining "IT", the authors refer to the definition given in the Economic Committee Report which sums it up as "computer technology, telecommunications and office systems in all aspects of information flows – from collection and processing, to storage, packaging and dissemination" (National IT Plan Working Committee, 1985: ii, 4).

different agencies tackling separate segments" (National IT Plan Working Committee, 1985: v). Furthermore, the committee states that "the current national computerisation effort is inadequate for fuelling future economic growth of Singapore." Instead, a national IT strategy shall enable the nation to exploit ICTs (a) as a sectoral industry by creating new ICT-related products and services; and (b) as a productivity tool in all economic sectors. While (a) clearly stands in for a k-society definition as ICT-economy, (b) actually acknowledges ICTs as tools that have to be applied in order to yield further development (ICT-society). In order to achieve (a) and (b), the committee suggests a seven-pronged approach. Each of the seven prongs – as stated in the National IT Plan – is a strategic building block to serve as catalyst for the national ICT movement.[5]

The plan reflects the shift from mere computerisation to ICT by adding the elements of telecommunication and office systems. Compared to the national computerisation policy of 1981, the National IT Plan from 30 November 1985 offers an integrated ICT policy for the next five years. Concerning the technological infrastructure (k-society as ICT-economy), the plan focuses on the convergence of telecommunications and computer technology, leading to the introduction of networking technologies, integrating computing and communications to improve business transactions. This leads to the implementation of an island-wide integrated services digital network (ISDN) in 1989, followed closely by the development of applications such as a trade documentation system named TradeNet to provide efficient and paperless processing of trade documents by government departments through electronic data interchange (EDI).[6]

The National IT Plan of 1985 is the first national initiative that aims to incorporate all ICT-related initiatives into one government policy. Although the focus lies on economy and ICT for economic growth, the committee does also briefly address potential social consequences such as com-

[5] For a list of the seven prongs, see Appendix U.

[6] Other EDI systems implemented are MediNet for the medical industry and health community as well as LawNet for the legal community (Ling, 2000/2001; 19). Also at that time, Singapore government focused on the development of the Televiewtechnology, accessible through the television set or personal computer. The Singapore-made videotext system displayed all four national languages and supports full colour photographs. For data transmission, Televiewused the telephone network and off-air transmission channels. Nevertheless, the user numbers remained low with merely 7.000 subscribers in 1991 (Kwan Ting Keong, 1995: 137). Instead, ISDN as network-technology took over.

puter crime and privacy issues. Furthermore, the committee implicitly addresses the potential of terms such as 'information society', 'information economy' and 'information age' for drawing a national vision. The committee points out:

> "It should be noted that the get-together of individuals from NCB, EDB, Telecoms and ISS to form a Working Committee bears testimony that separate organisations can share their resources and work as a team to realise a common vision for the country" (National IT Plan Working Committee, 1985: 57).

By doing so, the committee actually contributes to the then existing vision of nation-building (we, together for the nation's good) as well as to the creation of the vision of a Singaporean k-society. The focus lies on the technological implications, meaning the infrastructure as well as applications (k-society as ICT-economy and ICT-society). Nevertheless, the recession of 1986 raises the awareness that the one-sided focus on manufacturing and foreign direct investments cannot provide for long-term, sustainable economic growth. In order to assess Singapore's possibilities and needs for shaping the economy, the government installs an Economic Review Committee (ERC) under Lee Hsien Loong, then Minister of Trade and Industry. The work of the committee results in the recommendation to restructure and 'reinvent' Singapore's economy by diversifying. Besides manufacturing, the committee recommends the developing of a service industry as well as a stronger focus on local knowledge production (k-society as science society and creative economy). As discussed in the following, it takes several years until the recommendation, to increasingly focus on knowledge production, enters the matching blueprints and strategic plans.

A Vision of an Intelligent Island – The IT2000 Report (1992 – 1999)

In late 1990, together with the handover of the Prime Minister's position from Lee Kuan Yew to Goh Chok Tong, the new government publishes a document entitled "The Next Lap" (Singapore Professional Centre, 1991). "The Next Lap" aims to describe the hopes and aspirations of a new generation of Singaporeans. As overall goal it states to reach the standard of living

of Switzerland by 2000. Yet, it is not an action plan with concrete steps but merely a government document formulating the aims of the nation.[7]

Shortly after, NCB initiates the IT2000 Study in January 1991 and positions it as part of the vision of "The Next Lap". Its overall task is to examine "how ICT can create new national competitive advantages and enhance the quality of life in Singapore" (NCB, 1992a: 3). In March 1992, the National Computer Board publishes the report entitled "A Vision of an Intelligent Island – The IT2000 Report" (NCB, 1992a). In this report, the contributors review the status of ICTs in Singapore in comparison with global trends, paint a vision of how ICTs can further contribute to Singapore's development and state concrete strategies of implementation.

The planning process leading up to the "IT2000 Report" is developed by NCB in close cooperation with the industry, as outlined in Appendix V. It is later adopted by several other government statutory boards and applied – slightly adapted – for the planning of other action programmes.[8]

In the IT2000 report, NCB calls for the development of a national information infrastructure (NII) as the basis for a nation-wide information, communication and transaction system in order to be able to capitalise the opportunities posed by technological developments. As such opportunities, the report states the ability for "individuals, firms and communities to be more creative and to create pervasive linkage of individuals, firms and communities around the globe" (NCB, 1992a: 13). The inherent definition of k-society in this report is therefore clearly the one of an ICT-economy. The national information infrastructure shall be built as illustrated in diagram 9-3.

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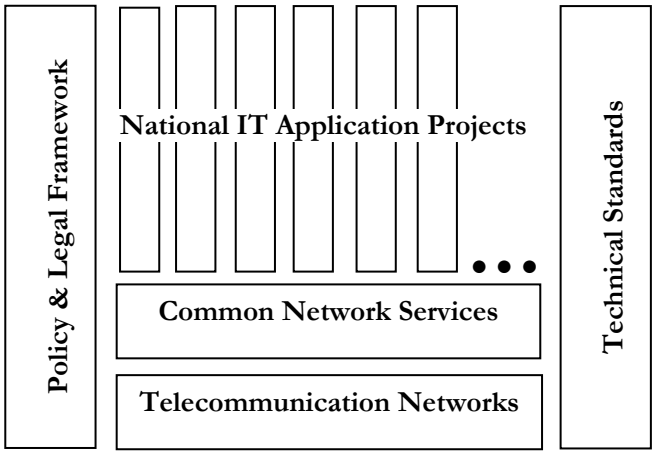
[7] The Director of the Arts and Heritage Division in the Ministry of Information, Communications and the Arts explains: "Each time a document like 'The Next Lap' comes out, one effect is to get people enthused and say, "Wow, I am going to reach for the next plane!" […] So it became a goal that people looked towards and said, ok, we have some idea of how we are going to move forward. I remember at that time, it featured strongly in our minds: in the next lap we will be this, in the next lap we will do that" (Koh L.-N., 30.03.05, interview with the author).

[8] Soh/Neo/Markus (1993) call the planning process leading to the IT2000-report "the first effort of its magnitude in terms of the number of sectors examined and the number of industry managers involved".

Diagram 9-3: National Information Infrastructure – A New Strategic Framework



Source: NCB, 1992a: 15.

NII shall consist of cable and wireless telecommunication networks, which are provided with common network services and national IT applications. Non-technological issues such as data protection and intellectual property rights shall be addressed by a policy and legal framework.

The development of NII is embedded in the vision "Singapore as an Intelligent Island", painted in the plan (NCB, 1992a: 17-32). It stresses the importance of NII for Singapore's future development and draws a picture of Singapore "among the first countries in the world with an advanced nationwide information infrastructure. It will interconnect computers in virtually every home, office, school, and factory. The computer will evolve into an information appliance, combining the functions of the telephone, computer, TV and more" (NCB, 1992a: 19).[9]

[9] Five major thrusts are pointed out:

1. developing a global hub: Singapore as a highly efficient switching centre for goods, services, capital, information and people;
2. boosting the economic engine: increase of competitiveness of every sector in the industry, especially those heavily relying on information and the fast access to it;
3. enhancing the potential of individuals: everyone has access to information, can develop their skills and creativity, and participate in life-long learning;

The implementation of NII is split into three components: conduit, content and compute. Conduit refers to the physical infrastructure, the pipelines. Content means the information that is transferred by the conduit and compute refers to the processing of the content in the conduit such as conducting user authentication, or the processing of permit documents (NCB, 1992a: 39-40). Hence, the importance of applying ICTs (defining k-society as ICT-society) as well as of creating knowledge (k-society as science society as well as creative economy) is acknowledged here, although not yet posing the main focus of the plan. The implementation of NII, embracing these three components, is discussed and a strategy of implementation outlined (NCB, 1992a: 37-50). Yet, it is not until 1996, that Singapore ONE, the national information infrastructure project is actually launched.

Concerning the rapid development of ICTs worldwide, the report recommends to closely monitor the ICT R&D initiatives in the US, Japan and the European Union. Furthermore, technology intelligence offices shall be set up in these regions in order to serve the needs of IT2000 and other R&D initiatives by exploring opportunities to participate in R&D projects of these regions.[10] Nevertheless, the chairman of NCB, then Ko Kheng Hwa is quoted by the Straits Times on 02 April 1992 as having said:

> "Focus will be given to applications that exploit currently available telecommunication infrastructure and information technology such as electronic data interchange, Teleview and ISDN" (Straits Times, 02.04.1992).

Disregarding this Singaporean focus on available technologies, the World Wide Web increasingly develops. In 1994, it is made available to the Singaporean public by Singapore's first public internet service provider named *SingNet*. Consequently, IT2000 and its focus on building a national information infrastructure is soon overtaken by the internet as acknowledged by Wong Seng Hon, then Divisional Director, NCB and IT2000-planer in a commemorative album of NCB (1999): "The Internet became the de facto infrastructure. That was something we didn't plan for." Technologically out of date within two years, the plan's vision remains and the belief in an arising information age in which Singapore as 'Intelligent Island' succeeds, catalyses numerous developments in the field of IT-applications, training and planning.

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4. linking communities locally and globally: increased participation in the world outside Singapore through electronic communities;
5. improving quality of life: enriching lives by increasing discretionary time, offering more opportunities in leisure activities, work and kinship.

[10] As an example, the report states the European Union's R&D in Advanced Communications Technologies for Europe (RACE) (NCB, 1992a: 45).

The vision painted by IT2000 produces a fertile ground in Singapore's society for the immense embracing of ICTs which lasts until today. Therefore, the IT2000-report can overall be regarded as a success, although the mentioned short-comings in the planning of the technological infrastructure have to be taken into account.

In August 1996, the Ministry of Information and the Arts (today MICA) installs the National Internet Advisory Committee (NIAC), which is supposed to advise the Singapore Broadcasting Authority (SBA) on the regulation of electronic information services and the development of the internet. The committee consists of 19 representatives of various sectors of society with a clear dominance of the state and state related entities. In an interview with the author, Dr. Wang Kai Yuen, the former Director of Xerox Singapore Software Centre, Member of Parliament (PAP) until April 2006 and member of the National Internet Advisory Committee from 1993 to 1997 describes the tasks of the committee:

> "Basically the committee advises the government on how to deal with the explosive growth of the internet and how to monitor it. […] In Singapore, we want to make sure that information that gets disseminated is correct, not a false rumour. Just because people are writing all kind of things, and there is no control over this. So the first thing this advisory committee did, was to black list certain sites. For instance, playboy.com. And the black list is getting huge. To monitor this today is an impossible task. But I think, where it is possible, we should still do it, because the younger people should not be exposed to this so early. If an adult intends to connect to playboy, he can always do it. There is always a way around it" (Wang K. Y., 12.04.05, interview with the author).

Censoring the internet in Singapore as described in this statement was made possible by licensing all Internet Service Providers (ISP). In September 1996, for the first time a man is charged for possessing pornographic movies that he downloaded from the internet (Straits Times, 26.09.96 qtd. in Ling, 2000/2001: 39). Nevertheless, as expressed by the Member of Parliament above, Singapore's government, after years of battles, has to realise, that the World Wide Web cannot be effectively censored.

Disregarding the rapid development of the internet and therefore obsoleteness of a Singaporean NII, the government announced in June 1996, the intention to spend SGD$82m on a nationwide communications network which will form the national information infrastructure, proposed by the IT2000-report (Ling, 2000/2001: 39). Shortly after, in September 1996, the industry consortium 1-Net is formed, to build, own and operate the whole network, which shall be called Singapore ONE (Singapore One Network for

Everyone). Singapore ONE aims at connecting the whole island, all homes and offices, public buildings, schools and libraries through a broadband network. This clear focus on the technological infrastructure by Singapore ONE states its inherent k-society definition as ICT-economy.

Technologically the network is based on broadband fibre optic with overlays to cable television through special modems and the telephone network using ADSL technology (Loh/Ang/Hukill, 2000: 245-246). Yet, officially, Singapore ONE is merely launched in June 1997, when Prime Minister Goh Chok Tong announces Singapore ONE's pilot network at Asia Telecom '97. At that time 400 households participate in the trial. The commercial launch of Singapore ONE follows one year later, in June 1998, and it is made available nationwide in December 1998. The network is meant to be a high-speed, high-capacity interactive multimedia connection to homes and offices delivering multiple services such as video-conferencing, high-speed internet, teleshopping, entertainment, links to government agencies, education and electronic libraries to its users. Many of these services are developed through government promotion and efforts initiated by NCB. The establishment of Singapore ONE is locally rated as an admirable, cooperative effort (Loh/Ang/Hukill, 2000: 246). Yet, the installation of it is accompanied by multiple problems. First of all, the costs involved for the end user are relatively high including the technological equipment as well as the monthly connection charges which prevent it from being used by the majority of the citizens.[11] The user numbers stay rather low and the vision of a completely linked island remains unrealised. The Dean of the School of Communication & Information, Division Journalism at the Nanyang Technological University states (Ang P. H., 21.02.05, interview with the author): "Singapore ONE wasn't really working. Despite all attempts to improve it, use it as a test bed, it didn't actually have many users." The author's informants mention three reasons for this: high costs for end users, lack of local content and technological problems.[12] As discussed by Ling (2000/2001: 41), the

[11] One of the author's informants who was involved in the planning process leading up to Singapore ONE describes: "Singapore ONE was a very bold idea. The idea of trying to get a nation and every member of this nation connected through broadband and make use of broadband" (A. D. Narasimhalu, 29.03.05, interview with the author).

[12] Prof. Ang Peng Hwa explains: "Singapore ONE was not far looking. It failed in its initial phase because it used Asynchron Transfer Mode (ATM). Internet uses Transfer Control Protocol (TCP). Singapore One used initially ATM because it was built by the telecoms not by IT people. So in fact there were a lot of problems at the beginning just to get it to work" (Ang P. H., 21.02.05, interview with the author). A Director of the Institute for Infocomm Research, who prefers to remain anonymous,

government's endeavour in establishing Singapore ONE might have exceeded the aim to make Singapore competitive but additionally involve the aim to create a Singaporean broadband-network that Singaporeans would use besides and partly instead of the internet. Hence, Singapore ONE may be seen as the attempt of providing Singaporean citizens with internet and at the same time "creating an internal system which bonds people to the neighbourhood, schools, clubs and local community", as stated by today's Foreign Minister George Yeo in 1995 (Straits Times, 26.05.95 qtd. in Ling, 2000/2001: 41). Ling argues, this internal, nation-wide system could reinforce a national consciousness and might guard Singaporeans against the negative aspects of the internet. Additionally, such an internal system could be monitored more easily than the internet.

Infocomm21 (2000 – 2003)

On 01 December 1999, the National Computer Board, until then the main driver of Singapore's ICT-push, merges with the Telecommunication Authority of Singapore (TAS) to form a new entity called Infocomm Development Authority (IDA). IDA is a statutory board of the government under the Ministry of Information, Communications and the Arts (MICA).[13] The merger between NCB, traditionally the ICT promoter in Singapore's government, and TAS, a regulating authority, is heavily criticised by some members of the public administration since it is regarded as a hindrance for future ICT promotion.[14] Shortly after the merger, on 01 April 2000, the liberalisation of

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refers to the lack of local content and stresses the inapplicability of the project to Singapore's small market: "There wasn't enough local content for Singapore ONE produced and the few pipes out of Singapore to the content were not capable enough. The problem was basically that Singapore copied the models of Korea and Japan but with the difference that Korea and Japan had enough local content to answer the demand" (22.02.05, interview with the author).

[13] IDA explains the reasons for merging on its website by pointing out that "as information and telecommunication technologies converged, and the internet became a staple in offices and homes, the rationale was clearly to have a single agency for integrated planning, policy formulation, regulation and industry development of the information technology and telecommunications sectors" (IDA, 2003b).

[14] Philip Yeo, the first chairman of the National Computer Board (NCB) and father of ICT in Singapore calls the merger "the biggest mistake made". He explains this statement: "The guys in Infocomm Development Authority (IDA) are regulators. When I was in NCB, I was a promoter and I was one of the few who were for the merger because I thought it makes sense to merge promoters and regulators. But instead of them merging for promoting, they become regulators. If you put a man on

Singapore's telecommunication sector is finally completed by the opening up of basic telecommunication services to full competition. Furthermore, foreign direct investment (FDI) restrictions on ownership of telecommunication operations in Singapore are lifted (IDA, 2002: 5).

In December 2000, IDA lays open its endeavours for the next five years in a strategic plan called "Information and Communication Technology 21 (Infocomm21)" (IDA, 2000). Infocomm21 is written in cooperation with several government agencies, the ICT industry and industry associations, scientific community and research institutes, as well as community groups. Yet, the process of conceptualisation involves far less brain-storming and urging for new ideas than the process leading up to "IT2000".[15] Furthermore, "Infocomm21" claims to not be a rigid master plan but merely a strategic framework and guide for industry, which will be updated periodically. The government, which until now took on an extremely proactive role in driving the ICT developments in Singapore, points out in "Infocomm21" that the implementation of the plan must be industry-focused and industry-led. It defines its own role in this implementation process as 'catalytic', meaning to act as facilitator, promoter, educator and 'anchor tenant' for the testing of new applications. Areas in which IDA plans to get actively involved include assisting local companies to grow, developing markets and removing regulatory obstacles for the industry if required (IDA, 2000: 2). In the report, IDA

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top who is a regulator, the remaining can't do anything. That's what they did, that's the problem" (Ph. Yeo, 11.02.05, interview with the author). This is also confirmed by a Director of the Institute for Infocomm Research, who wants to remain anonymous: "When NCB merged with the Telecom regulators, all the best people of NCB left. And IDA did not attract new people but just recruited from underneath. So the leading staff of IDA is mainly leading staff because of their seniority, not necessarily due to capabilities. After the merger, IDA should be 50% regulator, 50% promoters but most promoters left and the role of IDA as promoter is rather hidden today." (22.02.05, interview with the author). A Senior Director of IDA replies to the question of whether IDA today mainly acts as regulator by stating: "For some time regulation became very important. But now the role changed again since the policy development and regulation department were recently renamed and reorganised into a policy and industry development department. So there is a positive synergy taking place, which is quite unique worldwide." (W. Hioe, 30.03.05, interview with the author).

[15] As stated by a senior director of the Infocomm Development Authority: "Infocomm21 and Connected Singapore were done more informally without committees. We made use of industry consultation sessions and focus groups which met only once" (W. Hioe, 09.08.05, email to the author).

envisions Singapore as "a dynamic and vibrant global Infocomm capital with a thriving and prosperous eEconomy and a pervasive and infocomm-savvy eSociety". On the road to the digital future, the report focuses on three strategic objectives that shall be achieved: (a) the new eEconomy; (b) the new growth engine infocomm; and (c) the new eSociety. The focus lies on the creation of the legal infrastructure for eBusiness and the ICT industry (defining k-society as ICT-economy) as well as on the application of ICTs in the public service and in society (k-society as ICT-society). Here the focal shift towards emphasising the application of ICTs (k-society as ICT-society) can be assessed.

In May 2002, IDA publishes a status update report for "Infocomm21" (IDA, 2002). Here, IDA illustrates the developments in each sector of the six strategic thrusts in the last two years as outlined in Appendix W. Overall, "Infocomm21" as well as its status update report appear to be legitimating papers. While most of my interview partners referred to the "National IT Plan" of 1986 as well as the "IT2000"-report of 1992 as groundbreaking strategy papers as well as national visions for the Singaporean k-society, hardly anyone seemed to even remember the blueprint "Infocomm21". It appears to have been merely a blueprint which was due but did not actually move much. As such, "Infocomm21" actually appears quite similar to the action plan "Information Society Germany 2006" of the federal government of Germany, which mainly states initiatives that were not actually initiated by it.

Connected Singapore (2003 – Today)

In 1985, Singapore is hit by an economic recession for the first time since independence. Low skilled, labour intensive industries move out of Singapore to neighbouring countries and raise the awareness within Singapore's government for the need of not only fast but also sustainable growth. The chairman of the Intellectual Property Office and professor at the National University of Singapore describes the conclusion drawn by the Economic Review Committee (ERC), headed by then Minister of Trade and Industry, Lee Hsien Loong:

> "The committee identified that for Singapore to get out of the recession and continue to grow we had to move up the technological ladder because our cost structure is such that we can't do the things we used to do. Our neighbours caught up with us" (Hang Ch. Ch., 22.02.05, interview with the author).

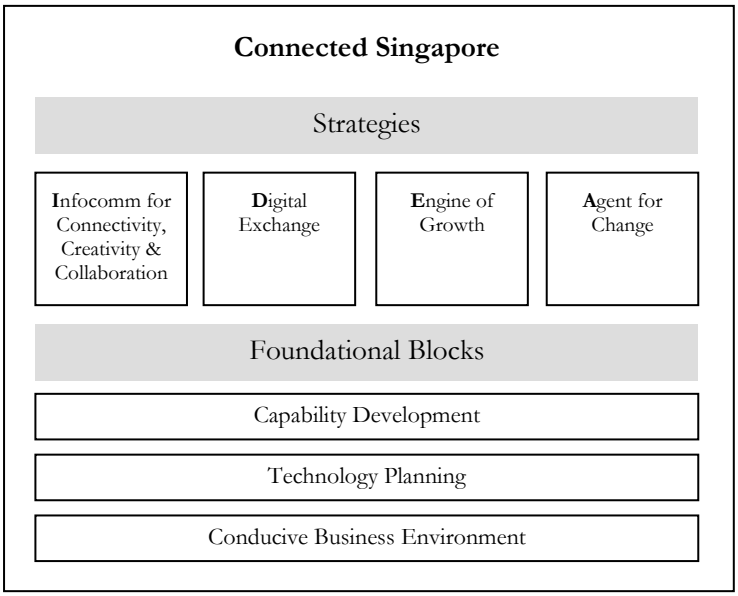
Dr. Tan Chin Nam, Permanent Secretary of MICA points to the developing of a service industry, besides the traditional manufacturing:

> "The ERC of 1986 redefined what Singapore wanted to be from the economic point of view and therefore had to go through a restructuring and reinvention of the Economic Development Board. That we see total business as a function and a mission was defined: Singapore as a global city with total business capabilities. Not just manufacturing but manufacturing plus services!" (Tan Ch. N., 02.03.05, interview with the author).

