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Abstract

In the field of regional cluster research, it is argued that it is possible to differentiate between the output of an individual actor and the output of a group of actors within the same cluster. In this discussion, the term 'emergence' is often connected to the observation that the whole is more than the sum of its parts and that emerging phenomena are created bottom-up from individual actions or communications. In this short essay the general question of how to explain emergence phenomena in regional high-tech clusters is raised. In order to answer this question, two sociological approaches – Luhmann's functional systems theory on the one hand and practical theory on the other – are explored and a look is taken at how each theory understands these processes and the resulting phenomena. Finally, a conceptual framework combining suitable elements from both theories and applicable to emergence processes and phenomena within regional high-tech clusters is outlined.

Zusammenfassung

In der Forschung zu regionalen Wirtschaftsclustern wird oftmals argumentiert, dass man zwischen dem Output einzelner Akteure und dem kollektiven Output mehrerer Akteure unterscheiden kann. In diesem Zusammenhang wird oftmals der Begriff der Emergenz ins Feld geführt. In diesem kurzen Essay gehe ich vor diesem Hintergrund der Frage nach, wie Emergenzprozesse in regionalen Clustern erklärt werden können. Hierzu diskutiere ich Emergenzkonzepte in zwei soziologischen Theorierichtungen, der Theorie funktionaler Systeme von Niklas Luhmann und den Theorien sozialer Praktiken. Abschließend schlage ich vor, zur Erklärung von Emergenzprozessen in regionalen Clustern konzeptuelle Bausteine aus beiden Theorierichtungen zu nutzen.

Keywords

Emergence, regional cluster, structural complexity, social practises

Schlagwörter

Emergenz, regionale Cluster, strukturelle Komplexität, soziale Praktiken

Contents

I. Introduction

In the field of regional cluster research, it is argued that it is not only possible to differentiate between cluster-internal and -external actors, but also between the output of an individual actor and the output – a result of the relations established through 'club-like interactions' (Steinle/Schiele 2002) or other forms of co-operation – of a group of actors within the same cluster. It is impossible to trace this output exclusively to any single actor and thus there can be no privileged access to it (to utilise or protect it). In addition to the advantages of positive externalities (knowledge spillovers, specific inputs of supporting industries, local labour markets) mentioned, for example, by Marshall, Beaudry and Breschi, the following aspects emerging from regional clusters can be identified: The establishment of special communication codes and social norms, better utilisation of various learning strategies facilitated by spatial proximity and the establishment of future-oriented collective knowledge bases (cf. Beaudry/Brecshi 2000). In this discussion, the term 'emergence' is often connected to the observation that the whole is more than the sum of its parts and that emerging phenomena are created bottom-up from individual actions or communications. In order to explain emergence processes, regional research often draws on the concept of 'collective learning'. According to the concept of 'collective learning', it is possible to start the investigation of emergence phenomena at meso-level (Jonas 2005). Here, the emergence of collectively shared knowledge depends on three prerequisites: the development of a common language, the establishment of specific knowledge about actual co-operation opportunities and the development of a common consensus on organisational problem solving strategies (Keeble et al. 1999). Naming the prerequisites for the creation of emergence phenomena, however, does nothing to explain the processes involved in meeting these prerequisites. Following this assessment, the general question of how to explain emergence phenomena in regional high-tech clusters is raised. In order to answer this question, two sociological approaches – Luhmann's functional systems theory on the one hand and practical theory on the other – are explored and a look is taken at how each theory understands these processes and the resulting phenomena (II. and III.). Finally, a conceptual framework combining suitable elements from both theories and applicable to emergence processes and phenomena within regional high-tech clusters is outlined (IV.).

II. Emergence and structural complexity

Niklas Luhmann's social systems theory provides an approach to the question of how new characteristics and elements could emerge or arise from regional innovations systems. However, one should not expect to find the term 'emergence' at the centre of Luhmann's theory. Quite the contrary is true: The term 'emergence' comes closer to being a metaphor or

a narrative component used to accomplish a better characterisation of the mechanisms behind social systems.

(1) According to Luhmann, the elements of social systems (e.g. those taking the form of actions or communications) are not ontological entities; within the systems, they only exist in terms of relationalisation – i.e. how they relate to and behave towards each other (cf. Luhmann 1987: 42f.). Elements cannot be disassembled at system level; a system can only constitute or change itself via the relations among its elements (cf. Luhmann 1987: 43). Consequently, emergence phenomena are not materially predetermined either, instead they are created by relationalisation at system level. Emergence takes place, firstly, if a system forms its own structural complexity and secondly, if it uses this structural complexity to organise its autopoiesis.