Furthermore, the above mentioned slow adoption of the Singapore ONE network due to a lack of local content indicates to the Singaporean government, that merely the building of ICT infrastructure will not get Singapore's citizens involved into an eLifestyle. Yet, this involvement of the citizens is regarded as essential for the creation of k-society and is one of the aims of blueprints such as "Infocomm21": to raise the e-savvyness of Singapore's society. In order to move up the value-chain and reach sustainable long-term growth, Singapore's government decides to emphasise local knowledge and content production, as will be discussed in detail in sections 9.3. and 9.5. This change in emphasis from building the technological infrastructure in order to push the manufacturing and ICT industry (ICT-economy) in addition to the production of knowledge and content (science society and creative economy) also finds expression in the current blueprint of IDA contributing to Singapore's k-society.

In 2003, IDA publishes its current master plan, entitled "Connected Singapore" (IDA, 2003a). Interestingly, IDA, in "Connected Singapore", feels the need to legitimise its further focus on ICTs and at the same time argue for IDA's own existence, due to the bursting of the dot.com bubble in mid 2000 and global insecurities concerning the future of the ICT industry. In doing so, IDA refers to analyses of the World Economic Forum, the OECD and analysts who were also quoted by The Business Times. Based on these external analyses, IDA nevertheless concludes that Singapore's economy and society is on the right track with ICT, yet has to increasingly develop technologies, applications and content itself, not merely manufacture it. This felt need to legitimise its action, is also expressed in the subtitle of the report "A Blueprint for Renewed Confidence and New Growth Opportunities" (IDA, 2003a: 4-5). In order to achieve a connected Singapore, the plan aims to implement programmes under four strategies based on three foundational blocks as illustrated in diagram 9-4 and described in detail in Appendix X.

Diagram 9-4: Key Strategies of "Connected Singapore"



Source: IDA, 2003a: 7.

The plan claims to "take cognizance of the need for Singapore to develop new sources of growth, including new areas involving creative inputs, like design and the arts" (IDA, 2003a: 7). Therefore, it is the first plan of IDA which incorporates the technological infrastructure as well as the "soft infrastructure", meaning knowledge and content production. The focal shift from ICT-economy to ICT-society as well as science society and creative economy that was already indicated by Infocomm21 is actually formulated in "Connected Singapore". ICTs are increasingly seen as technological enablers and productivity tools for all economic sectors. As stated in the plan (IDA, 2003a: 7): "Infocomm technology will be a true connector – bringing together the power of computing, communications and content, to create new business opportunities, consumer value and cultural experiences." Concerning the actors involved, IDA recognises itself as master planner for the strategies as well as catalyst and facilitator for initiatives. Yet, IDA places the success of each single programme in the hands of the economy and the citizens and calls for active participation. As mentioned above, "Connected Singapore" is basi-

cally a continuation of the four national IT plans before, which was, just as "Infocomm21", conceptualised by IDA in a rather informal process.

In June 2006, launches its current government action plan "Intelligent Nation 2015 – iN2015" which aims to "navigate Singapore's exhilarating transition into a global city, universally recognised as an enviable synthesis of technology, infrastructure, enterprise and manpower", as stated on the government website of iN2015 (IDA, 2006a). Led by IDA, iN2015 is a multi-agency effort, incorporating the private, public and people sector as referred to by the plan, meaning civil society groups. Overall, the masterplan paints a vision of Singapore as a global infocomm city and refers to ten areas of action. These are outlined in detail in ten accompanying reports (IDA, 2006b). The ten areas of action comprise "Digital Media and Entertainment", "Education and Learning", "Financial Services", "Government (iGov2010", "Healthcare and Biomedical Sciences", "Manufacturing and Logistics", "Tourism, Hospitality and Retail", "Infocomm Infrastructure, Services and Technology Development", "Enterprise Development for Singapore-based Infocomm Companies", and "Infocomm Manpower Development". While overall the masterplan still focuses on ICT infrastructure, ICT development and the application of ICT (k-society as ICT-economy and ICT-society),[16] the plan nevertheless incorporates topics such as knowledge and content production, the marketability of knowledge (k-society as science society and knowledge economy) as well as the closing of the digital divide and inclusion of all members of society into the ongoing developments (k-society as knowledge society). Overall the plan and its sub-reports sets high and rather impressive targets and definitely proves to be an enormous collective effort of state, economy and civil society players, supported by members of the scientific community and their expert knowledge. Nevertheless, the plan does not appear to be as visionary as it claims to be but rather builds on the existing vision of k-society in order to take an enormous step into an ICT- and knowledge-saturated future.

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[16] The four strategic thrusts are (IDA, 2006a: 8):

1. spearhead the transformation of key economic sectors, government and society through more sophisticated and innovative use of infocomm;
2. establish an ultra-high speed, pervasive, intelligent and trusted infocomm infrastructure;
3. develop a globally competitive infocomm industry; and
4. develop an infocomm-savvy workforce and globally competitive infocomm manpower.

The Singaporean ICT-society

eGovernment Action Plans

In May 1980, the Committee on National Computerisation (CNC) appoints the Civil Service Computerisation Group (CSCG) to study the needs of the civil service concerning ICTs. Ten study teams comprising 73 senior officers from the Computer Services Department and Management Services Department of the Ministry of Finance, the System & Computer Organisation of the Ministry of Defence and the remaining ministries formulate information system plans for 10 ministries. The CSCG integrates these plans and outlines a blueprint for the Civil Service Computerisation Programme (CSCP) (NCB, 1982: 1). The main objective of the CSCP at that time was to upgrade the efficiency and productivity of the civil service by installing information systems technology and applications in the ministries. The application of ICTs in the government administration clearly contributes to the construction of an ICT-society as k-society. Furthermore, the government activities shall result in spill-over effects into the private sector. According to Dr. Tan Chin Nam, "the Civil Service Computerisation Programme provided the basis to enable NCB to showcase that computers can be embraced to improve operations in the civil service" (Tan Ch. N., 02.03.05, interview with the author).[17] The conceptualisation as well as the implementation process is constantly monitored and adapted to current requirements by the leading staff of NCB. The CSCP, since its launch in 1980, evolves with every national IT plan until it is replaced by the first eGovernment Action Plan in 2000. Until then, NCB organises annual CSCP seminars, in order to discuss the implementation processes with representatives of economy and scientific community (NCB, 1984, 1985, 1987, 1992b).[18]

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[17] Most of the installed technologies are interactive systems using decentralised computing hardware, including 13 mainframe and 7 mini computers. Some of the most advanced systems shall be used in the fields of meteorology, as integrated land use data base and computer-aided dispatch system for police, fire and ambulance vehicles (NCB, 1982: 2).

[18] Interestingly, some of the keynote papers presented at these CSCP seminars by representatives of the civil service relate to theories originating in the scientific community, mainly the American academia, on computer development. Hence, it appears that the Singaporean civil service actually hears the knowledge produced by the scientific community and bases parts of its planning processes on it (NCB, 1987: 60-61). In 1987, for example, Dr. Tan Chin Nam, then General Manager of NCB analyses

The above mentioned difficulties due to heavy objections towards computerisation amongst the leading staff of the civil service were also confirmed by my informants. Philip Yeo, first Chairman of NCB, looks back to the beginning of ICT in Singapore:

> "They call me the father of IT in Singapore. But that's how it all came. The beginning was illegal: small business machines (SBMs) and intermediate business machines (IBMs). Why did I go through illegal channels? If I had applied for everything legally, I would never have got it!" (Ph. Yeo, 11.02.05, interview with the author).

Philip Yeo, who returned from Harvard University with a Masters in 1976, in the beginning chooses illegal channels to introduce the changes which he deemed necessary. In 1978, he becomes deputy secretary, and in 1979, Permanent Secretary in the Ministry of Defence. In 1981, he becomes the first chairman of NCB, is officially in charge of the computerisation of the whole civil service and heavily pushes it forward.[19] Hence, the beginnings

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the computerisation of the Singaporean civil service by using the picture of the third wave, which originally was drawn by Alvin Toffler. Dr. Tan Chin Nam outlines three waves of computerisation in Singapore (NCB, 1987: 57-60): (a) 1964-1981: civil service considered computing facilities as too expensive and only few were used centrally, with little interaction between management and data processing personnel, merely rudimentary data processing applications were implemented and "no respectable manager would get his hands dirty on computing"; (b) 1981-1987: formation of NCB, CSCP passed, implementing a technical infrastructure, building up of human infrastructure (computer staff); and (c) 1987-onwards: formulate new approach, manage advanced stages of computing, define a new blueprint for CSCP development. In 1989, the National University of Singapore (NUS) jointly organises a conference with NCB entitled "Information Technology and Singapore Society: Trends, Policies and Applications". At this conference, representatives of the state as well as the scientific community present their findings concerning future development in order to contribute to future policy planning (NUS, 1989).

[19] The Director of Temasek Laboratories describes the time before NCB was founded: "Before NCB was founded, it was very hard for many of us who wanted to promote computers. It was not commonly appreciated at that time. Many departments in the government service were not ready for change. Yet, the young people who came back from the UK, USA and Australia after graduating with Bachelors, Masters or PhDs saw the need for change" (Lim H., 17.02.05, interview with the author). After obtaining his PhD in Reading/UK, Lim Hock worked for the meteorological service in the former Ministry of Communication. He describes: "My boss was not convinced of the benefit, or even necessity of computing, but after a while he could not resist my pestering and he granted me SGD$1000 p.a. to buy computer time. So in the first year, I used the money to develop a programme for collecting,

of computerisation in Singapore were characterised by the struggle of few frontrunners against the resistance of the leading staff of the civil service at that time. Yet, Singapore was very young with a small tertiary educated class. With education highly valued, the government annually sent few students abroad for their studies. After their return they had to serve in the government service for a certain number of years. Hence, these young scholars came back with new ideas and were given the positions in the government service to actually work towards implementing their ideas; meaning to implement change. One of these changes was the rather early computerisation of the civil service.

In 2000, the successor of the "Civil Service Computerisation Programme", the first "eGovernment Action Plan" is launched. With SGD$1.5b, Singapore's government aims at becoming a leading eGovernment in the global k-society. As its predecessor, the "eGovernment Action Plan" subscribes to the importance of applying ICT for a k-society. Hence, it contributes to the construction of an ICT-society as type of k-society. The eGovernment strategic framework centres around three relationships: (a) government-to-citizens (G2C); (b) government-to-businesses (G2B); and (c) government-to-employees (G2E). This as well as the five strategic thrusts and six programmes are illustrated in diagram 9-5[20].

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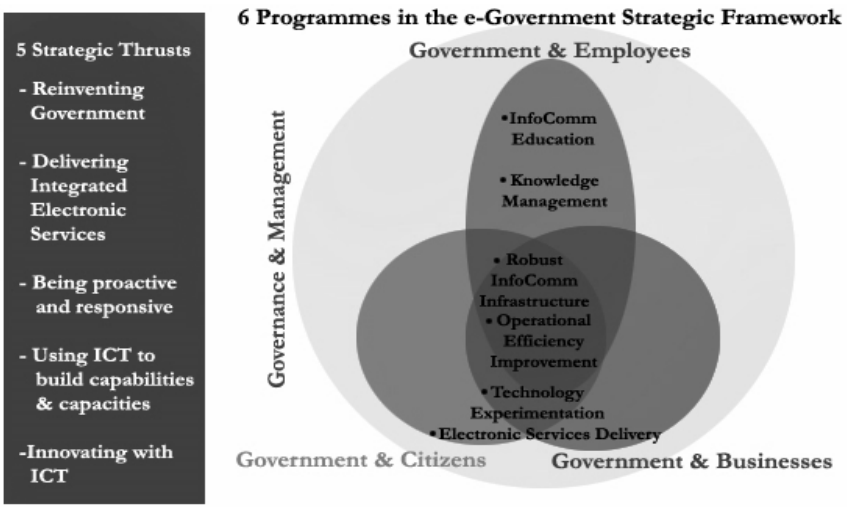
checking and archiving all the upper-air weather data of the last year. Before, the printing of the data book had sometimes taken a whole year, but now I had it all ready by February! So everybody was impressed! And then they increased my computer time budget from SGD$1000 p.a. to SGD$3000 p.a. and made me produce all these data books. It was very boring but it was perfect to illustrate the potential of computers to them." Referring to the founding of NCB, he states: "Then the government realised that computerisation of the public service needs to be pushed. That's when they formed NCB."

[20] As five strategic thrusts, the plan states: (1) reinventing government; (2) delivering integrated electronic services; (3) being proactive and responsive; (4) using ICT to build capabilities and capacities; and (5) innovating with ICT. These shall be achieved through six programmes: (1) infocomm education; (2) knowledge management; (3) robust infocomm infrastructure; (4) operational efficiency improvement; (5) technology experimentation; and (6) electronic service delivery.

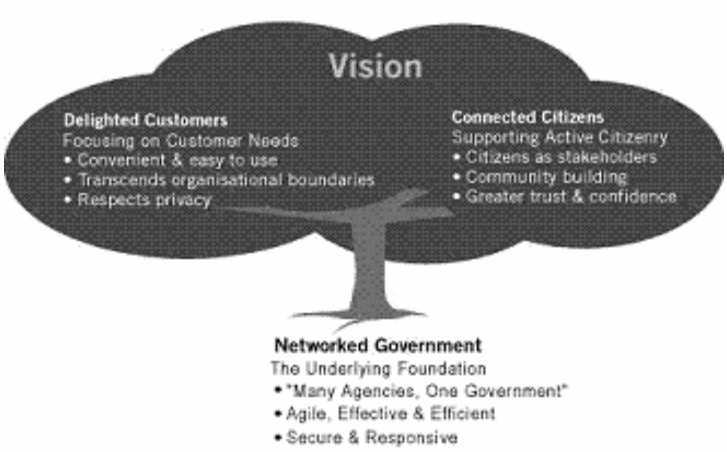
Diagram 9-5: eGovernment Action Plan 2000 – 2003



Source: IDA/Chua, 2006: 12.

This eGovernment Action Plan from 2000 is superseded by the second eGovernment action plan, published in 2003. It is the aim of this action plan to actively contribute to the creation of an eLifestyle that shall prevail in Singapore by 2006. Part of this eLifestyle shall be that individuals and businesses transact online with the government in all aspects of everyday, professional and private life. Citizens are, in this plan, regarded as customers of the public service, which in itself shall have developed into "a networked government, that delivers accessible, integrated and value-adding eServices" by 2006. Diagram 9-6 illustrates the three main aims as well as their mutual reliance:

Diagram 9-6: eGovernment Action Plan 2003 – 2006



Source: IDA/Chua, 2006: 13

As its main aims, the plan gears towards producing (a) delighted customers; (b) connected citizens; and (c) networked government.[21] As its predecessors, it clearly defines k-society as ICT-society.

Masterplans for IT in Education

Align with IT2000, the Ministry of Education (MOE) releases its first "Masterplan for IT in Education" on 28 April 1997. In order to assure the applicability of it, IT2000-planers are involved in the planning process.[22]

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[21] Delighted customers shall be achieved by providing them with easy to use facilities, transcend organisational boundaries and respect of individual privacy. Connected citizens shall be fostered by including them into eGovernment-endeavours as stakeholders, building active and interlinked communities and by contributing to a culture of trust into eGovernment services. The networked government is in the diagram regarded as the base of the whole eGovernment project. It is based on the principle "many agencies, one government", hence a very centralised approach.

[22] This is described by the Director of Educational Technology in the Ministry of Education: "IT2000 and the Masterplan I for IT in Education are fully aligned, because people who constructed IT2000 from NCB all had a hand in constructing

The SGD$2b masterplan aims to use ICTs for innovative, internationally orientated and technology-based education.[23] The overall aim of the masterplan is therefore the application of ICTs in education. Hence the inherent definition of k-society is clearly k-society as ICT-society. The goals of the masterplan are achieved in several phases by the year 2002. In general, the masterplan as well as its implementation is criticised positively by the media. Nevertheless, MOE is aware of the fact that k-society cannot merely be defined by the application of ICTs but that instead the production, usage and transmission of knowledge become increasingly important. When asked about the contribution of the masterplan to the Singaporean k-society, the Director of Educational Technology in MOE states:

> "I suppose Masterplan I is one of the main contributors. But KBE is not purely IT driven. IT is a basic requirement, something that you need but it is not sufficient. More limiting factors are cultural factors. You need to transfer people from a less knowledge-based to a more knowledge-based economy and that takes a lot of time. Infrastructure is very easy for us to build but to get people to use it and let it become part of their lives takes longer time" (Koh Th. S., 30.03.05, interview with the author).

This awareness finds expression in the second "Masterplan for IT in Education", launched in July 2002, two months after the publishing of "Infocomm21". As its predecessor, "Masterplan II for IT in Education" aims at the effective application of ICTs in education, learning and teaching. Its approach addresses the curriculum, assessment, instruction, professional development, pupil learning and school culture. The plan envisions that ICTs will be pervasively used as tools to customise education and develop lifelong learners. This shall contribute to Singapore's vision of thinking schools and a

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Masterplan I for IT in Education as well" (Koh Th. S., 30.03.05, interview with the author).

[23] The following four goals shall be achieved by 2002 (MOE, 1997):

1. Enhance linkages between the school and the world around it: increase cooperation between schools, institutions and companies;
2. generate innovative processes in education: developing new teaching and learning strategies that open new possibilities for curricula and assessment;
3. enhance creative thinking, lifelong learning and social responsibility: develop pupils' ability to think flexibly and innovatively, cooperate with one another and make independent judgments by increasingly using IT-based learning strategies;
4. promote administrative and management excellence in the education system: increase efficiency in administration, communication and educational management by using IT.

learning nation (MOE, 2002).[24] It is supposed to run until 2007. Until then, it accompanies the nations aim to develop into a k-society by equipping pupils with the required ICT-knowledge, using ICTs for creative thinking and more efficient learning. It therefore clearly contributes to an ICT-society as type of k-society. According to the Director of the Educational Technology Division, Dr. Koh Thiam Seng, the vision of a k-society results in Singapore in numerous blueprints, masterplans and initiatives in all involved sectors, all working towards this one vision (in an interview with the author on 30.03.05). A central approach as such, is not possible in all countries, certainly not in a decentralised system as in Germany. Yet, in a centralised city-state such as Singapore it is possible. The aspects of k-society that can be planned and created top-down, such as the creation of an ICT infrastructure and legal infrastructure, will especially benefit from it.

The Singaporean Science Society

In the late 1980s in Singapore, a shift from focusing on merely manufacturing to inventing and designing took place, as described in more detail in chapter 4, section 4.3. This change seems to originate from the first recession after independence that hit Singapore in 1985/86. At that time, the government installed the Economic Review Committee in order to formulate recommendations for strategically positioning Singapore's economy in the world economy. In its report, the committee clearly states the necessity for Singapore's economy to diversify and increase the depth of the existing economic sectors. The document furthermore looks at other developed economies and assesses that most industrialised countries invest more than 2% of their GDPs into research and development (R&D). In Singapore, R&D investments in 1990 only amount up to 0.85% of GDP (A*STAR, 2004: 26). In the visionary document "The Next Lap" (Singapore Professional Centre, 1991), the government formulates the aim to reach the Swiss standard of living by 2000 and therefore further enhances the aim to develop its economy in a

[24] The following aims are formulated in the plan:
1. pupils use IT effectively for active learning;
2. curriculum, instruction and assessment are enhanced using IT;
3. teachers use IT effectively for professional and personal growth;
4. schools have the capacity and capability in using IT for school improvement;
5. research on IT in education is conducted;
6. a widespread use of IT is supported by the appropriate infrastructure.

sustainable and long-term fashion. It results in a stronger focus of government activities on R&D in diverse fields of knowledge production (defining k-society as science society and knowledge economy), the raising of the educational level in society (k-society as knowledge society), increasing innovativeness and creativity as well as the commercial exploitation of the arts (k-society as creative economy and knowledge economy).

In 1991, the government of Singapore founds the National Science and Technology Board (NSTB), which is renamed into Agency for Science, Technology and Research (A*STAR) in 2001. A*STAR is a statutory board of the government under the Ministry of Trade and Industry, which oversees altogether 12 research institutes. Today's chairman of A*STAR and co-chairman of EDB describes the beginning of A*STAR as follows:

> "Our economy went through many different stages. We started in 1965 at high unemployment and worked ourselves up to full employment. We started with manufacturing industry, low-skill, labour-intensive, then steel and cotton industry, then chemical industry, then microchip and semi-conductor industry, then knowledge based industry. Knowledge is the key and the most important in knowledge is education, especially higher education" (Ph. Yeo, 11.02.05, interview with the author).

According to A*STAR's website, the board's goal is "knowledge creation and exploitation of scientific discoveries for a better world" (A*STAR, 2006). This shall be achieved by focusing on biomedical as well as engineering and science research in its research institutes (Toh/Tang, 2002). A*STAR's endeavour is clearly based on a definition of k-society as a science society, in other words, a society in which scientific knowledge becomes increasingly important. Yet, A*STAR's focus on economical, marketable knowledge also defines k-society as knowledge economy.

A*STAR regards itself as representing "today's research scientists and future generation of aspiring scientist who dare to race with the world's best towards the very limits of modern science". A*STAR comprises five main pillars: (1) the Biomedical Research Council (BMRC); (2) the Science and Engineering Research Council (SERC); (3) Exploit Technologies Pte Ltd (ETPL); (4) the A*STAR Graduate Academy (A*GA); and (5) the Corporate Planning and Administration Division (CPAD).[25] When the present chairman

[25] The Biomedical Research Council and the Science and Engineering Research Council promote, support and oversee the public sector R&D of Singapore. While BMRC oversees 5 research institutes, SERC supports 7 of the 12 research institutes of A*STAR. All of these institutes focus on R&D in Science, Engineering and Biomedical Science. Exploit Technologies Pte Ltd manages the intellectual property

joined the board in 2001, he changed the boards name from National Science and Technology Board to Agency for Science, Technology and Research (A*STAR). He explains:

> "In Singapore from the age of 6/7 to 11/12 years, the primary school kids only take English, Maths, Science and Mandarin, Malay or Tamil. Only four subjects, which is the reason why Singaporeans are good in Maths and Science. At the age of 12, they take the national primary school leaving examination and the highest mark for each subject is A*STAR. So I when I took charge of National Science and Technology Board (NSTB) in Feb 2001, I changed the name from NSTB to the Agency for Science, Technology and Research (A*STAR). Because the kids who get A*STAR are going to top secondary schools in Singapore and if they again get A*STAR they will get overseas scholarships and go to top universities. This exam at primary 6 is the most important exam of a kid. So Singaporeans are very oriented towards these exams. It is very good marketing because school kids in Singapore understand the name. If you get A*STAR, you are the best" (Ph. Yeo, 11.02.05, interview with the author).

This description of the change in name illustrates A*STAR's as well as Singapore's urge towards the top, for being the best, and achieving this within a short time frame. This drive also influences which knowledge production is mainly supported. A*STAR wants to contribute to Singapore's economy not only in the far future but as of today. Hence, the R&D conducted is mainly applied research, oriented along the requirements of the industry. When the board was formed, it was originally planned to support applied as well as basic research, in order to contribute to long-term growth. Nevertheless, the majority of research conducted by A*STAR institutes today aims at contributing directly to Singapore's economy.[26] The board states on its website: "Together with scientists we will build up our intellectual capital and our scientific capabilities. That will boost the economic competitiveness of Singapore." The following two diagrams are used by A*STAR to illustrate the potential of R&D conducted in its institutes for strengthening the key industry clusters of Singapore. SERC emphasises its focus "on fields essential

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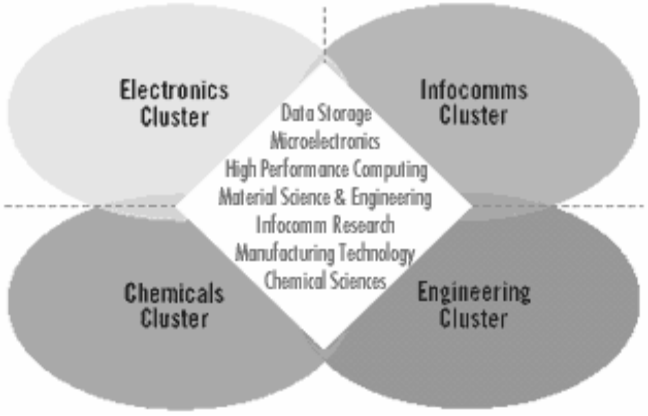
created by the research institutes and facilitates the transfer of technology from the research institutes to the industry. The A*STAR Graduate Academy is responsible for human capital development by promoting science scholarships and other manpower development programmes or initiatives. The Corporate Planning and Administration Division supports the other four organisational entities concerning administrative tasks such as finance, human resource, corporate policy and planning, corporate communications, legal, information technology and audit.

[26] This is discussed in detail in chapter 4, section 4.2.

to Singapore's manufacturing industry (especially electronics, ICTs, chemicals and precision engineering)".

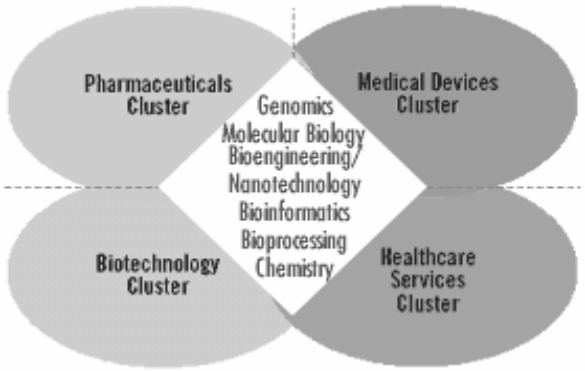
Diagram 9-7: SERC R&D-Efforts Strengthening Singapore's Key Industry



Source: A*STAR, 2006.

BMRC on the other hand aims at industry clusters that are still developing their potential. This is especially the case with the biotechnology cluster. Hence, the research requirements of these sectors are broader and the research conducted involves far more basic research than in the other sectors supported by SERC.

Diagram 9-8: BMRC R&D-Efforts Strengthening Singapore's Biomedical Industry



Source: A*STAR, 2006.

The sudden increase of R&D investments from 1990 onwards did not lead in all sectors to immediate economic growth which again resulted in criticism concerning the investments into R&D. These investments and R&D initiatives in the beginning mainly focused on ICTs. Due to low pay-off rates, the Singapore government in the late 1990s identified biomedicine, life sciences, pharmaceuticals and healthcare services as future, profitable research fields. Along the cluster theory of Michael E. Porter (1990, 1998), Singapore wants to develop several economic pillars, fuelled with high-technology R&D investments. This change in focus from ICTs to life sciences is described by the former Member of Parliament, Wang Kai Yuen as follows:

> "If you go through the records of A*STAR-funding, you can see, that up to five years ago, investment has been put mainly in IT and then, 5 years ago, it suddenly came to a flip over and most of it has been put into life sciences, because the IT-R&D did not yield the expected results" (Wang K. Y., 12.04.2005, interview with the author).

Concerning the current investments into life sciences, he is not certain whether they will actually contribute to economic growth as hoped for. He explains:

> "Life sciences will yield better results than the money spent on IT. But having said that, it may not contribute too much to economy either. Because there is a current debate in parliament, which says, that to produce one life science researcher in Singapore, our A*STAR-scholarship for one person

> includes SGD$1m. We are funding 40, so that is SGD$40m. So you need a lot of money to fund researchers in the life sciences and they won't be ready until 8 – 10 years later."

As expressed in this statement, the choice made by Singapore to diversify its economy and invest into knowledge production in order to build up various economic clusters that will assure sustainable long-term development requires time. It stands in direct opposition to the fast-track development path, taken by Singapore in the 1960s and 70s. Therefore, if successful, it might contribute to a more reliable and long-lasting wealth.

The push for development in bio and life sciences, which strongly contributes to a k-society definition as science society, was further enhanced by the construction of Biopolis, beginning in 2001 and financed by the Singaporean government with Sin$500m. Biopolis is a biomedical research hub, similar to an industrial park that offers home to approximately 2000 research scientists working in the fields of bio and life sciences for private and public research entities.[27] Besides office buildings and laboratories, Biopolis houses canteens, coffee shops and wine bars that enable researchers with diverse backgrounds, working in different fields and on multiple topics to meet, discuss and possibly develop new ideas. This infrastructure shall provide a fertile ground for a creative and innovative work atmosphere, produce synergies and lead to future ideas. It shall become the life science brain pool of Singapore. Philip Yeo, chairman of A*STAR describes the decision to build Biopolis by referring to the hoped for critical mass:

> "I became chairman of A*STAR in February 2001 and said, I want to do something where we put everybody together. Everybody together, it will become a critical mass. So I (illegally) built Biopolis" (Ph. Yeo, 11.02.05, interview with the author).

Besides creating a critical mass through the long process of training own research scientists by sending them overseas on A*STAR-scholarships, the research institutes of A*STAR heavily attract so-called foreign talents.

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[27] Biopolis is part of Fusionpolis, which is split into Vista X-Change (centre for private-public-partnership and industry development, financial and business services), Central X-Change (centre for ICTs, media and education industries) and Life X-Change (Biopolis). Together these three form Fusionpolis, which is described as "Singapore's icon of the knowledge economy where talents gravitate naturally and where diverse ideas thrive. With a focus on knowledge intensive activities in critical growth sectors, one-north would provide an intellectually stimulating and creative physical environment for entrepreneurs, scientists and researchers to congregate, interact and exchange ideas" (JTC Corporation, 20.02.2003).

Together with the local scientists, as well as employees of international research entities, hopes are pinned on these foreign talents to contribute to the critical mass, evolving in Biopolis. The executive director of the Genome Institute of Singapore describes this endeavour:

> "The most important thing that we can do in Singapore is to attract and to retain global talent. It is not just jobs, money or the resources, but the environment. The question why people like myself or many others in Biopolis come to Singapore? It is because the environment is conducive for what we want to do. Certainly, Singapore is safe, is clean, things work, people speak English, and it is a delightful living environment. But that is not the only reason. None of these aspects are the single most important reason, but together they form an environment that is ideal! It is a system that if you take one element away, the attraction may not be there! So part of our responsibility here is to provide that environment which also means that there are people who are very good, who are excited about working here, that we are doing first class research! Success breeds success and intelligent people like to be with other intelligent and successful people" (E. T. Liu, 04.02.05, interview with the author).

Growing your own and attracting foreign research scientists to Singapore and keeping them there is a time and cost intensive project. Building up from scratch high-ranking research and development centres, research hubs and fostering a 'critical mass' within a relatively short time appears hardly possible. Nevertheless, Singapore's government embarked on it in the name of a better future. Whether these projects will pay-off and lead to the pursued sustainable, long-term growth, remains to be seen. But the dauntlessness driven by a vision to do so is rather remarkable. Nevertheless, it is also criticised within the government administration itself. A deputy director of NLB remarks:

> "The government may not be fully able to realise the short-term return on investment in the research infrastructure (hardware and software) in Biopolis. It is very futuristic and requires certain conditions for it to happen. The Biopolis initiative shows that we are not risk averse. Knowledge investment, like any other investment is a risk that must be borne by governments" (J. Paul, 28.02.05, interview with the author).

The Singaporean Knowledge Society

Additional to the highly specialised R&D-development pursued by A*STAR, the government identified in the early 1990s, a need to raise the general level of education and creativity of Singapore's population. Conse-

quently, improving the nation's library system becomes a government priority. In June 1992, the Minister for Information and the Arts, then BG George Yeo, appoints the Library 2000 Review Committee in order to undertake a comprehensive review of library services in Singapore. The committee is chaired by Dr. Tan Chin Nam, then chairman of NCB and managing director of EDB. Based on this review, the committee is asked to formulate recommendations on how to improve the library system in order to serve the needs of Singapore's citizens. According to the committee, it approached the review by asking itself, what would the roles of libraries be like in 'the next lap' (Library 2000 Review Committee, 1994)? The conclusion drawn is to position the libraries as an integral part of the national system supporting Singapore as a learning nation. Hence, the inherent definition of k-society regards it as state of society in which every member of society shall have access to knowledge as well as ICTs and therewith the possibility to use, transmit and further knowledge. In these government programmes, k-society is defined as knowledge society. The committee argues in the letter of submission from the committee to the Minister for Information and the Arts on 15.02.1994:

> "We must expand Singapore's capacity to learn faster and apply the knowledge better than other nations. This differential lead in our learning capacity will be crucial to our long-term national competitiveness in the global economy where both nations as well as firms compete with each other on the basis of information and knowledge" (Library 2000 Review Committee to Minister for Information and the Arts, 15.02.1994).

Besides placing the work of the committee into the vision of the government document "The Next Lap", as indicated above, the committee also builds on the national information infrastructure (NII) that shall be developed according to the IT2000-report, published by NCB. The NII shall link all libraries and therefore enable them as digital access points for information and knowledge. On 15 February 1994, the Library 2000 Review Committee submits its report to the Minister for Information and the Arts, entitled "Library 2000: Investing in a Learning Nation (L2000)". In the report, the committee defines the tasks of the libraries in Singapore's future as:

> "to continuously expand the nation's capacity to learn through a national network of libraries and information resource centres providing services and learning opportunities to support the advancement of Singapore" (Library 2000 Review Committee, 1994: 5).

In order to realise this vision, the committee lists six strategic thrusts and three key enablers, as listed in Appendix Y. On 16 March 1995, the Parliament of Singapore passes the bill to establish the National Library Board

(NLB) from 01 September 1995 onwards. The board immediately starts with the implementation of "Library 2000 – Investing in a Learning Nation" under its first chief executive, Christopher Chia. Christopher Chia, similar to Tan Chin Nam and Philip Yeo formerly worked for NCB. He epitomises the civil servant that is increasingly called 'technopreneur' in Singapore. Under his leadership, "Library 2000" is rapidly implemented. Dr. Tan Chin Nam, chairman of the Library 2000 Review Committee describes the implementation approach taken by NLB:

> "We wanted rapid prototyping and the ability to transplant experience gained from renovating or building one library to the renovation or building of another. We said that we will try things; if they work, we will quickly enhance and spread them around. If they don't, we will retire them and look for alternatives" (Tan Ch. N. qtd. in Hallowell/Knoop/Neo, 2001: 3).

In 2005, NLB summarises its achievements in terms of the expansion of the library system in the last ten years as shown in the table below.

Table 9-3: Expansion of Library System between 1994 and 2004

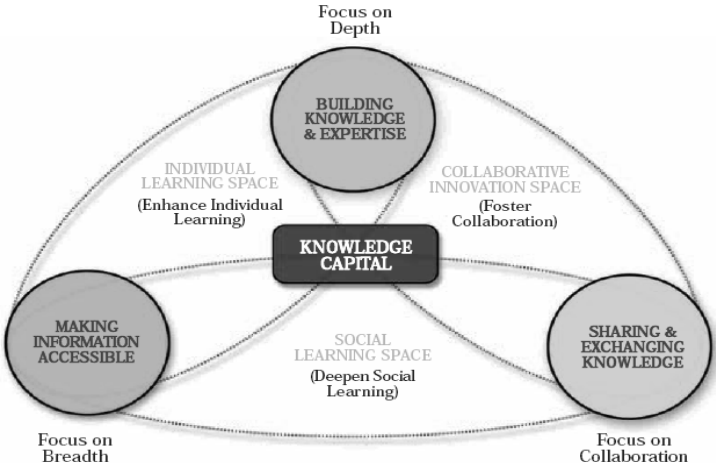
	In 1994	In 2004
No. of Libraries	15	73
Collection Size	3.4 million	8 million
Library Visits	5.5 million	31 million
Active Membership	500,000	1.1 million
Loans	10 million	27 million
Enquiries	186,000	2.3 million
Online Retrievals	0	4.7 million
Currency of Books	12 years	4 years

Source: NLB, 2005: 2.

In order to push this development further, integrate libraries as centres of knowledge sharing and creativity into the lives of the citizens and hence contribute to Singapore as a k-society, NLB publishes in May 2005 "Library 2010" (L2010). Here, NLB states its mission as expanding "the learning capacity of the nation as to enhance national competitiveness and to promote a gracious society" (NLB, 2005: 1). "L2010" analyses the progress

made by "L2000", and identifies the development into a learning society as the current need of Singapore's society.[28] Overall, the report assesses that Singapore requires a new knowledge framework which entails (a) making information accessible; (b) building knowledge and expertise; and (c) sharing and exchanging knowledge. Therefore, the library system of Singapore aims to (a) enhance individual learning; (b) foster collaboration; and (c) deepen social learning in the next 5 years. These three aims are based on the assumptions that there are three main means, by which people gain and use knowledge in society: (a) information – knowledge embedded in information or knowledge artefacts, such as books, websites and databases; (b) knowledge & expertise – knowledge embedded in people, in their competencies and experience; and (c) shared knowledge – such as the ability of a team to solve problems quickly and effectively (NLB, 2005: 16). These three main thrusts of "L2010" as well as their intended contributions to a new knowledge framework are illustrated in diagram 9-9.

Diagram 9-9: L2010 – Building Knowledge Capital



Source: NLB, 2005: 21.

[28] According to the report, libraries can contribute to k-society by supporting the following areas: (a) basic and applied R&D; (b) knowledge creation; (c) knowledge export; (d) knowledge acquisition; and (e) knowledge application.

The report concludes, that "the confluence of these activities, namely making information readily accessible, building content, sharing and exchanging knowledge, will help create knowledge capital from which dividends will readily flow back to the society and nation" (NLB, 2005: 21). Public libraries shall be developed into the third most important place in the lives of Singaporeans, besides home and work. They shall no longer just be centres of knowledge transfer, for life styling and spending leisure time but instead, they shall emerge as centres of discussion, interaction, cooperation; centres of social capital production. Social capital is identified by the Singaporean government as the key to innovation, "the hidden potential of society", which is required for Singapore's economic survival (NLB, 2005: 23). That social capital is closely connected to critical thinking, and innovation to change, is taken into account and accepted. As long as change is necessary in order to survive economically as well as in the case of the People's Action Party (PAP) politically, it seems to be accepted.

While the report mentions five goals[29] as well as implementing steps[30], the overall aim is clearly the creation of a new knowledge framework for Singapore based on libraries as social and communal centres, as incubators for social capital. Whether this can be achieved, remains to be seen, since it requires the input of the people rather than merely the infrastructure in the shape of a vast library network. Nevertheless, it has to be pointed out that the developing of the required infrastructure is advanced in a very straight forward and clever way. While initiatives like Biopolis, A*STAR or the "Creative Industries Development Strategy" focus on the development of certain clusters and economic sectors, "L2000" and "L2010" aim at raising the general level of education, creativity as well as social capital of Singapore's society.

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[29] As specific goals, the report mentions the following five (NLB, 2005: 24):

1. NLB being recognised as a first stop for Asian content and collection services;
2. a vibrant network of public libraries that are transformed into social learning spaces;
3. learning communities that are self-sustaining and self-renewing;
4. information and knowledge services that power a competitive economy;
5. a supportive environment for library, information and knowledge management professionals.

[30] These goals shall be reached by implementing 5 steps:

1. building a network of knowledge assets and make them accessible;
2. leveraging on technology, especially in support of collaboration;
3. organising around the customer communities to serve them better;
4. expanding the professional competencies;
5. measuring the impact to ensure continuing value and relevance.

Therefore, they establish Singapore's library system as a social integrator in the Singaporean k-society. This very inclusive character of "L2000" and "L2010", aiming at all members of society stands for a definition of k-society as a knowledge society, a society in which every citizen takes part in the consumption, transmission and production of knowledge. The present chief executive of NLB describes the functions of the library system in Singapore's society:

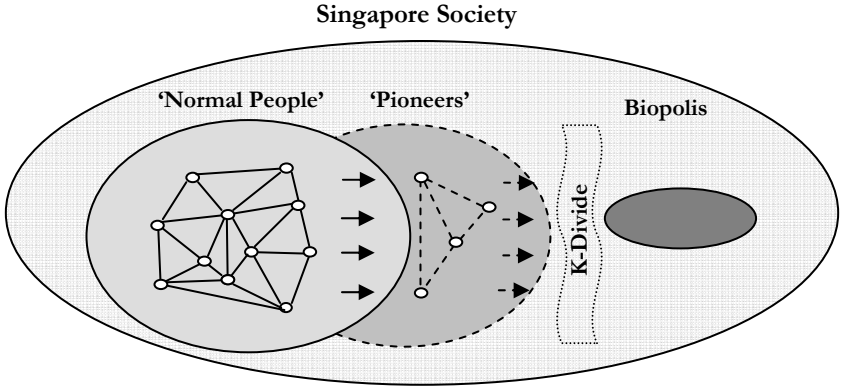
> "L2000 and L2010 raise the general educational and response level of society by building the capacity to learn and adapt. NLB and its library network bridges social divide and support the bottom of society to cope in the KBE. It supports all social classes, but it also prevents the gap when the top takes off, leaving the rest behind." (N. Varaprasad, 11.02.05, interview with the author).[31]

While projects such as Biopolis and "Library 2000" both illustrate the change in focus of the Singaporean government on merely the ICT infrastructure and applications (ICT-economy and ICT-society) to the production of knowledge (science society, knowledge economy, knowledge society), they focus on very different social and economic growth areas. The deputy director of Information Services of NLB sees Biopolis in comparison to the aims of "L2000" and "L2010" rather critically. He states, while drawing diagram 9-10:

> "The private-public investment into Biopolis is a lot of money, but it can result in a knowledge divide in Singapore and [NLB] needs to balance that out. So there is the high-end research in Biopolis which may not have any relevance to the lay man or entrepreneur in the street. […] So it becomes all the more important that we proactively connect both ends of society so that they would at least have the opportunity to interact and exchange knowledge. Some of them, maybe some product designer from an SME, might produce knowledge over here [outside the circle]. And we hope that the rest of the society connects to them and then slowly migrates to Biopolis or at least closer" (J. Paul, 28.02.05, interview with the author).

[31] Later on in the interview, he states: "'L2000' and 'L2010' contribute to KBE since they enable the people to actually live the idea of life-long learning. Life-long learning for the ordinary person is only possible if there is a vast and extensive library network accessible to everyone."

Diagram 9-10: Knowledge Divide, Exchange and Divide Closure



The Singaporean library system is oriented towards the integration of the whole society into k-society by raising the level of education and enabling people to become pioneers of k-society him/herself, rather than towards the development of one economic cluster, which involves high-end R&D and foreign talents.[32] Despite this impression of two directly opposing approaches (knowledge society versus science society), both contribute to the local production of knowledge as well as to a Singaporean k-society.

Nevertheless, this aim of raising the general level of education, creativity and social capital in society and especially the role of "L2000" and "L2010" in this process have drawn scepticism. One of my informants, the former director of Xerox Singapore Software Centre and Member of Parliament for the People's Action Party until April 2006 regards the role of "L2000" and "L2010" in this process as peripheral. Asked whether the two action programmes will raise the level of creativity in society, he replies:

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[32] The Chief Executive of the National Library Board explains this as follows: "NLB, L2000 and L2010 contribute to the KBE of Singapore, the creative industries, the R&D and all other cluster areas that shall and will be developed. NLB only contributes to them mostly indirectly, not directly. These cluster developments are more supported and catered for by the universities and research institutions. However, NLB has several components – public, reference, national and digital libraries – so we also able to support the overall development of the KBE both directly and indirectly. We aim to give the population the same level playing field as the specialists" (N. Varaprasad, 11.02.05, interview with the author).

> "They may or may not. I think it depends a whole lot on our primary and secondary school education. If we don't change the school system and the curricula, I don't think the peripheral activities like L2000 or L2010 can change the tone of creativity in Singapore" (Wang K. Y., 12.04.05, interview with the author).

No matter whether the level of creativity is in the end raised by primary and secondary school education or the extensive library network, it remains to be said, that it is the people who have to actually be creative. And this cannot be forced upon them. Nevertheless, an inspiring infrastructure that is created at an enormous speed in Singapore can help people to find and outlive their creativity.

The Singaporean Creative Economy

As Kwok and Low point out, Singapore's government did not make any distinct attempts to develop an overall long-term cultural policy up to the mid 1980s (Kwok/Low, 2001: 150). The few existing cultural and art activities focused on the attraction of tourism and the generation of income. Arts for its own sake hardly existed. Kong and Yeoh explain this as follows:

> "[F]rom independence until the late 1970s (some would argue into the mid-1980s), landscapes of the arts were conspicuous by their absence because the arts were accorded low priority, given the view that scarce national resources should be diverted to develop Singapore's fledgling economy, reflecting the ideology of pragmatism and survival" (Kong/Yeoh, 2003: 174).