(2) A system is structurally complex if, because of its limited interconnection capacity, an element can no longer be connected with every other element (cf. Luhmann 1987: 46). This means that social systems have to be 'compulsory selective'. Complex social systems are based on the selection of element relations which can be used for development and self-preservation. As a result, instead of asking of how simple elements can be turned into a complex structure – or how 'parts' can be connected to form a 'whole' and where the added value is to be found – (cf. Luhmann 1987: 50) the focus of the question is now shifted to understanding complexity. This can be expressed in terms of differences in complexity: Analytically, systems which are characterised by 'intangible' (or 'chaotic') complexity, i.e. systems where every element is connected to every other element, can then be distinguished from systems which are characterised by structural complexity, i.e. systems where only certain elements are connected with each other (contingently). The same differentiation applies to the complexity regarding a system and its environment.

(3) Secondly, the term 'emergence' is used to describe phenomena which arise from a structurally complex social system and which cannot be related to the characteristics of their components, as for example the intentions of actors (cf. Luhmann 1997: 134) but instead are produced autopoietically. Luhmann follows the assumption that the operative closure of a system is linked to the creation of inherent complexity – i.e. emergence. Clear boundaries have to be established if a system is to distinguish itself from an environment through its own internal order of interconnected elements. Only then will the self-production of elements – or self-reference – be triggered and the construction of a complexity that is inherent to the system be enabled (cf. Luhmann 1997: 135, Küppers/Krohn 1992). The theory of self-organising systems argues that self-reference in social systems leads to a recombination process involving existing system elements which creates both new qualities and new elements. Following Luhmann's line of argument, social systems operate with communications whose interconnection relies on sequencing. Interconnections of this kind are time-consuming and characterised by a high risk of disintegration. Hence, social systems are faced with the problems of 'chain formation' and 'branching' (or 'branchability'). These

problems are solved at the communication level. System complexity is generated if communication is exposed to itself. This means that every communication exposes itself to and anticipates queries, scepticism, approval, and disapproval. This creates indefinite complexity, which can only ever be presented as a temporary solution from an observer's perspective and always remains a phenomenon to be explained yet (also cf. Teubner 1992). This also means that complexity cannot only be constructed but that it can also be deconstructed (cf. Heijl 1992).

(4) The central feature of the qualities and elements mentioned above is their autonomy in contrast to previous system constellations (cf. Teubner 1992). Thus, elements are conceptualised as time-sensitive entities or events. The construction of complexity requires recursive operations, i.e. it draws on previous and subsequent, as opposed to currently effective, operations within the same system (cf. Luhmann 1997: 139). From a system theory perspective, emergence is not simply the accumulation of complexity, it entails interrupting and restarting the construction of complexity (cf. Luhmann 1987: 44). Social systems set their own operations according to their internal status at the time, which means that their operations are unique and that any repetition will have to be adapted to the respective system. In social systems, complexity is represented in the form of meaning, namely by means of distinguishing reality from opportunity or – from an operative point of view – by means of distinguishing 'matter-of-factness' from potentiality. Redefining meaning is always linked to other opportunities to update or potentialise. Thus, selectivity within all operations becomes an inevitable necessity for the construction and preservation of system complexity and therefore of emergence.

III.   Emergence and social practises

Action theory concepts usually avoid the term 'emergence' when analytically describing emergence phenomena. A promising action theory conceptualisation of such phenomena can however be found in the so-called 'practical constitution theories' (Joas 1992), which has gained in importance during recent years. This is not a homogeneous sociological theory but a conglomeration of concepts from various social science disciplines and lines of discussion which do however share a number of conceptual elements (Reckwitz 2003). Based on action theory, this theoretical conception is directed at a social theory which does not only explain actions but which also analyses the formation and effect of social structures. Neither 'action' nor 'communication' are defined as the minimum unit and pivotal element of this approach, instead, the focus is on 'social practices'. Advocates of this discourse, as for example Joas (1992), like to point out that they, in contrast to Luhmann or other practitioners in the field of system theory, are not in favour of an essentialistic interpretation of social systems under the assumption of an a priori existing system. Instead, the system concept is exclusively applied to the empirically provable reciprocity between individual and collective actors (cf. Joas

1992: 325). Systems are defined, in accordance with e.g. Giddens, as reproduced relations between actors or collectives which are organised as regular social practices (Giddens 1984).

But what does the concept of social practice actually mean? Among the many definitions on offer are three which can be considered particularly useful. The first one, by Schatzki, defines social practices as "a temporally unfolding and spatially dispersed nexus of doings and sayings" (Schatzki 1996: 89). According to Reckwitz, social practices are a standardised, routinised and socially 'comprehensible' bundle of activities which actors can fall back on in their actions (Reckwitz 2003: 289). The sociologist Hörning, on the other hand, understands social practices as a complex of various lines of action and procedures, including any form of deliberately withheld actions (Hörning 2001). These practices constitute an emergent social level which cannot only be found in the environment of the practicing individuals (cf. Reckwitz 2003: 289) but also within the individuals themselves. The explanation of emergence processes and phenomena starts from exactly this level.