According to Lee, the term 'cultural policy' finds its first official mention in Singapore's political sphere on 26 December 1978. On that day, then Minister of Culture, Ong Teng Cheong uses the term in a press release, referring to the protection of cultural heritage in order to provide younger generations with cultural depth, traditional norms and values (Lee, 2004: 285-286; Ong, 1978: 1). Aspects of arts and cultural expressions creating contemporary culture only began to play a role in government policy of Singapore, after they were identified as future growth areas by the Economic Review Committee in 1986. In February 1988, the government of Singapore appoints the Advisory Council on Culture and the Arts (ACCA), chaired by Ong Teng Cheong, in order to formulate recommendations on how to boost arts and culture as future growth sector in Singapore. In the "Ong Teng Cheong Report", as it is frequently named, published in April 1989, the ACCA assesses the state of the arts and culture in Singapore as well as formulates measures for creating a culturally vibrant Singapore (ACCA, 1989). The report includes

multiple recommendations aiming at the shaping of the cultural landscape of Singapore. As such it recognises the necessity to establish a new agency which spearheads the development of the arts in Singapore, the creation of a museum complex in the central civic district and the construction of a performing arts centre at Marina Bay (ACCA, 1989: 5-6). Furthermore, it recommends the establishment of a Literature Board, a National Heritage Trust, improvements to arts education in schools as well as to cultural facilities and an increase of promotional efforts for the arts (through public-private-partnerships). Following these recommendations, the Ministry of Information and the Arts (MITA), today MICA, is founded in 1990. Furthermore in the same year, the construction of "The Esplanade" is announced by the government as a multimillion-dollar arts venue. As further coordinating and planning bodies, the National Arts Council (NAC) as well as the National Heritage Board (NHB) are established in 1991 and 1993, respectively. While it is the task of NAC to raise the interest of the general public in arts and cultural activities, NHB oversees the development of a museum scene, the preservation of cultural heritage as well as archival record keeping. The report can be regarded as the beginning and first blueprint of a Singaporean cultural policy (Lee, 2004: 286). Yet, the following efforts were mainly designed as "money spinning blockbuster performances" (Lee, 2004: 288). Until today, most performances are conducted by foreign, not local theatre groups; most plays are written by foreign authors and only rarely narrate Singaporean stories.

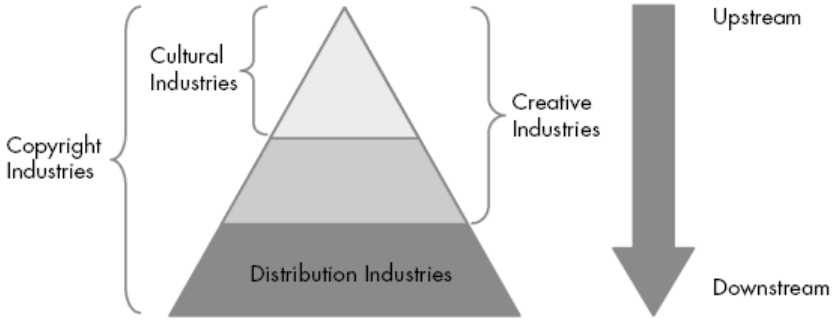
In 1995, the Ministry of Information and the Arts (MITA) publishes together with the Singapore Tourist Promotion Board (STPB) a document entitled "Singapore: Global City of the Arts". This policy document has to be regarded as an economic policy initiative that – as expressed by then Minister for Information and the Arts George Yeo – "hopes to do for the arts what it has done for banking, finance, manufacturing and commerce, and help create new ideas, opportunities and wealth" (G. Yeo qtd. in Kwok/Low, 2001: 152). It therefore re-affirms the already existing focus on arts and culture as potential economic sector rather than for its own sake (Lee, 2004: 288) and clearly defines this part of k-society as creative economy. In March 2000, MITA publishes the cultural policy document "Renaissance City Report: Culture and the Arts in Renaissance Singapore" (MITA, 2000). The report aims at the development of Singapore into a cultural capital of the twenty-first century and clearly emphasises the goal of developing Singapore into a global cultural hub that can compare itself with other cultural capitals worldwide, like London, New York or Paris. The "Renaissance City Report" assesses that Singa-

pore has successfully developed the institutional infrastructure for a vibrant culture and arts scene, including the above mentioned MITA, NAC and NHB. Yet, the report sees the future task in emphasising 'soft' aspects, meaning the support of the local cultural, theatre and arts scene. Nevertheless, as pointed out by Lee, this interest in developing the culture and arts scene does not go back to an interest in arts from an artistic standpoint but is more "attuned to the economic activity and political longevity of Singapore in an increasingly competitive global era" (Lee, 2004: 290). Kong talks of the "hegemony of the economic" in Singapore's cultural policy (Kong, 2000).

The beginning of the 21st century is nevertheless influenced by economic recession, which again is faced by the Singaporean government with establishing an Economic Review Committee (ERC). The ERC analyses the current situation and future potential growth areas of Singapore's economy. Within the ERC subcommittee 'Service Industry' the Workgroup on Creative Industries outlines the "Creative Industries Development Strategy" and publishes it in September 2002 (Workgroup on Creative Industries, 2002). According to the strategy, 'creative industries' can be defined as "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property."[33] The strategy aims for the development of creative industries as a 'creative cluster', which goes back to Florida's book "The Rise of the Creative Class" (Florida, 2002). Florida reasons that creative people have become the decisive source of competitive advantage in contemporary economy and society. Hence, businesses locate in places where clusters of creative people exist. Florida states: "A class is a cluster of people who have common interests and tend to think, feel and behave similarly, but these similarities are fundamentally determined by economic function – by the kind of work they do for a living. All other distinctions follow from that" (Florida, 2002: 8). The "Creative Industries Development Strategy" identifies three approaches to defining the scope of the creative cluster in Singapore: (a) the cultural industries; (b) the creative industries; and (c) the copyright industries. Together they form the creative cluster and mutually build on each other as shown in the diagram below.

[33] This definition is borrowed from the UK Creative Industries Taskforce (UK Creative Industries Taskforce, 1998).

Diagram 9-11: Composition of the Creative Cluster



Source: Toh/Choo/Ho, 2003: 52.

Nevertheless, the creative industries are regarded as main driver of the cluster. Here, Singapore's government distinguishes between basic (upstream) and applied (downstream) arts. Upstream arts refer to traditional arts such as performing, literary and visual arts. In opposition to this downstream arts refer to advertising, design, publishing and media-related activities. Upstream arts bear a commercial value in themselves, while downstream arts merely gain economic value when applied in other economic sectors (Toh/Choo/Ho, 2003: 52). Based on this analysis, the strategy aims to foster the development of the creative industries that will then further the whole creative cluster. In order to foster up and downstream arts, the Workgroup on Creative Industries of the Economic Review Committee formulates three blueprints focusing on arts and culture, design and the media industries (Workgroup on Creative Industries, 2002). The inherent definition of k-society in these blueprints is k-society as creative economy. "Renaissance City 2.0" is merely a continuation of the "Renaissance City Report" published in 2000 (Workgroup on Creative Industries, 2002: 9-20; MITA, 2000). It basically adds innovation as a key policy outcome within the arts and cultural sector. Interestingly, "Renaissance City 2.0" calls for a shift in all MITA agencies "away from the 'arts for arts sake' mindset, to look at the development of arts from a holistic perspective, to contribute towards the development of the creative industries as well as our nation's social development" (Workgroup on Creative Industries, 2002: 14). The second initiative, which is part of the creative industries policy is named the "Design Singapore Initiative" (2002: 21-32). It claims to be the first national collaborative strategy to spearhead the promotion of design in Singapore. In order to do so in an economically suc-

cessful manner, it seeks convergence amongst different actors, namely enterprises (industry users and designers), expertise and education. The aim of this initiative is "to inspire a fundamental change in the promotion and development of a pervasive design culture" (2002: 27). This shall be achieved by focusing on four strategies: (1) integrating design in enterprise; (2) developing a vibrant & professional design community; (3) positioning Singapore as a global design hub; and (4) fostering a design culture and awareness. The third initiative is entitled "Media 21" (Workgroup on Creative Industries, 2002: 33-49; Media Development Authority, 2003). It envisions Singapore as a "global media city, a thriving media ecosystem with roots in Singapore, and with strong extensions internationally" (Workgroup on Creative Industries, 2002: 37). The blueprint aims to reach this vision by implementing five strategies: (1) to develop a state-of-the-art media city; (2) to position Singapore as a media exchange; (3) to export made-by-Singapore content; (4) to augment the media talent pool; and (5) to foster a conducive regulatory environment and culture. "Design Singapore" but especially "Media 21" are economic policy agendas, although their physical manifestation lies in the framework of fostering the development of a creative cluster. A rather interesting aspect of the "Media 21" policy framework is also, that the media in Singapore is often regarded as mouthpiece of the Singaporean government and has therefore mixed only little with other economic and especially cultural sectors. The same Singapore as the one in which the press is regulated until today by a newspaper and printing presses act aims to position itself as a global media capital. The seeming contradiction is solved by aiming at attracting foreign media companies to produce their documentaries and programmes on the region; not by encouraging local media players to conduct critical journalism on Singapore and its government.

Overall the "Creative Industries Development Strategy" has to be regarded as part of the attempt to develop several economic clusters on which Singapore's economy can build in the future. Within the typology of Singapore's k-society, illustrated in diagram 9-1, one can speak of a creative economy. Yet, after focusing on engineering, maths and sciences for the first two and a half centuries after independence, Singapore's sudden aim to foster creative thinking, writing and drawing was criticised and smiled at. One of my informants who works as professor at the Nanyang Technological University, School of Communication & Information, Division of Journalism and Publishing states:

> "Some economists say that Singapore should just give up in the creative industries sector and that it simply is not going to be Singapore's strength.

> The education system has given the students too much science and math education and not enough literature and the arts. This is changing now but not very fast. (…) Singapore's strength is to get the system right, in logistics, organisation, trade, infrastructure, reliability of services etc. It should just focus on that and let creative industries be the sector of other countries" (Ch. George, 08.02.05, interview with the author).

Later in the interview, Cherian George explains the expressed pessimism by pointing to the government:

> "Actually these economists saying that Singapore should just give up on creative industries, argue that Singapore's government is not likely to loosen up politically and as long as it doesn't, you are not going to have the kind of creative culture that you have elsewhere."

Whether Cherian George or the government's optimism is right will be seen in the future. Nevertheless, what is interesting here is the very pragmatic approach taken by the Singaporean government in outlining a cultural policy in order to foster a creative cluster that will contribute to future economic growth. The same pragmatism and straightforwardness can also be observed in the process leading up to a Singaporean k-society. The final intention is clear: to assure economic prosperity and together with this political stability, meaning PAP maintaining political legitimacy based on economic growth and therefore remaining in power.

Discussion

In Singapore, five phases of government engagement and activism can be identified, during which the Singaporean government defined k-society process-related inherent in the activities constructing it. While in the late 1970s and all of the 80s, Singapore's government embarked on building an island-wide information and telecommunication infrastructure (ICT-economy) and developing ICT applications (ICT-society). In the 90s, the focus moved to additionally increasing investments in R&D (science society) as well as to providing access to ICTs, education and knowledge to every citizen (knowledge society). In recent years, this was further extended by the aim to develop creative industries, investing heavily in the arts and cultural scenes of Singapore as well as changing school and university curricula with the aim of fostering creativity (creative economy). Additionally, the assessed action plans address topoi regarding intellectual property and copyrights, hence the marketability of knowledge (knowledge economy) as well as the creation of a regional, ASEAN-wide or global k-society (global k-society), but

do not focus on these two definitions of k-society as much as on the five mentioned above. Together, these seven sub-k-societies, defined and constructed in and by the government programmes, shape the uniquely Singaporean k-society. Hence, the k-society constructed by the Singaporean government defines k-society by focusing on five imaginaries: ICT-economy, ICT-society, science society, knowledge society and creative economy. Furthermore, they conduct few activities towards a global k-society and a knowledge economy.

The five phases described above indicate a focal shift in constructing k-society over time. While in the beginning the definition of the society that should be constructed was very technologically focused (ICT-economy & -society), it increasingly opened up to R&D (science society), the inclusion of every citizen in knowledge production, usage and dissemination (knowledge society) and the fostering of the creativity of Singaporeans (creative economy). Two steady parameters in this process of construction nevertheless exist. First of all the state-formulated aim to create k-society and secondly, the clear focus on economic development. All activities launched for the creation of k-society are meant to contribute to economic growth and prosperity, as the overall aim of creating k-society is economically legitimised.

In Germany, the shift from first focusing on ICT infrastructure and application to later the fostering of R&D can also be observed. Yet, the activities towards the development of an ICT infrastructure and applications were far less all-embracing and far-reaching than in Singapore (e.g. no Germany-wide wireless internet). This has partly to do with the sheer geographical size of Germany. The activities towards k-society as science society are, in Germany, accompanied with the aim and need to cut costs in the educational and research system, while Singapore's government is constantly increasing the R&D budget. The closure of digital divides is the formulated aim for both countries but Germany concentrates on the making available of ICTs for everyone while Singapore goes beyond this and aims to make knowledge available for everyone through an island-embracing library system. In Germany, activities fostering the knowledge production by every citizen are neglected. Also, activities fostering the creativity of society are not launched. Obviously the felt need for such activities does not exist. One reason for this might be that the federal structure with education being under the rights of the states as well as the fact that arts education traditionally exists in German schools maintain a freedom of thinking and teaching that allows for the development and growth of creativity, without having to especially foster this creativity.

Nevertheless, in both countries the activities towards the construction of k-society can be traced back to the aim of securing economic stability and growth. The Singaporean government identified first the building of an ICT infrastructure as well as the development of ICT applications, and later the building of a publicly available knowledge infrastructure (library system), the fostering of R&D and creativity as the areas securing future growth. The German government similarly identified the building of an ICT infrastructure and the development of ICT applications as areas securing future growth. Yet, in recent years, the government activities of Germany focus on the closure of digital divides while the knowledge producing sector (R&D) increasingly has to economically justify its existence.

Chapter 10

The Construction of K-Societies: Conclusion

The aim of this book was to shed light on the question: what are k-societies? In order to do so, an empirical analysis of the processes which led to the creation of k-societies was necessary and had been missing until now. By redrawing the processes that brought, and until today bring, k-societies into existence, it became obvious that k-societies are not merely the result or logic consequence of technological, economic and social changes, i.e. the development of information and communication technologies, the growth of the service sector and the increased economic dependency from knowledge and information. Instead, the data presented in this book clearly suggest that k-societies are furthermore actively and with enormous efforts taken, constructed by collective actors in society. This aspect of k-society has until now been ignored by most scholars working on the topic. Instead, the vast majority of scholars exclusively hold changes in the social, economic and technological fabric of society responsible for the emergence of a different type of society or economy (chapter 2), and label it in manifold ways (chapter 7). The terms 'knowledge society', 'knowledge-based economy' and 'information society' were most commonly used. Yet, if k-societies are socially constructed and are not merely the result of technological, economic or social developments, they have to be researched in a different way than has been done until now. Not only possible indicators of arising k-societies have to be assessed but more so the actors and construction processes that create k-societies. The definitions attached to k-societies by the collective actors creating them shed light on what k-societies actually are. Based on this conviction, this book assessed the definitions of k-society inherent in government programs and action plans of the states Germany and Singapore in conjunction with the remaining subsystems engaged in the construction processes – the economy, scientific community, civil society and the media. The focus on these two states was an empirical restriction and no confinement to the hypothesis.

The process of constructing k-societies is divided into (a) the construction of k-society concepts by the scientific community, (b) the creation of a vision of a self-emerging k-society by the scientific community and national politics and (c) the construction of k-societies as stages of social and economic development by the subsystem state, here in Germany and Singapore.

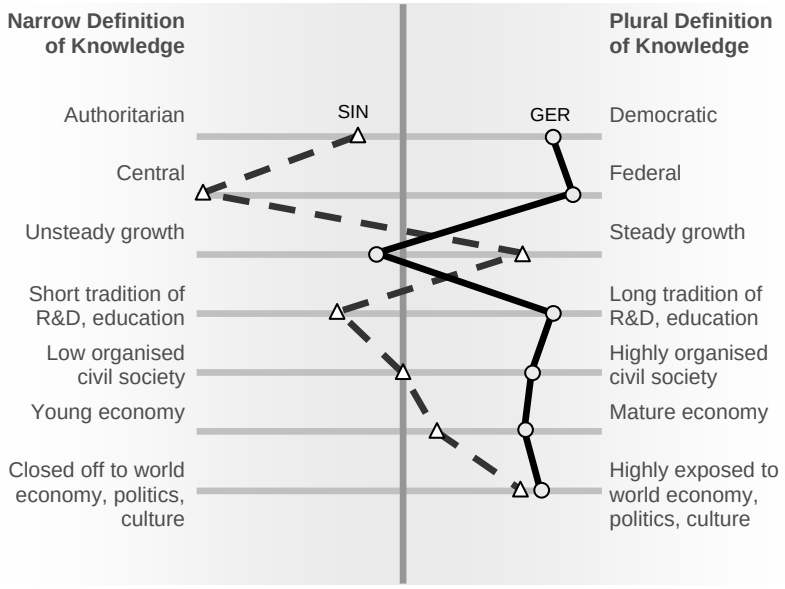
After the idea of a self-emerging k-society and the attached terminology had entered the political sphere, the processes of k-society construction as stages of development were accelerated and legitimised by the vision of a self-emerging k-society. The political activities, legitimised by this vision, then actually constructed (and until today do) what was said to emerge by itself. The textual orientation of the political programmes and action plans expresses the definitions of k-society attached to it by the social actors conceptualising these programmes. Consequently, the programmes and activities inherently define country-specific k-societies. The collected data nevertheless showed that there is not one definition of k-society and never will be. Instead, many differing definitions of k-society exist, each uniquely shaped by the actors creating it in the respective country. Furthermore the analysis showed that the country-specific definitions and processes of construction of k-society are highly determined by the structural realities as well as the dominant definitions of knowledge in each country. Consequently, multiple, country-specific definitions of and paths to, k-society exist. For the social actors constructing k-societies, this finding means that the structural realities have to be addressed in order to assure the creation of a pre-defined k-society. Government programmes initiating certain changes are merely short-term incentives. In both countries of investigation, the government initiatives towards k-society seek economic stability and growth. Disregarding differences in time, the k-society definitions aimed for, and the paths taken, are quite similar. Nevertheless, wide structural differences prevail and will also in the future prevent a convergence of the two k-societies. On an international scale this finding of each country-specific k-society being shaped by the structural realities and definitions of knowledge in the respective country, means that a global k-society would not be the sum of many equal or similar types of k-societies; that there is not a specifically characterised stage of development that can be reached and would look in every country the same. Instead a global k-society will be an amalgam of multiple, widely varying and country-specific k-societies. Or rather, due to differing speeds of development, an amalgam of widely varying k-societies, industrial, less and least developed societies. Each k-society will at the same time incorporate aspects of industrial, less and least developed societies and each industrial, less or least developed society will incorporate some aspects of k-society.

Modelling the Construction of Multiple K-Societies

The data illustrated in this book clearly argue that the definition and construction of each country-specific k-society is highly determined by the dominant definitions of knowledge which again are shaped by the prevailing structural realities. This finding and the empirical data provided are in their explicitness new to the current scientific discourse on k-society and its relevance to the construction of k-societies should not be underestimated. Accordingly, the construction of an economically and socially stable k-society relies on structural realities that support a plural definition of knowledge that then again fosters a wide range of knowledge production and dissemination. However, most structural realities can merely be changed to a limited degree by collective actors in society. Hence, there will always remain some aspects of k-society that are influenced and shaped by the structural realities rather than by the will of its constructors which means that there will always be country-specific and therefore multiple, widely varying k-societies.

This finding asks for a conceptual model that enables us to predict the definition and construction of k-societies in countries other than the countries of investigation. In order to do so, the diagram below illustrates two extreme sets of structural realities that support (a) a narrow and (b) a plural definition of knowledge.

Diagram 10-1: Modelling Country-specific Definitions of Knowledge



Most countries' definitions of knowledge are located somewhere in-between the two extremes, shaped by the prevalent structural realities. This also applies to the dominant definitions of knowledge in Germany and Singapore as illustrated. Yet, it is important to point out that it is irrelevant whether a certain bullet point is one or three milimeter to the left (or right) of the centre of this diagram but rather that it is to the left (or right) of the centre. Hence, the above model does not aim to illustrate the exact level of being centrally or federally organised for example. Instead it is the aim to offer a model into which all countries worldwide can be sorted into. Based on this, a prediction concerning the dominant definition of knowledge which then influences the definition of k-society can be formulated. Let me discuss the stated structural realities with regard to their impact on the definition of knowledge in Germany and Singapore along their degrees of influence expressed by my data.

In Germany, the multi-party, democratically organised political system, backed by its legal infrastructure protecting the rights of the individual allows for a wide range of knowledge to be produced and transmitted. This is institutionally supported by the federal structure, with education, research and

development being largely under the rights of the states rather than the federal government. Furthermore a high level of civil organisation in German society fosters a culture of critical discourse. Critical discourse is a fertile ground for the production and dissemination of highly differing knowledge, which again is the source for evolution, development and change. Contradicting knowledge and creativity stand for a diverse, plural definition of k-society. Yet in recent years the economic downturn in the 1990s led to an increased focus on economically-viable knowledge, meaning that applied, rather than basic R&D as well as knowledge areas such as natural sciences and engineering are especially fostered. This is nevertheless counter-balanced until now by a long tradition of R&D and education and therewith a well established and diversified infrastructure of knowledge production. The rather mature level of the economy supports this integrative definition of knowledge by being able to absorb and economically exploit applied and basic research outcomes as well as areas of knowledge such as human and social sciences, experimental and fine arts. The relatively high degree of economic exposure to the world economy fosters an economy-focused definition of k-society. On a political level, it encourages the national government to foster the creation of k-society, shortly after countries such as the USA, Japan and the EU, have ventured into this field.

In Singapore, the one-party, guided democracy, backed by a legal infrastructure restricting free opinion, speech and press, predefines the number of social actors defining which knowledge is produced and transmitted and clearly empowers the state in taking on a dominant position in knowledge politics.[1] This strong position of the state is enabled, and further strengthened, by the central structure of the city-state, neglecting to scrutinise the defining activities of the state by state governments and municipalities as is done in a federal system. Due to the legal infrastructure protecting the state rather than the individual, civil organisation is rather low and critical discourse not common in Singapore. Yet, the experienced steady and rapid growth and therewith the maturing of Singapore's economy increasingly asks for a widening and deepening of Singapore's knowledge base. This has also been realised by the government which increasingly opens its formerly quite narrow definition for basic R&D as well as knowledge areas such as the arts, human and social sciences. The traditional focus on applied research and knowledge areas such as natural sciences, engineering and lifesciences that originated from a very short history of R&D and education is increasingly

[1] This became obvious in the interview statements quoted in chapter 7.

turning towards knowledge areas that are hoped to secure long-term economic, social and cultural development for political legitimacy. This is further supported by a high level of exposure to the world economy, politics and culture that enables a rich knowledge exchange and inspiration.

Yet as indicated above, it has to be born in mind that country-specific definitions of knowledge are not static but instead underly a certain dynamism and change over time as we can see in the cases of Germany and Singapore. Furthermore the data suggested that structural realities such as the difference in size of population and land do less affect the country-specific definition of knowledge but rather the speed and degree of implementing k-society programmes encompassing all aspects of social, economic and technological development. Moreover it is important to state that the aspect of economic growth appears to be the most central to state governments in deciding which knowledge is fostered. Less developed countries with rather immature economies will – no matter how democratic, federally organised or exposed to the world economy they are – mainly focus on applied R&D and knowledge areas believed to directly contribute to economic growth. Basic R&D and knowledge areas that are blieved to merely indirectly contribute to economic stability are seriously only fostered in economically advanced countries. In these more mature economies nevertheless, these formerly neglected knowledge areas such as arts, social and human sciences, design and culture become most central for local innovations, creative ideas and design. It is these mature economies in which creative knowledge advances as the main value-generating factor of productivity and is responsible for a further widening of the gap between knowledge and pre-industrialised economies.

The above makes predictions concerning the dominant definition of knowledge in certain countries and therewith the definition of k-society possible. In the case of China for example one can argue the following. As a country with a rather authoritarian government, restricting free opinion, speech and the press, a federal organisation with nevertheless all main political decisisions being taken by the central government, steady growth of a rather immature, industrialising economy, a short tradition of high-level research and development, a low organised civil society and a mediocre level of exposure to the world economy, politics and culture, the definition of knowledge is overall quite diverse due to the federal structure and major social divides responsible for multiple, highly differing everyday realities. Nevertheless, the dominant definition of knowledge affecting which formalised knowledge is produced and disseminated is rather narrow, defined by few collective actors in society, of which the state and economic interest groups most likely

form the most powerful. Furthermore, high-level, state financed research most likely focuses on applied research and research fields such as natural sciences, engineering and medicine, i.e. areas of knowledge that are believed to directly contribute to economic growth and the outcome of which can be absorbed by the national economy. If the Chinese government now took conscious steps towards the construction of a Chinese k-society, I would assume that the definition of k-society and the paths taken towards its realisation would very strongly focus on technological and economic aspects of k-society. Aspects such as the closure of a digital and knowledge divide, as well as the fostering of arts and critical thinking for creativity would most likely be neglected for many years.

In the case of the United States of America one could predict a rather plural definition of knowledge, allowing for critical thinking and social aspects in defining and constructing of a US-american k-society, while at the same time immensely fostering technological and economic aspects of k-society. The democratic, federally organised structure with more or less steady economic growth, enriched by a long tradition of R&D and education, a highly organised and vocal civil society, backed by a legal infrastructure allowing for critical thought and free speech, a mature economy absorbing a wide range of knowledge and a high level of exposure to the world economy, politics and culture allow for a rather plural definition of knowledge, shaped by a vast arena of social actors.

The empirically based finding that the structural realities and definitions of knowledge in both countries heavily influence the country-specific definitions of, and paths to, k-society is of immediate relevance to the planning and construction processes of k-societies. It basically means that government programmes and action plans can merely give short-term incentives which will have no long-term effect, as long as the prevailing structural realities don't support the aims of these programmes. Consequently, if the state wants to realise a type of k-society in which certain aspects shall flourish, i.e. the production of a wide range of knowledge including critical, state of the art and high-tech knowledge, the creation of incentives is not sufficient. Instead, for a long-term realisation of these precise aspects of k-society, the structural realities in the respective country have to be changed accordingly, i.e. that they not only allow, but foster, this development. With regard to Singapore this means that it is not enough to create public libraries as spaces for critical discussion and for the exchanging of ideas in order to foster a critical mass. Instead a change in the legal infrastructure, which currently still restricts the freedom of opinion and speech, will eventually be necessary. Hence, the

structural reality responsible for little production of critical knowledge will have to be changed, rather than granting precisely defined spaces in which creativity shall take place. In Germany, the federal structure with education and research under the rights of the federal states, rather than the national government assures an overall relatively plural definition of which knowledge is produced and spread. It therefore should be maintained instead of – as currently done – installing a 'Free University Act' that transfers all decision-making rights on which knowledge areas are especially fostered to the chancellor of each university. According to this Act, the chancellor of each university will merely be advised in its decisions by a committee made up of members of the international scientific community, the economy and the state. Tendencies as such will widely alter the German definition of knowledge once more and increase the possibilities of the economy to highly influence the decisions taken within the apparently independently acting scientific community. It consequently becomes questionable whether the freedom of research contributing to a plural definition of knowledge can – in practice and not just in theory – be maintained in the future.

Nevertheless – to state the obvious – not all structural realities can be changed according to the aims of the state. While the structural realities of each country heavily influence the state definition and construction process of k-society, the state can only sometimes influence the structural realities in a way that match the state definition of k-society. One example of a structural reality, which is very difficult for the state to change, is the legal restriction of stem cell research in Germany. It decreases the range of knowledge produced and disseminated and therefore stands for a definition of k-society in which certain knowledge areas are forbidden. Yet, at the same time, stem cell research is a topic in which two influential groups of society, groups which both bear the ability to mobilise voters against the elected government, stand in direct opposition (of opinion) to each other.

A Contribution to Luhmann's Autopoietical Subsystems

With reference to Luhmann, the data suggest to argue against his statement "structure follows function", and instead state that function, the aim of which is to define and create k-society, is shaped by the structural realities dominant in each country. One major difference lies in the varying models of functional differentiation with structures of decision-making between the state and the remaining subsystems of society in both countries. The models structure the

communication flow from the subsystems besides the state to the state activities which define and construct k-society.

In Germany, the subsystems of society involved in the construction of k-society besides the state – economy, scientific community, civil society and media – have very limited influence on the activities of the state in defining and creating k-society.[2] The main channels of taking influence are study, government and enquete-commissions of the federal government, the implementation process of the government action plan, public-private-partnership (PPP) initiatives, and conferences and workshops on the topic. Consequently, the possible influence is advisory in character. The subsystems besides the state do not possess any decision-making power concerning the construction of k-society by the state. The degree to which the interests of these subsystems, communicated by the advisory activities are heard, is very low. It seems to depend on aspects such as the individuals involved in the commissions and their future positions, the competition posed by other topics, the time when the recommendations are published in the legislative period and how they are perceived by the governing parties.[3] Furthermore the data collected for this book clearly illustrated that the scientific expertise on k-societies, the theoretical concepts and their creation was hardly at all taken into account by the state. Instead, the state actors defined k-society completely independent from the scientific expertise developed, merely adopted the terminology, but not the concepts. [4] Furthermore, the mode of defining

[2] This was outlined in chapter 5.

[3] This was outlined in chapter 8.

[4] In the action programme 'Information Society Germany 2006', the publishing ministries BMWA and BMBF refer to the "Global Information Technology Report 2002-2003" published by the World Economic Forum in order to authenticate Germany's improvements in relation to its ICT infrastructure and applications (BMWA/BMBF, 2003: 5). Besides this, the action programme uses statistical data collected by studies conducted by (a) the TV-channels ARD and ZDF (BMWA/BMBF, 2003: 13); and (b) BITKOM (BMWA/BMBF, 2003: 14ff). In the sequential action programme "Innovation and Jobs", the publishing ministries BMWT and BMBF refer to data collected by (a) the European Information Technology Observatory (BMWi/BMBF, 1999: 15ff); (b) the German association of Information Technology (Fachverband Informationstechnik im VDMA und ZVEI) (BMWi/BMBF, 1999: 19ff); and (c) the Technical Scientific Association Electro Technology, Electronic, Information Technology (Technischer Wissenschaftlicher Verband Elektrotechnik, Elektronik, Informationstechnik) (BMWi/BMBF, 1999: 25ff). One exception is the final report of the enquete-commission "Globalisation of the World Economy". In the section on the global knowledge society, the commis-

is different. While the members of the scientific community working on k-society define k-society categorically, the governments of Germany and Singapore define it procedurally, i.e. inherent in the government activities creating it. Consequently, the model of structural differentiation in Germany matches the picture drawn by Luhmann, who argues that a structurally differentiated society is made up of independently acting subsystems; so called autopoietic subsystems of society. Hence, a very plural definition of k-society is formed and a multi-pronged process of construction takes place.

In Singapore, the subsystems involved in the construction of k-society besides the state can influence the activities of the state in defining and creating k-society to a much higher degree than in Germany.[5] The main channels through which the construction process can be influenced, are expert commissions/committees, by becoming a member of the board of directors of a statutory board, or conferences and workshops as platforms for the exchange of interests and perspectives. The final reports of commissions (advisory activities), contrary to that in Germany, can become government action plans (constructive activities) if passed by the minister cabinet or parliament.[6] Furthermore, the subsystems besides the state actually gain decision-making power when their representatives become members of the board of directors of statutory boards of the government. Hence, the possible influence taken is advisory as well as constructive in character. The degree, to which the interests of these subsystems, is heard, is very high. They are mainly communicated by the final reports of commissions, which can turn into constructive activities of the state and by their representatives on the board of directors of statutory boards.[7] Nevertheless, not only the economy, scientific community, civil society and media can influence state activities, but the state also highly influences these subsystems. The two main universities of Singapore as well as the research agencies A*STAR and ISEAS, which are strong pillars of Singapore's scientific community, are, for example, at the same time statutory boards of the government. The subsystem civil society is heavily influenced by the state due to the legal system controlling public speech, demonstrations and the formation of politically critical subcultures.

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sion refers to the works of academics such as Daniel Bell, Nico Stehr and Jeannette Hofmann (DB, 2002: 259-260). This can nevertheless be explained by the fact that academics are members of the commission and therefore a direct link exists to the works of the scientific community on the topic.

[5] This was outlined in chapter 5.

[6] This depends on who established the commission.

[7] This was outlined in chapter 9.

Furthermore, the state until today controls most of Singapore's media. Consequently, the state has strong, decision-making influence on these subsystems but at the same time grants these subsystems influence on its statutory boards and the conceptualisation processes of action plans. Hence, the influence is mutual and the boundaries between the subsystems are permeable. With regard to the k-society expertise developed by the international scientific community, the data illustrated that Singapore's government only made little use of this expertise.[8] Nevertheless the degree to which it incorporated scientific expertise in its planning processes for the construction of k-society was higher than in Germany. Thus, the model of structural differentiation does not match Luhmann's notion of a society structurally differentiated in independently acting, autopoietical subsystems, none of which is dominant to the others. Instead, inter-linkages exist between the subsystem state and each remaining subsystem. Hence, the subsystems beside the state can actually influence the state definition and construction of k-society. While the subsystems besides the state dominantly act in accordance with the interests of the state, the state grants them influence on the construction process of k-society conducted by it. Furthermore, a clear hierarchical order strengthens the position of the state with the remaining subsystems being subordinate to it. This results in a clear cut, easy to grasp definition of k-society in Singapore, which is shaped in a circle of all engaged subsystems. Accordingly, the construction process is very effective, time efficient and covers the whole island geographically, as well as socially.

[8] In the "Infocomm21 Plan", IDA merely refers to a survey commissioned by itself (IDA, 2000: 22). In the "Creative Industries Development Strategy", the Workgroup on Creative Industries within the ERC subcommittee "Service Industry" points to the definition of creative industries developed by the UK Creative Industries Taskforce (Workgroup on Creative Industries, 2002: 2). Furthermore, the strategy points to Richard Florida's theoretical idea of a rise of the creative class (Workgroup on Creative Industries, 2002: 1). In the "Connected Singapore Report", IDA refers – just as BMWA/BMBF in Germany – to the "Global IT Report 2002-2003" (World Economic Forum, 2002-2003), and regards infocomm as a critical catalyst for social transformation and national progress. Furthermore, IDA in this report refers to the OECD Information Technology Outlook 2002 (OECD, 2002) and also, an article published by The Business Times in February 2003 (IDA, 2003: 4). In the most recent government programme "Library 2010", NLB merely refers to the statistical data published by (a) the Statistics Singapore Newsletter (NLB, 2005: 6); and (b) the Labour Force Survey of the Ministry of Manpower (NLB, 2005: 8).

K-Society as Technological, Economic Programme and as a New Focal Point of Collective Identity

In both countries of comparison, k-society originally was a technological and economic programme. The conducted government activities towards the construction of k-society textually clearly focused on the development of an ICT-infrastructure, the application of ICTs, their economic utilisation and according adjustments to the legal system. Furthermore, the economic utilisation and exploitation of knowledge, and not merely the technology facilitating the transmission and storage of it, increasingly moved into the centre of political interest.

External as well as internal reasons can be identified for – with enourmous input – conceptualising and implementing these political programmes, labeling them with visionary terms such as 'information society', 'knowledge society' or 'knowledge-based economy' and legitimising their existence as well as accelerating their implementation by constructing a vision of a self-emerging k-society. National governments and international organisations took up the terminology developed by the scientific community, but not the categorical definitions offered, and massively contributed to the picture of k-society forming the society of the future. As outlined above, the construction of k-societies was constructed as a necessity for further economic development and even the survival of developed, industrialised economies. World and regional summits concerning the matter pushed for national governments to adopt the topic and to integrate it into their national political agendas. The two parts of the World Summit for the Information Society, held in Geneva and Tunis in 2003 and 2005 respectively can be mentioned as examples. Consequently it is reasonable to speak of an international pressure in the political arena as external reason to adopt the construction of k-societies into the national government's agendas. As internal, meaning national reason to jump onto the bandwagon of k-society construction one can clearly identify the aim of both national governments to contribute with technologically and economically focused policies to the fostering of economic growth. It is based on the belief of many national governments worldwide that their apparent contribution to economic growth will legitimise their powerposition and therewith might result in maintaining political legitimacy.

Yet, over time a second component was added to the aspect of k-society being a technological and economic programme for maintaining political legitimacy. Global as well as national developments can be identified as

reasons for a change in purpose and utilisation of the political agenda 'the construction of k-society'. The continuously proceeding globalisation, the end of the East-West conflict and its accompanying weakening of the nation state increasingly contribute to a culture of insecurity. Beck speaks of insecurities, the lack of safety as well as uncertainties (Beck/Giddens/Lash, 1996). Giddens (1999) underlines the human component in creating these uncertainties and speaks of 'manufactured insecurities' which, according to him, go hand in hand with late modernity (Giddens, 1991). Beck (1992) looks at the ways of dealing with hazards and insecurities and conceptualises these developments under the term 'risk society'. Here he does not so much focus on increased risks in society but instead on organised responses to risks in today's society. Nevertheless, Beck and Giddens agree with each other that increasingly manufactured, by humans produced risks change social relations and the structures of society. Stehr (2000) refers to the fragility of modern society by argueing that the transformation of traditional industrialised societies into k-societies offers increased possibilities for individuals to act freely, while the powerposition of the state and social collectives decreases. Due to this parallelity of developments, an increase of the role and possibilities of the individual and a decrease of the powerposition of collectives, k-societies are fragile, modern societies. Yet, Stehr understands this as a positive rather than a negative process.

In the case of Germany and Singapore, the above mentioned global developments but furthermore national historical milestones contributed in the past years not only to an increase in felt insecurities but also in a change of the function of the political programme k-society. In Germany, the reunification of East and West Germany in 1990, the economic downturn in the 1990s and the end of the era Kohl in 1998[9], just to mention a few, can be identified as national contributors. Current political discussions on the collapse of the social security system, the negative population growth and its strains onto the retirement schemes, reforms of unemployment funds as well as the continuous moving of production sites out of Germany contributing to the high unemployment rate additionally increase the feeling of insecurity. Furthermore these developments are currently overshadowed and facilitated by a coalition government of CDU and SPD, traditionally the two main and ideologically opposing parties, that largely hinders its own moves and reform capabilities.

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[9] Dr. Helmut Kohl had been German Chancellor for 16 years (1982-1998).

In Singapore, the economic downturn in 1986 which reminded Singapore's government of its missing hinterland, the lack of natural and restricted number of human resources required for constant economic growth based on industrial production. Neighbouring countries with vast resource pools were beginning to catch up and it became apparent to Singapore's government that it had to identify new, long-term areas of growth. Yet, the rapid economic development from a less developed into an industrialised nation brought about social and cultural change. A culture of development and change that encompassed all aspects of society resulted similarly to Germany in an increase of felt insecurity. Even the traditional basis for maintaining political legitimacy of Singapore's government – rapid economic growth – was affected, whose strong, guiding hand had attempted to reduce these insecurities. A growing number of young voters who have not experienced the deprivations of poverty in the years before and shortly after gaining independence and therewith do not subscribe to economic growth as main basis of political legitimacy, increasingly demand additional justifications for the strong power position of the one-party democracy.

If one then assesses the degree up to which the governments of Germany and Singapore pursued the construction of k-societies not just as stage of social and economic development but furthermore as a vision that orients, motivates and guides actors and interprets it in front of the increased level of insecurity, risks and fragility of society, the following becomes obvious. Disregarding all country-specific differences of the constructed k-societies in Germany and Singapore, k-society was in both countries in the early years clearly an economic and technological programme. Yet, over the years, the construct k-society became more than this. Today, while it in effect still is an economic and technological programme in both countries, the construct itself is furthermore offered by the two state governments as a new focal point of collective identity. A focal point and vision that explains the changes taking place by pointing to the apparent self-emergence of k-society, the growth of the service sector, the development and application of ICTs and the increased profit margins of knowledge intensive goods. A focal point and vision that channels activities towards its own realisation. K-societies become real by making people believe in their existence or emergence (Berger/Luckmann, 1984). A focal point of collective identity that is able to, up to a certain degree, interlink traditionality and modernity, seeing that the construction of sustainable k-societies is based on knowledge, as deep and as wide, as diverse and mutually enriching as possible. Meaning, k-society requires a strong, wide and deep knowledge base in society which can only be achieved when enrich-

ing newly produced knowledge, modern knowledge with traditional, culture-specific knowledge. And finally, a focal point of collective identity that reduces the felt insecurities, risks and therewith the fragility of society by offering what Philip Yeo in an interview with the author called 'a lamp', something to follow, a vision that – in Weber's understanding – orients and motivates actors.

Multiple K-Societies versus Multiple Modernities

Due to a circular, mutually influencing relationship of the prevalent structural realities, dominant definition of knowledge and the state activities taken towards the construction of k-society, the definitions of k-society as well as the paths taken towards its realisation in each country of investigation was highly unique and differed widely, while at the same time showing some similarities. This led me to argue that due to differing structural realities which shape the dominant definition of knowledge in each country, the constructed k-societies highly differ and are country-specific, meaning unique in each country, although a certain pattern could be identified in order to predict the construction of k-society based on each country-specific definition of knowledge. Consequently, multiple k-societies are created and have to be interpreted parallel to Eisenstadt's concept of multiple modernities. This was illustrated by choosing two widely varying countries – Germany and Singapore. According to Eisenstadt's concept of multiple modernities, in each country, mainly depending on its culture rather than on its structural realities as argued with reference to k-societies in this book, different answers to modernisation processes such as structural differentiation, social mobilisation and the decrease of traditionality are given. Eisenstadt speaks of the need of modern societies worldwide to regulate the continuously new forming societal groups, their opposing world views and, from this arising conflicts, by integrating them in a common institutional frame of reference and creating new focal points of collective identity, in which tradition and modernity to some degree can be interlinked (Eisenstadt, 1979, 1998, 2000a, 2000b, 2001, 2002, 2006).

Consequently multiple k-societies have to be understood as a clear contribution to multiple modernities. One should not misunderstand me here. I do not argue that multiple k-societies are multiple modernities. Rather, multiple k-societies are offered by state governments as new focal points of collective identity that explain the changes taking place, offer some guidance,

reduce insecurities and combine to a certain degree aspects of traditionality and modernity. Just as the industrialised society acted (and in some countries still does) as a focal point of collective identity during the first modernity, k-society has to be understood as a focal point of collective identity during the second modernity to use Beck's term, or during the period of multiple modernities to stick with Eisenstadt. With the term 'second modernity', Beck coins the period after modernity and argues that a renaissance of modernity takes place shaped by the realisation that humans cannot control all risks, not even the ones created by themselves, such as environmental risks and climate change. According to Beck, systems such as politics, science and religion promised to protect humanity from the risks every single one of us faces during his/her life. Yet, during the period of the second modernity, society has to realise that these systems are not the solutions to our problems but that they actually are part of the problem. Once society realises this, it can redefine its problem-solving strategies. Beck here argues for a 'cosmopolitan realpolitik' which can be regarded as part of a world polity approach. With the term 'second modernity' he nevertheless attempts to combine the continuity of modernity as well as an epochal turn. The continuity of modernity Beck sees in the valuing of the indivual, personal political freedom and the antidogmatic pressure to reason. The at the same time observable epochal turn is for him caused by the geographical detachment of capital, labor and home due to ongoing globalisation processes, the ecological crisis and the end of the industrial society. The problems of the second modernity are therefore the side effects of side effects of the first modernity (Beck/Giddens/Lash, 1996). They are the manufactured insecurities of Giddens and risks that increase the fragility of society.

Eisenstadt does not – as Beck and Giddens – discuss his concept of 'multiple modernities', meaning culture-specific answers to modernisation processes as a period after the first modernity, a period that has to deal with the consequences of the first modernity. Instead he focuses on the differences of modernity in different cultures and countries and argues that there are multiple, rather than merely the western or European, path to modernity. Nevertheless, Eisenstadt looks at modernities that developed much later than the European and Northamerican modernity and even uses the so-called western modernity as reference modernity for discussing the later. These modernities highly differ from the western while at the same time offering some similarities which justifies their interpretation within the concept of modernity. Yet, due to the fact that these modernities developed in the age of globalisation, they have to not merely address the changes taking place due to

modernisation but furthermore the insecurities arising from an ongoing globalisation, the end of the East-West conflict, the weakening of the nation state and the environmental problems predominantly resulting from the first, the western modernity. Consequently, it becomes necessary to develop Eisenstadt's concept further by relating it to Beck's 'second modernity'. In detail this nevertheless has to be left for further research.

This book, based on vast empirical data, illustrated that (a) k-societies are constructed as theoretical, categorically defined concepts by the scientific community, (b) as stages of reality by actors in society, as well as (c) that (a) and (b) foster the construction of and are themselves encouraged and legitimised by (c) a vision of a self-emerging k-society. The comparison of countries as widely differing as Germany and Singapore showed that in each country (b) the construction of k-society as stage of reality is shaped by the structural realities and dominant definitions of knowledge. This results in multiple, widely varying country-specific k-societies. In order to predict the shaping of different k-societies in countries worldwide a model was suggested.

Nevertheless, the data also illustrated that k-societies do not only vary in different countries but that k-society as construct was in both countries in the beginning clearly an economic and technological programme. But over time, it became more and acts in Germany and even more in Singapore today as economic and technological programme, as well as a new focal point of collective identity offered by the state in order to reduce insecurities and offer emotional peace. As such, the suggested concept of multiple k-societies then has to be interpreted within the concept of multiple modernities.

Consequently, the initial question, what k-society actually is has to be answered by stating: k-society is to the second modernity, the time of multiple modernities what 'industrial society' was for the first, western modernity. K-society is a theoretical concept created by academics and scientists. K-society is a vision that legitimises and accelerates action towards its own realisation. K-society is a stage of development in which knowledge forms the center for social, cultural, economic and technologic development. K-society is a new focal point of identity in the second modernity. And finally, k-society is a social construction of reality that will shape our future to come.