At this point, a brief introduction to the concept of social practices will be given, followed by a closer look at the underlying concept of emergence (4). There are several terms and key points in various definitions that help to give a clearer picture of social practices: (1) The localisation of social practices on a collective level, (2) the integration of manifestations and artefacts and (3) the central role of (establishing) routines.

(1) On the first point: The origin of the concept of social practices can most certainly be found in the theory of action. The relationship between individual actors and practices can be efficiently specified with the help of an action-based perspective, because practical approaches help to explain lines of action at a collective level. 'Practices' refers to the repetition and repeatability of a complex of actions which is 'typically' produced by various individuals in different situations. This means that actions are never seen isolated but always occur within the context of space and time. By and large, followers of practical approaches are critical of individualistic and monadic perspectives. Thus, contrasting other sociological approaches, motivation is not seen as the sole driving force behind lines of action. Lines of action, together with their intended and unintended consequences, are not seen as the outcome of isolated individualistic actions. The focus of analysis is shifted away from an individual persons who acts at a specific time and place on the basis of determinable attitudes or incentives. Actions are not analysed in terms of goals and means, they are seen as being part of a framework of social practices. In short, instead of analysing isolated actions, practices – or bundles of lines of actions - are analysed. Practices could be seen as a kind of uniform or context-based cloak which a person wears to match the occasion. The observational focus is not so much on the person itself but rather on the 'cloak'. Actors in regional clusters, for instance, adopt practices by a specific choice of clothes, gestures or localities to meet each other. Under this perspective, the significance of objects, events or actions is determined by means of social practices.

(2) On the second point: Compared to other approaches from the theory of action, the practice-oriented approach to interpreting social processes is characterised by some additional aspects to be discussed at this point: This perspective enables studying the interactive processes of greatly varying actor constellations; and it is possible to link the development of knowledge and skills to the manifestation or embodiment of actions. A person engaging in practices is likely to move his or her body in a noticeably specific way. One example for this is the quality control of micro-technology components where workers have to visually check hundreds or even thousands of parts. The workers minimise errors by developing specific routinised movements which put less strain on the eyes. And specific routines are needed for the exchange of knowledge at the regional level where staffs from different companies are given the opportunity to exchange information about their respective quality control routines. Within the concept of social practices, routinised movements and implicit, sequentially used forms of knowledge and comprehension are part of the same phenomenon: Without the respective knowledge and comprehension, the actors (or doers) would not be able to produce corresponding uniform body movements. According to, amongst others, Giddens, actors have a practical consciousness, to wit: a practical, interpretative knowledge. This knowledge is then used in actions and linked recursively to body movements. Put to use, the practice can be confirmed or refuted and is thus open to change. Actions can be interpreted as continuously updated action routines, which are shaped in 'physical' interaction with the environment. This enables researchers to include – the otherwise theoretically and empirically neglected – artefacts in the analysis of lines of action. Artefacts, like clothing, product components, architecture and so on, are integral and constituting elements of social practices.

(3) On the third point: Social practices constitute normality for actions. This normality is characterised by a combination of frequently and regularly dealing with oneself, with artefacts and with others. Under favourable circumstances, normality holds the prerequisites for collective learning processes, as for example a common cluster specific language or specific knowledge about actual co-operation possibilities. Normality materialises in collective action patterns and styles, while the action practices are updated according to the situation at hand: If faced with a situation requiring action or interaction, actors fall back on already existing, routinised practices. Within the concept of social practices, structure is created by routine, or better: by actually realised routines. But, as mentioned earlier, action – even if it is embedded in structure – is also taking place in form of a process. These processes can be found in 'interpretative work'-situations, in which the situation itself is subject to interpretation and thus decisions can be made to alter routines. Usually situations are dominated by existing practices. But this is not to be mistaken for a mere repetition of collectively established and well-trained conducts. The concept of social practices divides the social world into two opposing categories: with routines on the one hand and unpredictability and change on the other (Reckwitz 2004). This means that practices can be categorised according to the relative rigidity regarding repetitions and the relative flexibility regarding failures, re-interpretations and potential conflict in a given situation. The logic of social

practices – despite, following Weber, their traditionalistic character – does not lie in the sole repetition of routines but in varying degrees of uncertainty and the resulting context-based chance for re-interpretation. This leads to a 'capacity' to innovate or to preserve that lies far beyond mere reproduction. It is this capacity which will now be used to explain the concept of emergence.