Appendices

Appendix A International Experiences of Constructing K-Societies

The idea that knowledge becomes increasingly important to social, political and economic development was originally developed in the academic sphere, mainly in the United States of America and Japan, in the 1960s and 70s. In Europe, merely a small number of scholars researched the topic at that time. Nevertheless with time, the idea entered the sphere of politics. In the 1970s, many industrial countries promoted microelectronics as well as the "new media" cable TV and view data. In the 1980s, the promoted technology was ISDN (Integrated Services Digital Network). In the 1990s, multimedia and 'the information superhighway' emerged as new catchwords, which are currently replaced by WLAN (Wireless Local Area Network), UMTS (Universal Mobile Telecommunications System) and digital signaling (in opposition to analogue handheld two-way radio). As pointed out by Kubicek et al (1997: 9), the k-society-topic was a technology-focused idea that – until the 1990s – failed to capture the public's imagination. Nevertheless, the governments of many countries, with the USA, Japan and the European Union belonging to the foremost, embarked on political programmes aiming at the construction of k-societies. In the following paragraph, I will highlight some activities of these three early players.

US-American Activities

The internet, which can be regarded as the technological foundation of k-societies, has its roots in the US-American defence-sponsored research project called the ARPANET. The ARPANET was designed to build a communication network that could withstand nuclear attack. This network should enable defence-sponsored scientists to share computer resources. It was developed in the late 1960s in several university research laboratories in the western United States and eventually grew from two dozen sites in 1971 to 200 sites in 1981. In 1993, 160 countries were connected and the internet as a communication infrastructure with mailing services, file transfer and news groups was created (King/Kraemer, 1995: 5). Besides the ARPANET, several other private companies built their own networks. IBM for example built the VNET. In order to enable communication between these networks,

gateways were introduced. Yet, these gateways created problems arising from the lack of standardisation, for example in the way addresses were spelt out. In order to straighten these irregularities, a set of conventions was drafted and published in the network community. The publication of these conventions basically marks the beginning of the internet, combining the varying networks that existed until then.

In 1992, governor Bill Clinton and senator Al Gore picked up this development of the enormously fast growing internet and ran a successful presidential campaign, promoting the support of this new telecommunication infrastructure. This 'information infrastructure', as named by Clinton and Gore, was quickly given the name 'information superhighway' by the public. A few months after taking power, the Information Infrastructure Task Force (IITF), composed of high level representatives from various ministries, was formed under the lead of the then Minister of Trade, Ronald H. Brown. Additionally, the IITF was accompanied by the advisory council, constituted by high level representatives from business, scientific community and non-government organisations. In September 1993, the IITF published the Agenda for Action, a mix between declaration and action plan. Here, the National Information Infrastructure (NII) was defined as a "seamless web of communication networks, computers, databases, and consumer electronics that will put vast amounts of information at users' fingertips" (IITF, 1993). The access to information should lead to an information revolution which was supposed to introduce sustainable changes to human lives, work and interaction. As main actor, the Agenda for Action identified the private sector. The state (federal, state and communal governments) should act as moderator and fill in the gaps neglected by the private sector. From the state, it demanded the following:

1. promotion of private investments via tax policy & regulation;
2. extension of universal access at a reasonable price;
3. promotion of technological innovations and new applications also through state financed research programmes;
4. promotion of the invisible, interactive and user oriented op eration of the NII by changing regulations;
5. information security and net reliability;
6. improving the management of radio signals;
7. protection of copyrights;
8. cooperation of state, communal and foreign governments;
9. creation of access to government information.

One year after founding IITF, a progress report was published (IITF, 1994a). Furthermore, the working group on applications published the broad spectrum of applications of that time (IITF, 1994b). The outline involved topics such as e-commerce, industry applications, disaster management, schools, libraries and art. The Advisory Council, founded in 1993, published three reports during its three year activity (US-Advisory Council on the National Information Infrastructure, 1995, 1996a, 1996b). The reports focus on how to create broader access to NII and the possible tasks of schools and libraries in this process.

The question of universal access was increasingly recognised by IITF. Consequently, the government appointed the National Telecommunications and Information Administration (NTIA) with the task to suggest ways of assuring universal access to the government in preparation for a telecommunication reform. The reform of the telecommunication law was executed in 1996, aiming at the deregulation of the telecommunication sector (Kubicek, 1999: 70). Further areas of legal reform were copyright, data security and coding, control of illegal discriminating contents as well as the equipment of schools. In the second term of the Clinton-/Gore-administration, the focus shifted to numerous projects aiming at the final user. Hence, NII was continued to be built, but at a more user-oriented level than before.

The Clinton-/Gore-administration managed to introduce the topic of ICTs to the public (Read/Youtie, 1995: 101). Reasons for this might have been the visionising character of the Agenda for Action, the booming growth of internet technology and, the use of the term 'information superhighway' which drew an analogy to the construction of the interstates, the US-American motorways, that link the different states (Kubicek, 1999: 70/71).

Activities of the European Union

On the level of the government of the European Union, the conceptual idea of a k-society, first mainly termed 'information economy' gained relevance in the early 1980s. In November 1983, the Council of Europe established the Senior Officials Group on Telecommunications (SOGT) as an advisory group to the European Commission. Additionally, a subgroup of SOGT was formed with the name GAP (Group d'Analyse et de Prévision) in order to support the European Commission in the long-term development of the telecommunication networks (Campbell/Konert, 1998: 73-74). Aiming for economic growth and employment, ICTs were identified as key technolo-

gies. Consequently, research and development in this field was, in competition with Japan and the USA, especially supported.[1] Two examples are, ESPRIT (European Strategic Programme on Research in Information Technology – since 1984) as well as RACE (Research and Development in Advanced Communications Technologies in Europe – since 1988). Providers of telematic applications were supported by programmes, such as DELTA (Developing European Learning through Technology Advance) and DRIVE (Dedicated Road Infrastructure for Vehicle Safety in Europe).[2] These research programmes were accompanied by the Commissions Action Plan on Telecommunications (EC, 1984). The further telecommunication politics of the European Union were mainly structured by the "White Paper on the Completion of the Community-wide Market for Goods and Services", published in 1985 (EC, 1985) and the "Green Paper on the Completion of the Common Market for Telecommunication Services", published in 1987 (EC, 1987). With the beginning of the 1990s, the European Union widened its focus from explicitly ICT-development to additionally ICT-applications. In 1993, the Commission published a White Paper entitled "Growth, Competitiveness, Employment – The Challenges and Ways forward into the 21st Century" (EC, 1993). This White Paper emphasised the importance of trans-European networks as stimulation for the European economy and a decrease of unemployment. The construction of information networks and European networks in the transport and energy sectors were to be of prime importance. The increased focus on the effects of ICTs on work processes resulted in a decrease of the terms 'electronic highways' and 'information economy'. Hence, the European Commission adopts the term 'information society' and reasons that Europe focuses its activities, differently to the USA, on the social aspects, including education (Kubicek, 1999: 73). This White Paper forms the basis for the foundation of a high-level expert group in cooperation with representatives of the industry. In 1994, the expert group, headed by Martin Bangemann, presents its report "Europe and the Global Information Society – Recommendations to the European Council" at the EU-summit in Corfu (Bangemann, 1994). The report outlins the following steps to shape Europe's way into a k-society: (a) the liberalisation of Europe's telecommunication markets; (b) the creation of a common regulatory framework regarding standardisation; (c) the protection of intellectual property rights; and (d) respect of privacy and the security of data transmission. The expert group argues in this report that the best support for information networks and services would

[1] For details, see Vogel, 2000: 324-333.
[2] For details, see Campbell/Konert, 1998.

be open and competitive markets. The Bangemann-Report can be regarded as EU's master-document and key reference point for policy initiatives related to the electronic communication sector (Preston, 1997: 282). On the basis of this Bangemann-Report and after being requested to do so by the European Heads of State and Government, the Commission of the European Union published the action plan "Europe's Way to the Information Society" in the same year (EC, 1994). This action plan focuses on the following four areas: (a) the regulatory and legal framework; (b) the networks, services, applications, and content; (c) the social and cultural aspects; and (d) the promotion of k-society.

Some pilot projects for the development of networks, applications and new services should be conducted under the management of the Information Society Project Office (ISPO), created in December 1994. Furthermore, it became increasingly obvious to the Commission, that a European k-society is not merely centered on questions concerning technology, industry and the legal framework, but that a political agenda is required. In preparation to this, the Commission forms the Information Society Forum in 1995, embracing themes such as public services, culture, and consumer protection. Furthermore, the forum articulates the aim of shaping a European k-society to the public. In July 1996, the Commission publishes the "Green Paper on Living and Working in the Information Society: People first", which focuses on social aspects of k-society (EC, 1996a). In November 1996, the Commission adopts the k-society action plan, entitled "Europe at the Forefront of the global Information Society". This action plan builds on completed, pending and ongoing actions and is updated regularly (EC, 1996b). The liberalisation of the European telecommunication sector is fully completed in the beginning of 1998. Yet, one aim, advancing during the liberalisation process, is the assurance of universal service by rules and procedures, implemented and financed by the European Commission (Niebel, 1997: 66).

Due to the eEurope 2002 initiative of the European Commission in December 1999, Europe's political leaders meet in March 2000 on an EU-summit in Lisbon. Here, the target of developing Europe into "the most dynamic, competitive and knowledge-based economy in the world by 2010" is formulated (EC, 2000a). Consequently, the European Council publishes the eEurope 2002 action plan in June 2000 (EC, 2000b). It is designed to speed up and extend the use of the internet to all sectors of the European society. It seeks to bring European citizens online in all aspects of their lives, allowing them to participate in and benefit from the possibilities offered by digital technologies. In June 2002 at the Seville European Council, the eEurope

2005 Action Plan is launched and endorsed by the Council of Ministers in the eEurope Resolution of January 2003 (EC, 2002). It states the aim to develop public online services (eHealth, eLearning and eGovernment) and a dynamic environment for e-business through widespread availability of broadband access at competitive prices and a secure information infrastructure. In February 2004, a mid-term progress report is published, emphasising the need for sharing experience between the member states and tailoring services to user needs. In June 2005, the European Commission sets out a new strategic framework, entitled i2010 – A European Information Society for Growth and Employment. The progress made by eEurope 2005 as well as by i2010 is assessed in a benchmarking report in December 2005 (EC, 2005: 2). Main trends identified are: (a) broadband roll-out is a clear success; (b) disparities between the member states have not yet been reduced; (c) connectivity of enterprises is high throughout EU25; (d) availability of online public services has continued to grow; (e) all member states are confronted with the challenge of extending k-society to people with little or no formal education, those not in employment and older people (EC, 2005: 2-3).

Activities of Japan

From the late 1960s onwards, the term 'information society' is frequently used in reports and publications, mainly written in account of government administrative bodies. The aim of most reports is to assess the arising Japanese k-society as well as to identify activities guiding this development. Special focus lies on the impact of technological development, specifically in the field of microelectronics, and on social and economic processes of transformation (Steinbicker, 2001: 18). Nevertheless, it is important to note, that at the end of the 1960s in Japan, k-society is still regarded as a revolution inside the system of the industrial society. The idea, that k-society might replace industrial society only emerged with the beginning of the 1970s.

In 1971, the Japan Computer Usage Development Institute produces a governmental action plan with the title "The Plan for an Information Society: A National Goal towards the Year 2000". As main actor, the Ministry for Industry and Trade (MITI) (renamed into Ministry of Economy, Trade and Industry (METI) in 2001) steps up, with its main role being the fostering of synergy-effects between research and industry, the public sector and non-governmental organisations (Vogel, 2000: 286-288). Similarly to the IITF in the USA, the plan identifies the private sector as main actor in the process of

creating k-society. Besides this, the plan paints an image of a future society: a central state controlled database; linked up telesystems in the medical field; programmed school lessons, which foster an ICT-embracing attitude; an information system for small and medium sized enterprises; and a centre for retraining parts of the work force. Mattelart (2003) describes it as a "Computepolis", a city, completely linked via personal computers, with automatic traffic planning, mega-supermarkets with hardly any staff, computer guided transport vehicles, and fully automated air-conditioning systems (2003: 91/92). Merely one year after "The Plan of an Information Society" was published in Japan, the Federal Ministry of Education and Science of Germany publishes a German translation of the report with the title "Japan's Technological Strategy" (Japans Technologische Strategie, 1972). Hence, the activities of other players, i.e. Japan, were monitored by the German government.

By the late 1970s, attention is turning away from direct incentives for investment and towards the promotion of inventions (Morris-Suzuki, 1996: 212). In order to stimulate corporate creativity, the Very Large Scale Integration (VLSI) project is set up under the auspices of MITI's National Research and Development Programme in 1976, focusing on the development of microchips. With the beginning of the 1980s, MITI defines the three following fields of research as main areas of innovation and research heavily supported by the government: new materials, biotechnology and new forms of microelectronic technology (Morris-Suzuki, 1996: 214). Several highly government-financed research projects follow, yet their success cannot be compared to the one of VLSI in establishing the microchip industry of Japan. In 1985, the Key Technology Promotion Centre is set up jointly by MITI and the Ministry of Posts and Telecommunications. By the early 1990s, the Key Technology Promotion Centre has supported several hundred research projects, mainly in the area of microelectronics. In the eyes of MITI, its activities in the information sector proved to be successful, when Japanese companies slowly took over a major market share in the hard drive and personal computer producing industry. Also, they established themselves in the production of video and audio systems (Mattelart, 2003: 93). The hopes of a better future, fostered by the development of the microchip, video and audio systems industry were, in Japan, popularised by the futurist Yonej Masuda. In his book, "The Information Society as Post-industrial Society", published in 1980, Masuda describes a future society, in which intellectual creativity wins over the consumer society, self discipline is socially integrated and humans live in harmony with the nature (Masuda, 1980). Nevertheless, in the 1990s, the Japanese government turns away from its former strong focus on the computer industry and in-

creasingly emphasises the reformation of the educational system as well as basic research, in order to provide for potential long-term development. Interestingly, this change in focus shows a clear parallel to the developments in Singapore, discussed in chapter 9 (Vogel, 2000: 323).

In 1994, MITI publishes a "Programme for Advanced Information Infrastructure" focusing on the expansion of the information technology network, connecting businesses, research institutions, offices and corporate production sites (MITI, 1994). With reference to private homes, the programme looks at video-on-demand technology as well as at the further developing of two-way large-capacity, high-speed communication services. Due to the awareness that Japan lags behind other nations in the informatisation of the public sector, this is addressed by this programme. In 1999, the Ministry of Posts and Telecommunications in Japan publishes a White Paper, entitled "Communications in Japan 1999" (MPT, 1999). This White Paper assesses the impact of the internet on the status of the information and communication industry and policies of Japan. This assessment contributes to the formulation of the IT policy package of the Japanese Government, entitled "E-Japan Strategy", which is formally decided by the cabinet in January 2001. Its main objectives are the following (Noguchi, 2003: 71):

1. to increase the volume of e-commerce in 2003 to ten times the level of 1998;
2. to make available the world's most advanced communication networks by 2005;
3. to increase the number of MA and PhD holders in IT-related fields to a level comparable to the USA;
4. invitation of thirty thousand highly skilled foreign workers.

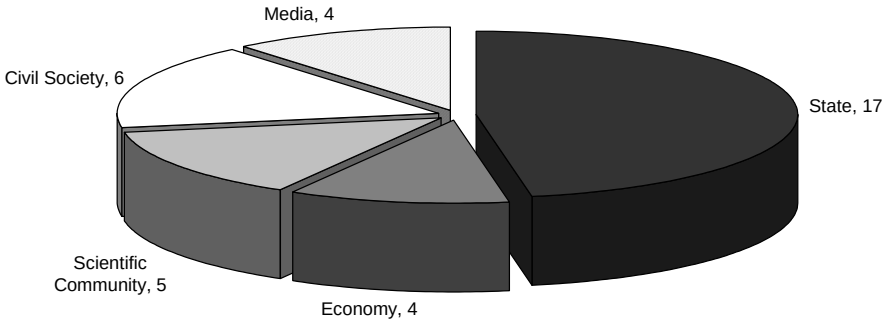
According to Noguchi, the E-Japan Strategy nevertheless focuses mainly on communication facilities. Noguchi argues that the construction of transport infrastructure does not necessarily contribute much to improving the quality of life. Furthermore, Noguchi criticises, that government data on the internet are rather insufficient. Even the E-Japan Strategy paper was, after publishing, not available on the internet (2003: 72).

As pointed out by Tuomi (2001: 4), each of the three countries, USA, EU and Japan, legitimised their activities towards k-society with their current situation. While Japan hoped for a solution to the hollowing out of its manufacturing industry, the European initiative has to be understood as a reaction to the pressures of global competition and as a transnational reaction to increasing unemployment. In the USA, the information superhighway was re-

garded as a solution to the U.S. infrastructural crisis and advanced as a presidential campaign topic (Schneider, 1997: 345).

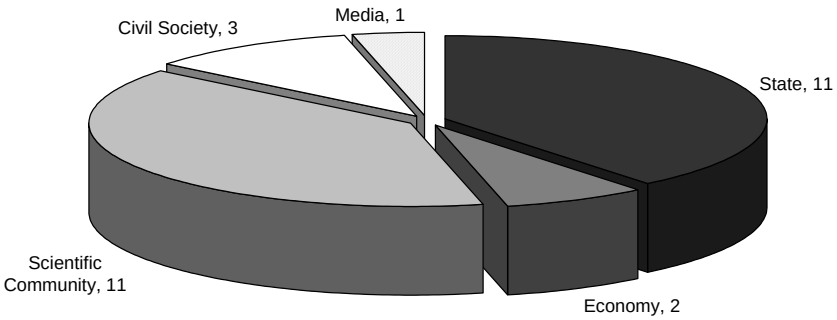
Appendix B Interview Partners in Germany

Diagram A-1: Interview Partners in Germany according to their Subsystem-Affiliation



Appendix C Interview Partners in Singapore

Diagram A-2: Interview Partners in Singapore according to their Subsystem-Affiliation



Appendix D German R&D-Politics

Table A-1: Development Phases of German R&D-Politics

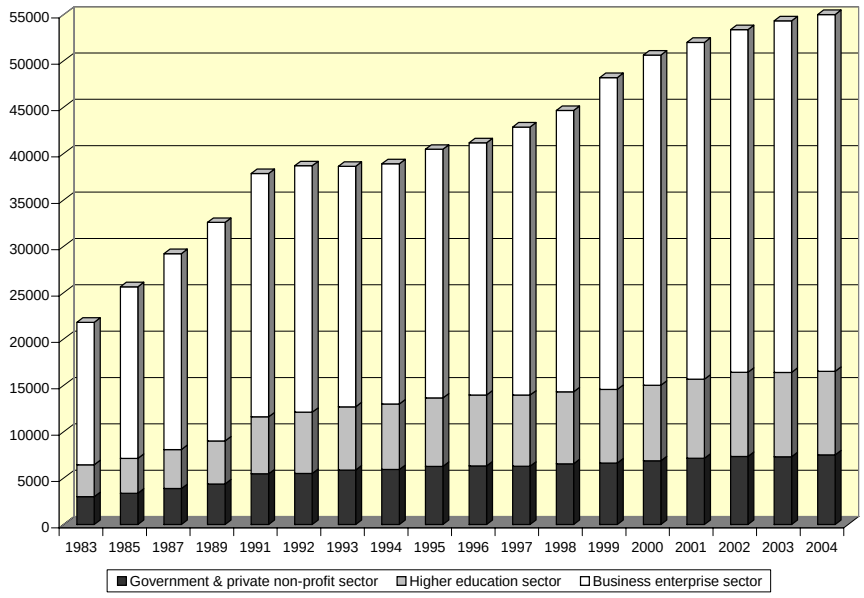
Characteristics Phase	Central Aim	Foci	Organisation	Main Support Instruments	Responsibilities
Laissez-faire-phase (1949-1955)	Reconstruction	Low support, founding of research institutes	Founding of e.g. Fraunhofer-Society	Institutional support	Decentral with the states
Imitation & Catch-up Phase (1955-1966)	Reaching world standard	Nuclear and weapon research, astronautics	Founding of large research institutes	Institutional support of large research institutes	Predominantly with the states
Make-up & Innovation Phase (1966-1972)	Closing of technological gap	Data processing, key technologies	Continued founding of research institutions, BMBW	Institutional & project funding of international projects; programme support	Federal government gains importance
Phase of Efficiency Increase (1972-1982)	Modernisation and restructuring	Industrial innovations	Few foundings, BMFT	Direct project funding & indirect funding	Federal government dominating
Conservative Modernisation Phase (1982-1990)	Strengthening of market forces, deregulation, principle of subsidiary	Basic research, key technologies, aviation and astronautics	Few foundings, BMFT	Institutional funding, indirect funding, research in networks	Federal government dominating
Phase of Reconstructing East Germany (since 1990)	Construction of research in eastern Germany	Construction/ Modernisation of east German research institutes	Coordinating bodies, e.g. Advisory board for Research, Development and Innovation[3], BMFT/BMBF	Institutional support, direct project funding	States re-gain competencies and responsibilities

Source: Bräunling und Harmson, 1975: 11; Fuchs, 1992: 54-100; Fleck, 1990: 47-59 quoted by Vogel, 2000: 159; translation by the author.

[3] Rat für Forschung, Entwicklung und Innovation

Appendix E Expenditure on Research and Development in Germany

Diagram A-3: Expenditure on Research and Development [4] by Sectors
- million Euro –

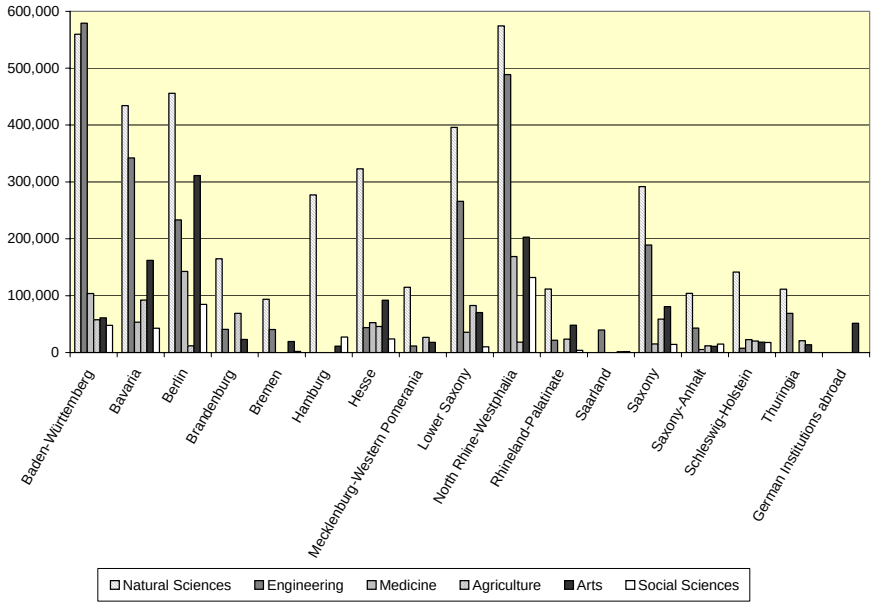


Source: Compiled by the author based on Statistisches Bundesamt, 2006c, last updated on 31 March 2006.

[4] Until 1989 former territory of the Federal Republic of Germany, from 1991 Germany; Universities 2003 in this diagram are estimated.

Appendix F Expenditure of Public Research Institutions in Germany

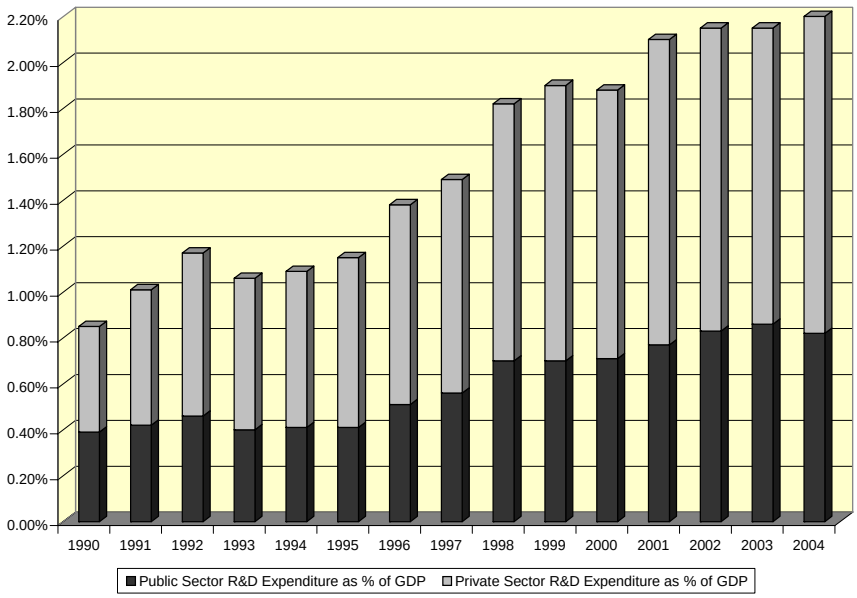
Diagram A-4: Expenditure of Public Research Institutions in 2002 - by States and Research Areas not Indicating Total Spending - thousand Euro -



Source: Compiled by the author based on Statistisches Bundesamt, 2004: 19.

Appendix G Singapore's R&D Expenditure

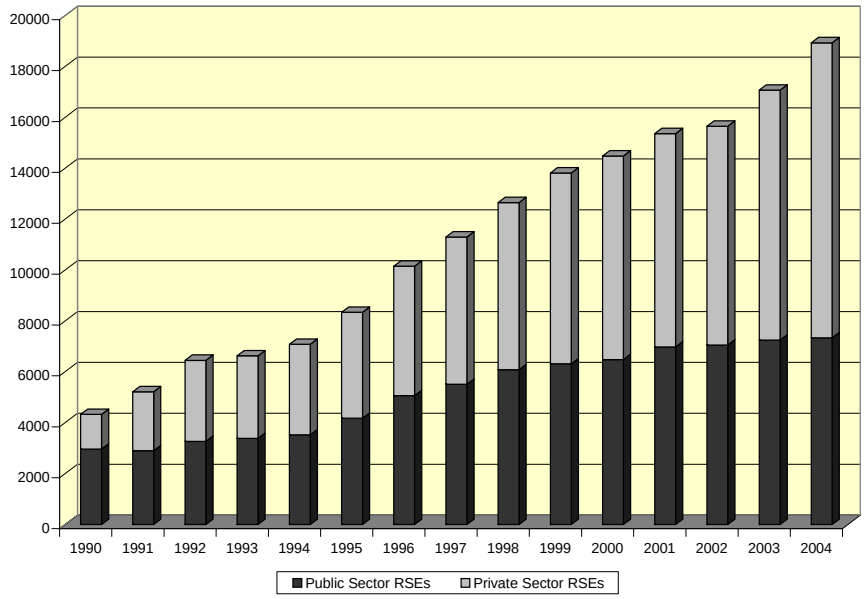
Diagram A-5: Time Series of Singapore's R&D Expenditure
- % of GDP -



Source: Compiled by the author based on A*STAR, 2005: 26

Appendix H Increase of Research Scientists and Engineers (RSEs) in Singapore

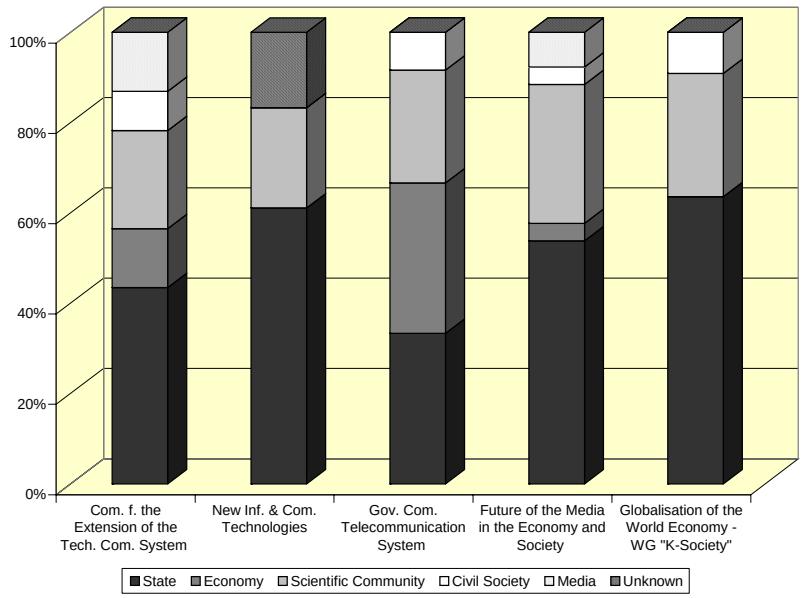
Diagram A-6: Increase of Research Scientists and Engineers (RSEs) since 1990s
- in total numbers -



Source: Compiled by the author based on A*STAR, 2005: 26.

Appendix I Subsystems' Presence in German Government Commissions

Diagram A-7: Subsystems' Presence in each German Commission separately - in % -

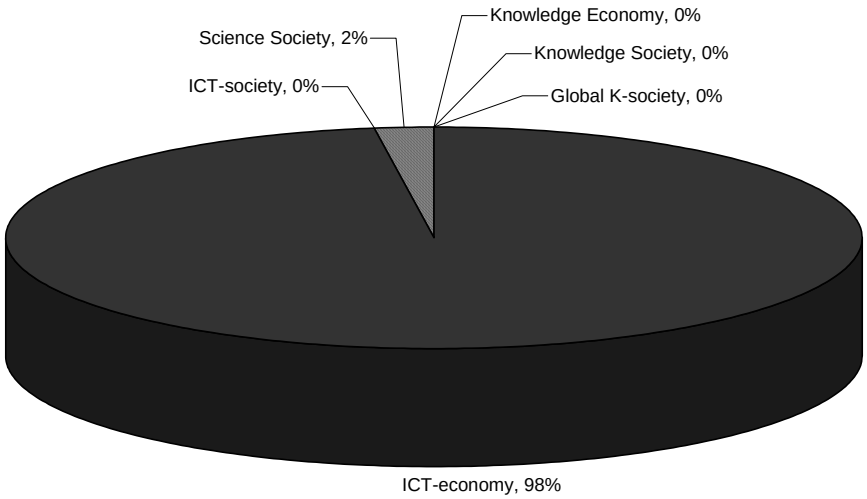


Source: Composed by the author based on DBt, 2002: 604-611; DBt, 1995: 163-167; DBt, 1983: 2; KtK, 1976: 15-17; Regierungskommission Fernmeldewesen, 1987: 10-11.

The diagram above illustrates in percentage the representation of the subsystems state, economy, scientific community, civil society and the media in each commission of the German government contributing to a German k-society separately.

Appendix J Categorised Recommendations of the "Commission Telecommunication System"

Diagram A-8: Categorised Recommendations of the "Commission Telecommunication System"
- in % -



Source: Composed by the author based on Regierungskommission Fernmeldewesen, 1987: 2-8.

The main recommendations formulated in the final report are as follows (Regierungskommission Fernmeldewesen, 1987: 2-8):

1. Telekom keeps the net monopoly as long as she rents out cables to appropriate and competitive conditions;
2. Telekom keeps the monopoly on the telephone service. All other services shall be offered under competitive conditions;
3. the liberalisation shall be accompanied by competitive price politics on the rented telephone lines;
4. Telekom shall not possess a monopoly on the production of end-user devices and instruments; and
5. a multitude of structural changes shall support the liberalisation process and assure that the German Federal Post can face the competition while at the same time fulfil infrastruc-

tural tasks. These structural measurements shall include organisational aspects, as well as aspects concerning the tax law, human resources, as well as activities raising the market oriented engagement of the German Post.

Appendix K Five Interim Reports of the Enquete-Commission "Future of the Media in the Economy and Society – Germany's Road into the Information Society"

The five interim reports of the enquete-commission "Future of the Media in the Economy and Society – Germany's Road into the Information Society" as well as the dates of submission to the German *Bundestag* are listed below:

1. Freedom of opinion, diversity of opinion, competition – Broadcasting and Regulation Requirements of the New Media, date of submission: 07.11.1996;
2. New Media and Copyright, date of submission: 30.06.1997;
3. Protection of Minors in the Multimedia Age, date of submission: 04.05.1998;
4. Security and Protection in the Internet, date of submission: 22.06.1998a;
5. Consumer Protection in the Information Society, date of submission: 22.06.1998b.

The first interim report "Freedom of Opinion, Diversity of Opinion, Competition – Broadcasting and Regulation Requirements of the New Media" outlines the current and future media-political developments, with specific focus on the consequences of the new media on the dual broadcasting system and the media concentration in Germany. Additionally, the interim report discusses social, political and economic opportunities of the telecommunication technologies (DBt, 07.11.1996: 4). The second interim report "New Media and Copyright" discusses a topic which is of direct importance to the economic but also societal development in a k-society. It focuses on the economic exploitation of knowledge and therefore looks at the k-society as a knowledge economy. The enquete-commission acknowledges the economic potential of knowledge, as well as the rapidly changing environment of ICTs and consequently changing requirements to copyrights. The enquete-commission recommends the development of national and international per-

spectives and legal frameworks securing copyrights.[5] The third interim report "Protection of Minors in the Multimedia Age" (DBt, 04.05.1998) addresses the decreased possibilities of control over violent, racist and pornographic content in the new media.[6] With this assessment of social consequences of ICTs, the third interim report addresses topoi that are grouped in diagram 8-2 as defining knowledge society. The fourth interim report "Security and Protection in the Internet" (DBt, 22.06.1998a) aims at high safety standards in utilising ICTs.[7] This includes a safe technological infrastructure, the protection of personal privacy and an appropriate legal infrastructure. Hence, two definitions of k-society are inherent in this report: (a) k-society as ICT-economy (technological and legal infrastructure) and (b) k-society as knowledge society (social consequences). The fifth interim report "Consumer Protection in the Information Society" (DBt, 22.06.1998b) is concerned with the protection of end consumers in electronic transaction, such as transactions through the internet.[8] It therefore addresses topoi that stand for a definition

[5] Nevertheless, the commission advises to refrain from strongly reforming the existing German copyright until the changed requirements, changed due to the information and communication technologies, become clearer (DBt, 30.06.1997: 4).

[6] In the first part of the report, the commission analyses national measurements of control in the new media as well as the increased requirements for regulation internationally. In the second part of the report, the commission formulates recommendations for protection of minors in the new media. Strong emphasis is put on voluntary self-control and media pedagogy. Furthermore, the importance of an enlightened society and responsible parents, who are aware of the potential dangers coming with the new media, is underlined (DBt, 04.05.1998: 4-5).

[7] In doing so, the report contains three main parts. In the first part, the commission assesses the technological, organisational and political preconditions for a secure information infrastructure, including the topic of data protection. The second part addresses data as well as privacy protection which is essential for raising the acceptance of information and communication technologies amongst the citizens. The third part of the report looks at security in the internet out of the perspective of criminal law. Similarly to the third interim report, the fourth report underlines the increasing importance of self protection when using information and communication technologies. Yet, self protection requires an awareness of the underlying dangers. The report aims to raise this awareness in society (DBt, 22.06.1998a: 1).

[8] Electronic business transactions will increase in numbers if the end consumer feels protected. This feeling of safety has to be produced by securing consumer rights in electronic transactions just as much as in non-electronic, traditional transactions. The commission recommends slight adaptations of the national consumer protection law as well as enhanced international cooperation in the field (DBt, 22.06.1998b: 4).

of k-society as an ICT-economy (technological and legal infrastructure) as well as an ICT-society (application of ICTs in order to raise its usage).

Appendix L The Government Programme "Information Technology" – Areas of Action

Five areas of action are identified (DBr, 07.06.1984: 3):

- Improvement of the competitiveness of Germany and Europe by increasing risk capital, market opening and innovation-oriented supply;
- motivating citizens to embrace the technological challenge with information campaigns and an increased usage of ICTs in education;
- stimulating innovative markets by extending the communication infrastructure and innovating the sector of end device production;
- broadening the technology base in order to secure the Defence ability of Germany on a long-term basis;
- intensifying and concentrating the research capacities of Germany in the area of information technology with the aim to develop a public and private R&D capacity that corresponds in quality and quantity with the international competition.

Appendix M The Government Programme "Information Technology 2000" – Aims

Six aims (DBr, 19.10.1989: 4):

1. Developing the economic and technological conditions enabling a broader and more efficient application of ICTs. New markets shall be conquered, the competitiveness of the Germany strengthened, jobs secured and new jobs created;
2. improving the conditions of development, production and marketing of components, devices, software and services in the field of information technology in order to participate in the international markets;

3. strengthening basic research on information technology; improving the cooperation between research institutes, universities and enterprises as well as supporting the development and application of information technologies in small and medium-sized enterprises;
4. utilising the potential of information technologies in the fields of environmental procetion, improvement protection, improvement of work conditions, efficient energy use and fulfillment of state tasks;
5. utilising ICTs in long-term, economically viable concepts for the extension of the communication and transport infrastructure. An area-wide extension of these infrastructures shall decrease distances and therefore reduce disadvantages of rural production sites and peripheral regions;
6. the educational system shall embrace ICTs and prepare citizens of all age groups and educational backgrounds for participating in these new developments.

Appendix N The Government Programme "Info2000: Germany's Road into the Information Society" – Aims and Detailed Initiatives

The main aims formulated in "Info 2000" are (BMWi, 1996: 8):

1. Utilisation of growth and employment opportunities;
2. increase of competition on the markets for information technological products;
3. intensifying the dialogue between economy and society;
4. expertise-building for increased usage of information technologies in all areas of the educational sector;
5. securing Germany as a research and science hub in the field of information technologies;
6. extension of an efficient infrastructure for information and communication;
7. utilisation of modern information technology for a more efficient and citizen-oriented administration;
8. intensified usage of information and communication technologies in economy and areas of public interest, such as

transport, environmental protection, health system, education;
9. protection of privacy rights in using information technologies;
10. improving access to up-to-date data from science, technology and industry by the means of information and communication systems;
11. matching national and European policies;
12. structuring international cooperation on the basis of the principles on the information society, passed by the G7-Conference.

Some of the main activities outlined in detail:

Under "Liberalisation of the Telecommunication Market", the federal government states in the action plan that a new telecommunication law shall be passed by summer 1996. The draft is presented to the German *Bundesrat* on 09.02.1996 and passed by the German *Bundestag* and *Bundesrat* on 18.06.1996 (DBr, 09.02.1996; DBr, 28.06.1996). It is only fully implemented by 01.01.1998. Also by summer 1996, the federal government aims at drafting a law concerning the information and communication services. On 20.12.1996, the federal government presents a draft of the "Information and Communication Services Law" (*Informations- und Kommunikationsdienste-Gesetz* – IuKDG) (DBr, 20.12.1996). After multiple changes, the law is passed by the German *Bundestag* and *Bundesrat* on 13.06.1997 (DBr, 13.06.1997). It comes into force fully on 01.01.1998.
In order to foster the dialogue between industry and civil society groups concerning the k-society, the "Petersberg-Circle" is founded. This Petersberg-Circle accompanies the developments of a German k-society with conferences, publications and awareness building amongst industry, scientific community and society until today. Nevertheless, its activities have decreased with the decreasing popularity of the topic in the past years. In addition to the Petersberg-Circle, the government (BMW & BMBWFT) initiates the "Forum Info2000: Social and Cultural Challenges of the Information Society". The forum offers a platform for discussing the challenges ahead. In eight working committees, different topics concerning the development into a k-society are discussed amongst representatives of the state, scientific community and industry (Goerdeler, 21.02.1997). The Forum Info2000 is renamed as "Forum Information Society" in the action plan "Innovation and Jobs in the Information Society of the 21st Century", published in 1999.

In order to promote research and development, the action plan states the drafting of a conceptual framework "Innovations for the Information Age 1997-2001". In 1996, the Federal Ministry for Education and Research initiates a consultation process with the economy, scientific community and labour unions, in order to compose a conceptual framework 1997 – 2001, entitled "Innovations for the Information Society". On 29.10.1996, BMBF sends out a draft of the concept to all engaged actor groups asking for feedback (BMBF, 1996). On 16.07.1997, the parliamentarian secretary Elke Wütting answers a request of Dr. Manuel Kiper, Member of Parliament concerning the date for completing and passing this conceptual framework (DBt, 18.07.1997). The parliamentarian secretary replies that it should be passed in the same year after the summer break. At the end of 1997, BMBF submits a concept with the title "Innovations for the Knowledge Society 1997-2001". This concept is heavily criticised by SPD due to its focus on traditional support of research on ICTs, not of research on their societal consequences, the changes taking place due to these technologies and the possibilities of the state to monitor and channel these changes (DBt, 29.04.1998). The requested changes are rejected by the German *Bundestag* on 24.06.1998 (DBt, 24.06.1998: 22709).

Appendix O The Progress Report "Info2000: Germany's Road into the Information Society"

The progress report lists the following activities as results of the action plan „Info2000", published in 1996 (BMWi, 1997: 3-7, translation by the author):

1. Improvement of legal conditions
   - Passing of the Telecommunication Law (Telekommunikationsgesetz – TKG); eradication of the telecommunication monopoly as well as the founding of an independent regulating body from 01.01.1998 onwards.
   - Passing of the Information and Communication Law (Informations- und Kommunikationsdienste-Gesetz – IuKDG) on 01.08.1997, which assures competition on the markets of information and communication technology.

2. Dialogue with industry and society
   - Founding of Forum "Info 2000" as a platform for discussing the op-portunities and risks of ICTs with all actors of society.
   - Founding of the discussion group "Petersberg-Kreis" with represent-tatives from industry, scientific community, labour unions and state concerning economic-technological questions of the information society.
   - Improving the publicity of the federal government by installing web-sites for nearly all federal ministries as well as publishing information material on the information society.
3. Educational system
   - Adaptation of existing and creation of new job descriptions in alli-ance with the requirements of the information society.
   - The initiative "Schools on the Net" shall assure internet access for 10.000 schools from 1996 to 2000.
   - Support of multimedia-applications in universities, with a focus on media-based learning and library applications.
4. Support of research and development
   - The research concept "Innovations for the Knowledge Society" shall further R&D in the field of information technologies.
   - Increase of R&D funding in the field of microelectronics as basic technology.
   - The R&D-programme "Labour and Technology" shall contribute to an efficient and socially justified application of technology in the work field.
5. IT-strategy of the public administration
   - Equipping all federal offices with modern ICTs.
6. Norms and standards
   - Adaptation of ICT-norms on a national, European and international level.
7. Applications
   - Initiative "Telework" (10.1996) capitalizing the potential for growth and employment inherent in telework.

- Pilot project "Commercial Use of Information and Communication technologies by Small and Medium sized Enterprises" (05.1997) promoting the commercial usage of the technologies in these enterprises.
- Preparing initiative "Electronic Business Communication" (autumn 1997) raising the acceptance and usage of ICTs in business interaction.
- Supporting the usage of ICTs in the fields of nutrition, agriculture and forestry; e.g. by founding a German Information Centre for Agriculture (Deutsches Agrarinformationsnetz – DAINet).
- The "Economic Forum Traffic Telematic" aims at the use of ICTs in street traffic;
- In cooperation with the states, a German Environmental Informa-tion Network (Deutsches Umweltinformationsnetz – GEIN) is developed.

8. European and international governmental cooperation

- Cooperation with the European Union in order to create a body of rules and regulations, outlining the road into Europe's information society.
- International cooperation in the Organisation for Economic Coop-eration and Development (OECD), International Telecommunication Union (ITU), World Trade Organisation (WTO), World Intellectual Property Organisation (WIPO) and the Council of Europe. Main focal areas are the prevention of illegal content in the internet, cryptology, reduction of trade barriers for ICT-products, liberalisation of basic-telecommunication services and protection of intellectual property.
- Involved in projects with other G7 countries supporting eBusiness transactions in SMEs and the health sector.
- Organising the international conference "Global Information Networks: Making use of the Chances" in cooperation with the Commission of the European Union on 06 to 08 July 1997.

9. Coordination on the national level

- Forming an inter-ministerial committee on the level of permanent secretaries as coordinating body for national initiatives towards a German information society.

Appendix P Action Programme "Innovation and Jobs in the Information Society of the 21st Century" - Aims

The overall ten aims of this action programme are the following (BMWi/BMBF, 1999):

1. increase of ICT usage in all areas of economy and society with the aim to occupy a top position internationally;
2. assurance of all groups of society participating with equal chances for males and females in the usage of ICTs;
3. ensuring the interests of the community, protecting human dignity, rights of minors and consumers, right of informational self-determination as well as the possibility to protect sensitive information;
4. modernisation of the education system with the aim to teach every student some basic knowledge of responsible ICT-utilisation;
5. sustaining and extending the high level in basic research as well as the development of ICT applications;
6. extension of the information and communication infrastructure;
7. increasing the use of ICTs in small and medium enterprises for a rise in innovativeness, flexibility and productivity;
8. exploiting the potential of ICTs for an ecological modernisation along the guidelines of AGENDA 21, passed in Rio;
9. utilisation of ICTs in all sectors of the public administration in order to increase efficiency, improve public relations and communication between federal administration and citizens, enterprises and organisations;
10. promoting European and international cooperation for shaping the road into the global information society.

Appendix Q The Progress Report "Information Society Germany – Innovation and Jobs in the 21st Century" – Indicators for Implementation and New Targets

The following indicators of successful implementation are stated (BMWi/BMBF, 2002: 5-10):

1. the number of internet users over 14 years of age rose from 14 million at the end of 1998 to more than 30 million. The quota of female users increased from 30% in 1998 to 43% mid 2001;
2. in autumn 2001, all schools were equipped with internet access. Nearly all students use personal computers for their studies;
3. the number of mobile users doubled in 2000 and grew further in 2001 up to 56 million;
4. the economic sector of the information and communication technologies contributes with more than 800.000 employees up to 7% to GNP;
5. eCommerce in Germany with a turnover of ca. € 20 billion ranks highest in Europe.