(4) In order to be consistent, change or preservation of a practice cannot be based on the actors' ability to directly and individually exert influence. The sociologist Andreas Reckwitz (2000; 2003) emphasises that the aspects of this capacity are inherent in the social practices themselves. These aspects are firstly the ongoing contextual and situational processes and secondly the timing or event sensitivity of social practices.

Firstly, the ongoing contextual and situational processes are responsible for a constant examination and potential revision of social practices because the acquired knowledge and competence have to be adapted to the respective context and situation. Situations, according to Joas (1992: 236), are not 'mute', they expect actions: Even though practices – as mentioned before – can be routinely reproduced, these routines can be disturbed. This is not only true for every-day interactions. One example from the sociology of science and technology demonstrates that the construction and production practices for technical artefacts, like high-frequency antennae, have to be changed if a substitute for one of the basic materials is used, if, for example, metal is substituted for plastics. If change did not take place in the early stages of product-design, the functionality of the new plastic antennae would be at stake. Irritating factors could for example be 'new' or unpredictable events, persons or artefacts, which can then lead to failure, disruption or change. Emergence phenomena can be created at any time. They are based on the adaptation of social phenomena to relevant situational contexts – and not on pre-existing, pre-situational intentions or planned actions. Action plans – as stated by Joas (1992: 237) – cause individuals to enter a situation, but they do not provide the individual with the ability to cope with the situation. This ability is not the result of planning but of the adaptation of the elements of social practices needed in this specific situation.

Secondly, timing is of importance. According to Mead, practices are not only employed in a given timeframe, from the actor's perspective they are always employed in the present (situation) – or right now. No matter how routinised practices may be, actions will have to be re-enacted and changed because the timing and the position within the timeframe will not stay the same. This causes insecurity for the actors who cannot be sure whether their actions will be successful and wether the practice can be continued. On the other hand, actors are only able to adjust definitions – how they see themselves or others, what is right and what is wrong – because no two situations will ever be exactly the same. Even if a practice was highly repetitive, actors would still be able to create new meanings or alter definitions. Still, this only describes one of the many aspects of social practices, namely the aspect referring to practices being inherent to the actors themselves (see above). On the

other hand, it has to be emphasised that actors only 'carry' social practices. From a practical perspective, social practices are not the consequence but the origin of individuality. Their ability to influence ongoing practices is based on temporality. At a conceptual level, the temporality of social practices stems from Mead's notion of sociality (Joas 1989). Mead understands this as the act of connecting newly emerging events to previous events. Social practices are thereby constituted by respectively updated events which in turn need to be related to other events (cf. Nassehi 2006: 140). Emergence is created via the act of connecting events from different points in time – even if the emerging phenomena fail to show any change from an observer's point of view.

IV. Conclusion: Emergence and regional clusters

What can be gained from explaining emergence processes and phenomena in regional high-tech clusters? The two explanations are certainly marked by significant differences regarding, for instance, the notion of systems, the relationship between social systems and actors and the focus on communication vs. practice as the basic minimum unit. Apart from this, both explanations bear a striking similarity regarding the explanation of emergence. This is especially true for the temporalisation of social processes, which constitutes a suitable starting point for explaining the concept (cf. Nassehi 2006). Additionally, a rather useful argument is provided by Luhmann: social systems as well as regional clusters only create observable emergence phenomena after they have established structural complexity, i.e. after boundaries have been set up which is the prerequisite to enabling the interconnection of system internal operations. Only then will regional clusters be capable to produce emergence phenomena which are non-existent in their environment. The concept of the relationalisation of system elements by social practices inherent to regional clusters can be taken from the practical theory approaches. Practices can never be isolated phenomena within social systems. They are always, if only loosely, interconnected with other practices. Usually, different practices are not necessarily co-ordinated or clearly distinguishable. Practices cannot only stand in a complementary relationship, they can also step into competition with each other, especially if they are interconnected at a social or factual level. Therefore, practices, as seen by practical theorists, can be loosely or tightly interconnected in a multitude of ways. Following Giddens' Theory of Structuration (1984), practices link (individual) social acts with structures. Social structures are not considered to be detached from the actors; they are continuously renewed within the context of social practices to form a virtual framework and have a structural impact on actors. This perspective enables the analysis of processes of complexity development in social systems as well as their impact on actors: Systems are a result of the empirically detectable and permanent reproduction and interconnectedness of actual moments of social structuration and thereby ultimately the result of emergence. One chance to make further and more distinguished statements lies in the typification of regional clusters, which would be aimed at a categorisation on the basis of

the degree of structural complexity determined by the specific combination of social practices. Another possibility to accomplish a better analysis at the empirical level is to typify regional clusters, again according to their structural complexity, but based on the specific relationalisation of social practices.

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