The progress report lists the following new targets (BMWi/BMBF, 2002: 8-10):

1. raise the number of internet users above 14 years of age up to 70% until 2005;
2. expand broadband communication as dominating access technology;
3. promoting education as key task in the information society;
4. support mobile and multimedia eBusiness initiatives;
5. raise the portion of small and medium enterprises with eBusiness-strategies up to 20% until 2005;
6. expand eGovernment by offering more than 350 services online;
7. promote target oriented, applied IT-research;
8. together with the industry increase net security;
9. increase the quality of life by promoting innovative applications in the sectors health, transport and environment;
10. further European and international cooperation.

Appendix R Criticism mentioned by Interview Partners concerning the Conceptualisation and Implementation of German Federal Government Action Plans

During the interviews conducted for this study, the 36 interview partners in Germany (see Appendix B) mentioned the following criticism with regard to the conceptualisation of the action programmes "Innovation and Jobs in the Information Society of the 21st Century" and "Information Society Germany 2006":

Table A-2: Criticism concerning Conceptualisation of Action Plans

Criticism	State	Econ.	Sc.Com.	Civil S.	Media	Total
Activities existed already before action programme	7	1	3		1	12
Industry, Academia and People S. should participate stronger in conceptualisation		1	4	3		8
Focus on big, partly over-sized projects			1	1		2
Focus on straw-fire like effects, rather than sustainable programmes	1	1	2	2	1	7
Focus on technological and economical rather than aspects of social development	2	1	3	4	1	11

Interestingly, 12 out of 36 interviewees mentioned the fact that many activities stated in the two action programmes already existed beforehand as something negative, 7 of these 12 representing the federal administration itself. The second most mentioned criticism is the focus on technological and economical development rather than aspects of social development. Representatives of the scientific community as well as the civil society especially called for increased participation in the conceptualisation. Representatives of all subsystems criticised the little emphasis on the sustainability of projects and mentioned, that many activities are like straw-fires, big and publicity-effective but one-off shows. Therefore the criticism was much weaker concerning the focus on big, partly oversized projects that are very costly but not necessarily output-effective. This was only mentioned by 2 interviewees.

Concerning the implementation processes of these action plans, the interview partners in Germany focused on the following aspects:

Table A-3: Criticism concerning Implementation of Action Plans

Criticism	State	Econ.	Sc. Com.	Civil S.	Media	Total
Lack of monitoring		3	1	1	1	6
Lack of coordination amongst ministries		3	2			5
Lack of publicity work	3	1		2	2	8
Fragmentation of federal, state and municipal activities	2	2	1	2		7
Unsatisfying transformation of work processes (eg. eGovernment)		1				1

Concerning the implementation of the activities stated in the programmes, 5 out of 36 informants mentioned a lack of coordination amongst ministries. Here, the informants mainly criticised the ineffectiveness caused by rivalries amongst BMWA and BMBF as well as that concerning the eGovernment initiative BundOnline between BMWA and BMI. Furthermore, mainly representatives of the economy criticised a lack in monitoring the implementation processes which is also expressed in the following statement by the Head of the Knowledge Centre of Accenture:

> "The programmes implement, what was originally planned in 1999, ignoring the developments worldwide in this area. Hence, the conceptualisation of the plan might have been quite advanced originally but the implementation is not monitored and adapted accordingly. In Canada for example, eGovernment-services are only made available online, if one knows, that they are used. In Germany, it is impossible to find out how often certain eGovernment-services are used. Either because it is kept secret or because it is not monitored. And I am quite sure, that the later one is the case. And that's how we will not save any money with eGovernment" (S. Falk, 25.10.04, interview with & translation by the author).

In accordance with this, informants also criticised the fragmentation of federal, state and municipal activities. Due to a lack of coordination between these three levels, solutions and concepts for certain initiatives were developed twice or simply not interconnected well enough. This, as well as a lack of publicity work, advertisements and information campaigns are held responsible by 8 informants for a lack of acceptance by citizens which results in low user rates for example concerning eGovernment-services. Connected

to these eGovernment-services, one informant also criticised that the work processes involved in certain service provision are until today very similar to the traditional work processes. Hence, ICTs are used for service provision but not for actually making the work processes within the administration more efficient and effective. According to this informant, Chairman of the eGovernment Work Group of the industry association Bitkom, eGovernment will not lead to any cost reductions.

Besides this criticism concerning the implementation processes, 7 of the 17 interviewed representatives of the state, 2 from the academia, one representing the people sector and one representing the media were of the opinion that the programmes of the federal government are of much lower importance to the everyday life of citizens than the initiatives of the municipalities and states.

Therefore it can be concluded, that the action programmes certainly fulfil the purpose of legitimising national politics and play a major role in constituting the information society of Germany as a political topic. Furthermore, the action programmes accompany the conceptualisation and implementation of a multitude of different programmes, subsume all federal ministries under their umbrella and act as initiator for further projects and initiatives towards a German information society conducted by the economy, the scientific community, civil society and the media. Nevertheless, the action programmes are all working programmes, i.e. their conceptualisation as well as implementation has to be criticised and could always be improved.

Appendix S The Government Programme "Information Society Germany 2006" – Description of New Initiatives, Future Areas of Engagement and Targets

Description of New Initiatives (BMWA/BMBF, 2003):

The German Internet Prize, for example, is a yearly awarded price to small and medium enterprises for outstanding internet-innovations. Prizes and awards are publicity-effective, economical but not necessarily sustainable initiatives that become especially popular when the state budget is low. In the area of applying ICTs in economy, BMBF finances several research projects enhancing software engineering

in SMEs (project "Software Engineering 2006") as well as the development of optical networks ("MultiTerraNet"). Yet, these projects were not initiated by the action plan but existed already before hand. In the field of applying ICT in education as well as closing digital divides, the initiatives "Women on the Net" and "Schools on the Net" that were mentioned in section 8.2.3 are complimented by the initiative "Youth on the Net" which equips up to 10.000 youth centres with computer and internet workplaces until June 2006 (www.jugend.info). Concerning eGovernment, the federal government under the auspices of the Federal Ministry of the Interior continues its BundOnline Initiative. As described in section 8.2.3, the progress of BundOnline was recently evaluated as second best eGovernment-project within the European Union (Government Computing, 21.06.2005). Within the framework of BundOnline, the federal government offers multiple competence centres which provide basic components for the usage of online services of the government. One example is "Elster" (*Elektronische Steuererklärung*), the electronic tax return. Elster enables the tax offices to process income, business, turnover and wage tax electronically. Additionally, the initiative "Germany Online" – as mentioned in section 8.2.3 – aims at the coordination and further development of all eGovernment projects in Germany (including the federal, state and municipal level). Furthermore, a virtual job market is installed in December 2003 under the auspices of the Federal Office of Labour (www.arbeitsagentur.de). Besides initial problems with the usability of the online job market, the costs involved with this project are generally criticised. In January 2004, the Federal Office of Labour announces a cost increase from scheduled €77m to €100m (golem.de, 19.01.2004). In February 2004, allegations due to assumed corruption are made against the Federal Office of Labour, which nevertheless could not be proved (Heise, 27.02.2004). A rather successful project is "Atlas" (*Automatisiertes Tarif- und Lokales Zollabwicklungssystem*) under the auspices of the Federal Ministry of Finances. Atlas is responsible for the usage of ICT for commercial goods transfer across the borders of Germany. Atlas enables custom processes to be electronically applied for, executed and archived (www.zoll-d.de/atlas).

Four areas for future engagement are identified:

1. Digital Economy for Growth and Competitiveness;
2. Education, Research and equal Opportunities;
3. eGovernment, Security and Trust in the Internet; and
4. eHealth. Within these four areas, the action programme sets specific targets and a timeframe within which they shall be reached.

The main targets comprise the following (BMWA/BMBF, 2003: 10-11):

1. Internet use: increase to 75% of population, especially female users by 2005;
2. broadband: increase to 7m lines by 2004 and to >20m lines by 2010;
3. total digitisation of broadcasting services through aerial, cable and satellite by 2010 for TV and 2015 for radio;
4. Germany leading the way in developing reliable software and IT-systems by 2006;
5. increase penetration of new media in schools, vocational training institutions and universities by 2006;
6. development and enhancement of eScience applications by 2004;
7. "Germany Online": launch of 15 implementation projects by 2003 and implementation of 50% of the "Germany Online" projects by the federal, state and local governments by end 2005;
8. "Federal Government Online": online provision of all 440 Internet-capable services by 2005;
9. launch of the virtual employment market by end 2003;
10. introduction of 40m 'job cards' by end 2005;
11. introduction of 80m health cards by end 2005.

Appendix T Singaporean Expert Committees and Resulting Action Plans

Table A-4: List of Singaporean Expert Committees and the Resulting National Action Plans

Expert Committee		National Action Plan	
1980	Committee on National Computerisation	1981 – 1985	National Computerisation Plan
1985	National IT Plan Working Committee	1986 – 1991	National IT Plan
1991	IT2000 Committee	1992 – 1999	A Vision of an Intelligent Island – The IT2000 Report
		2000 – 2003	Infocomm21
1994	Library 2000 Review Committee	1994 – 2004	Library 2000
2002	Economic Review Committee (Workgroup on Creative Industries)	2002 –Today	Creative Industries Development Strategy
		2003 –Today	Connected Singapore
2003	Economic Review Committee		
2005	Library 2010 Review Committee	2005 –Today	Library 2010

Appendix U Singapore's "National IT Plan" – Seven Prongs

The seven prongs are the following (National IT Plan Working Committee, 1985: vi-vii):

1. IT-Manpower: IT professionals shall be developed into "highly skilled champions" for exploiting IT;
2. IT-Culture: Promotion of a "supportive culture" in order to prepare Singapore's citizens "for their role in the emerging information economy";
3. Information Communication Infrastructure: Maintaining the best telecommunications facilities in the world for "a differential advantage in the Information Age";

4. IT-Application: Overcoming the "technological phobia" of new users by providing assistance and exploiting IT further in all economic sectors;
5. IT-Industry: Promotion of a powerful IT industry as a driving force "to push the economy towards a higher level of performance";
6. Climate for Creativity and Entrepreneurship: Developing an "Indigenous capability in applied research in IT" in order to benefit from advanced technological applications. This requires "a stimulating environment which promotes creativity and enterprise".
7. Co-ordination and Collaboration: Uniting the efforts of various organisations under the leadership of a new National Committee on IT in order to realise the full potential of IT.

Overall the committee formulates 22 recommendations – for each of these strategic building blocks 2 to 4 recommendations, which provides each block with Singapore-specific areas of action (National IT Plan Working Committee, 1985: 54-56).

Appendix V "IT2000" Planning Process

In 1990, NCB felt the need for a new IT master plan (IT2000) focusing on ICT-infrastructure as well as applications. In order to write such a plan, a comprehensive consultation process was designed, identifying eleven industry sectors, most relevant to the Singaporean economy. Eleven sectoral groups were formed for identifying strategic inter-organisational applications for their sector (quotes from then NCB directors can be found in Neo/Soh, 1993: 8). They were chaired by representatives from Telecom, NCB secretariat, other government statutory boards, and tertiary education institutions. Together with their chair, then NCB chairman Tan Chin Nam, they formed the IT2000 steering committee. Each sectoral group comprised of about fifteen CEOs and senior managers of business corporations and government agencies, two experts from the universities and a five-person support team from NCB (NCB, 1992: 57-63). They met once a month over a five-month-period in order to brainstorm and evaluate strategic ideas of application for their sector. Furthermore, one NCB manager, supported with a four-person team, worked with the chairperson of each sectoral group in order to facili-

tate the planning process. The NCB team provided all background information required (studies on IT trends, IT applications in other countries, national IT agenda etc.) and developed a structured planning process for the sectoral groups that would provide them with an exact time table and work agenda (Neo/Soh, 1993: 8). Therefore, this consultation process offered multiple insights into the needs of the economy, while the economy was provided with a direct channel for communicating their interests to the state administration. This consultation process is until today commonly used by IDA, as confirmed in an interview with William Hioe, at time of the interview Senior Director, IDA: "Today, it is the same consultation style as the one that was done in the process leading to IT2000, where more than 200 people from the industry were engaged in eleven subcommittees. So we hear what the industry has, in terms of their future vision and their industry growth. Then we look at it from the technological side to see how IT can bring about those future possibilities that they are dreaming about and try to solve some problems that have been nagging them. So it is a two way process in the sense that we are looking at it more from the technological and the regulating kind of view while people from the industry look at it more from the business kind of view and then we can see how the two can marry" (W. Hioe, 02.03.05, interview with the author). According to Hioe, the possible influence taken by the economy has increased over the past years: "In fact over the last few years we are asking the industry to take more the lead rather than the government telling them, this is the way."

The IT2000 planning process was based on 4 principles:

1. application-driven: strategic application ideas and concepts from key industry sectors intended to increase Singapore's competitiveness;
2. network infrastructure: for establishing linkages across sectors and between businesses and home users;
3. actionable: specific projects were regarded as systems engineering projects which developed strategies and schedules for implementation;
4. top-down and bottom-up planning approaches with feedback loops in-between: sectoral planning and conceptualisation of the network infrastructure were top-down while business functions, activities and information flow in industry sectors were studied bottom-up.

As quoted by Neo and Soh (1993: 7), an NCB director explains: "In our research and overseas trips, we did not come across any national IT planning benchmarks or methodology that we could adopt. Therefore, we had to develop the IT2000 planning methodology using the planning practices of large diversified business enterprises."
Soh/Neo/Markus (1993) call the planning process leading to the IT2000-report "the first effort of its magnitude in terms of the number of sectors examined and the number of industry managers involved".

Appendix W "Infocomm21" – Six Strategic Thrusts

In order to do so, the plan defines six broad strategic thrusts (IDA, 2000: 5-6):

1. Singapore as premier infocomm hub: developing into a global infocomm hub with strong links to other infocomm technology centres and marketplaces worldwide. Aim: among the top two infocomm hubs in Asia-Pacific by 2005;
2. Singapore businesses online: developing into a trusted, global e-business hub where business-to-business and business-to-consumer eCommerce play dominant role. Aim: among top three worldwide and first in Asia-Pacific for eCommerce infrastructure, among top five worldwide and first in Asia-Pacific for eBusiness readiness by 2002;
3. Singapore government online: developing eGovernment further. Aim: among top five eGovernments worldwide by 2002;
4. Singaporeans online: developing into infocomm-savvy society with pervasive e-lifestyle. Aim: among top five infocomm-savvy societies worldwide;
5. Singapore as infocomm talent capital: position itself as infocomm talent capital and eLearning hub. Aim: among top two infocomm talent capitals and eLearning hubs in Asia-Pacific, by 2005;
6. Conducive pro-business and pro-consumer environment: foster pro-business and pro-consumer policy and regulatory environment in order to foster the development of the New Economy.

Concerning the first strategic thrust "Singapore as a premier infocomm hub" (IDA, 2002: 6-12), the report is surprisingly positive by referring to the growth of the infocomm industry revenue from 1998 to 2000 by 30%. Its contribution to Singapore's GDP in 2000 was estimated as 5-6%. The affect of the global recession in 2001 on the Singaporean infocomm industry is regarded as less threatening since the industry appears to remain resilient to it. In order to foster the positive development further, IDA recommends a further expansion of the broadband network with increasing emphasis on content production, the nurturing of local enterprises, as well as spearheading the development of a wireless industry cluster fostering the increased use of mobile technologies. Concerning the second strategic thrust "Singapore business online" the report concludes that eCommerce in Singapore continues to grow in business-to-business as well as in business-to-customer transactions (IDA, 2002: 13-17). The report refers to the ranking given in the World Competitiveness Yearbook 2001, which rated Singapore's eCommerce infrastructure first in Asia and fifth worldwide (IDA, 2002: 14). Altogether the report states six fields of action in which state and industry players improved the eBusiness- and eCommerce-infrastructure of Singapore. These areas include securing online transactions, cost-effective ePayment services, reviewing the electronic transaction act, promoting secure and trusted eBusiness practices as well as self-regulation in the production of Internet content. In order to catalyse the digital transformation of businesses, IDA is promoting eCommerce amongst small and medium enterprises (SMEs). Concerning the third strategic thrust "Singapore government online" (IDA, 2002: 18-21), the report states that in January 2002, 66% of all government services that are suitable as online services were online available. Yet, it aims at reaching the 100% margin by December 2002. Furthermore, the report lists several online applications in detail. Evaluating the possibility to file income tax online, the report states that 36% of all taxpayers (nearly 700.000 citizens) made use of it in 2001. Besides online applications, the eGovernment initiative also aims at innovating operational processes by installing a shared public service infrastructure for common work processes in all government agencies. Concerning the fourth strategic thrust "Singaporeans online", the report lists several indicators for the connectivity of Singapore's citizens and concludes that existing activities are working well although not all citizens have been reached until then (IDA, 2002: 22-25). In order to bridge the assessed digital divide, IDA engages the industry into a PC Reuse Scheme in which second-hand PC's are used to equip community and cultural centres and therefore increase the access to ICTs and internet. Several other programmes address specific groups in society (ethnic groups, seniors or citizens with disabilities). Con-

cerning the fulfilment of the fifth strategic thrust "Singapore as Infocomm Talent Capital", the report refers to several manpower programmes promoted by IDA, which are supposed to accelerate infocomm training and skill acquisition on five levels of qualification (IDA, 2002: 26-28). Concerning the sixth strategic thrust "Conducive pro-business and pro-consumer environment", the report refers to policies and initiatives implemented by IDA in order to foster an environment of collaboration and competition (IDA, 2002: 29-30). Examples include the liberalisation of the telecommunication sector, the instalment of a Competition Code of Practice and Interconnection Framework for the infocomm industry and the National Trust Council enhancing secure eCommerce.

Appendix X "Connected Singapore" – Strategies & Foundational Blocks

Strategy 1 "Infocomm for Connectivity, Creativity and Collaboration" aims at an increase of ICT usage in order to enable every citizen to make use of the technology for work, play, lifestyle and learning (IDA, 2003A: 8-11). This includes the maintenance, further development and increase in pervasiveness of the national infocomm infrastructure including the implementation of Wireless Internet Service Providers (WISPs). Furthermore, this infrastructure has to be filled with applications and content. Therefore, IDA leveraged a "Creative Connections Programme" which shall make heritage and artistic resources available on Singapore ONE. Under the umbrella of the "Got to Be Connected-Programme", several projects focusing on the increase of infocomm literacy are conducted.

Strategy 2 "Digital Exchange" aims at developing Singapore as a leading global digital distribution and trading centre. It therefore targets at increasing the value of digital transactions through Singapore from SGD$150m (2003) to SGD$500m by 2006. As ways of achieving this, the plan states the intention to develop an end-to-end infrastructure that integrates the processes of digital production, management, localization, archival and distribution. Furthermore, digital content has to be secured and efficient treasury functions for copyright management installed (IDA, 2003A: 12).

Strategy 3 "Engine of Growth" targets at the creation of new economic activities in the IT-sector, making use of Singapore's traditional hub status (2003: 13-17). It is the aim to increase the contribution of the IT-industry to GDP from 7% (2003 to 10% by 2012. As potential new growth areas, IDA

identified five clusters: (a) value added mobile services; (b) infrastructure for wireless and wired networks; (c) multimedia processing and management; (d) web services and portals; and (e) security and trust infrastructure. Also, the report stresses Singapore's potential as test bed for IT-related products. The report speaks of Singapore as a "digital living lab". In corporation with Microsoft, IDA put up a programme named ".Net MySingapore", which aims at developing and testing mainly community web services in corporation with local partners from economy and scientific community, as well as Microsoft. In the telecommunication sector, IDA ensures competition and therefore low prices. Furthermore, Singapore in October 2002 becomes the first GPRS Roaming Exchange Peering Point in Asia and hopes to build on this for further telecommunication usage.
Strategy 4 "Agent for Change" concerns the usage of ICTs for higher efficiency in businesses and government agencies (2003: 18-21). Here, IDA builds on the achievements of the Civil Service Computerisation Programme (1980-1999) and the first eGovernment action plan (2000-2003), followed by the second eGovernment Action Plan from 2003 to 2006. Several work processes shall be improved in order to increase eGovernment usage.

The implementation of these strategies is based on three foundational blocks, namely "capability development", "technology planning" and "conducive business environment". The foundational block "capability development" includes manpower training programmes, competency centres and the Infocomm Local Industry Upgrading Programme (iLIUP) which basically fosters relationships between MNCs and local enterprises in order to encourage the exchange of technology, expertise and domain knowledge. The foundational block "technology planning" aims to assist the leadership in the infocomm industry to strategically plan forward in order to set technology directions. Hence, IDA prepares an Infocomm Technology Roadmap which outlines the technology landscape of Singapore in comparison to worldwide developments. This roadmap shall assist the industry in identifying business opportunities. Furthermore, IDA cooperates with industry partners and other government agencies to conduct technical trials for new technologies. The Information Technology Standards Committee (ITSC) promotes the adoption of international and establishes national infocomm standards. The foundational block "conducive business environment" focuses on the establishment of pro-business regulations and policies in the telecommunications industry, and promotes the eliminations of foreign investment restrictions and barriers in order to achieve free market access (IDA, 2003a: 22-27).

Appendix Y "L2000" – Strategic Thrusts & Key Enablers

The strategic thrusts include the following:

1. An adaptive public library system comprising a national reference library (ultimate reference centre), specialised reference libraries (e.g. law and medical libraries of NUS), public libraries (comprising regional, community and neighbourhood libraries), as well as special libraries (school libraries, business & arts library, ISEAS-library);
2. a network of borderless libraries by connecting the libraries of Singapore with overseas libraries and databases as well as providing online library access to users from their homes, offices and libraries through NII. Also, inter-library loans island-wide shall be made possible;
3. co-ordinated national collection strategy which empowers each library to be responsible for a certain range of collection in order to avoid duplications and maximise collection coverage nationally. Also, materials in native languages from China, Malaysia, Indonesia and India shall be acquired and the usage of libraries liberalised, meaning opened for everyone;
4. quality service through market orientation: public libraries have to face competition from a host of lifestyle and leisure activities to attract people as library users through publicity programmes and the taking of fees ensuring that library meet real market demands;
5. symbiotic linkages with business and community in order to became part of the social fabric of Singapore. Library locations should be part of cultural, educational and commercial complexes;
6. global knowledge arbitrage: Singapore's libraries shall support its citizens with information relevant in building links to developing economies such as ASEAN, China, India, etc. by providing assimilated, disseminated knowledge on the region. Singapore shall become a centre of knowledge arbitrage by gathering, analysing, distilling, collating and making available useful information to businesses.

The implementation of these six strategic thrusts shall be facilitated by the following three key enablers:

1. Human resource development: adapting current librarian training courses to the requirements of the information age, retraining existing librarians as mediators between users and technologies for retrieving the required information, revising the scheme of remuneration for librarians;
2. technology (ICTs) should be exploited for the improvement of library services (information retrieval) as well as library operations;
3. organisational leadership: establishing a statutory board with a flexible structure and effective management system in order to implement the Library 2000 recommendations.

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