

The Innovative Power of (Industrial) Commons in Managing Creativity to Support Network-Economics

Eva Gatarik
Rainer Born

The main point of our investigations and research is to reflect, analyze and argue for the use of the innovative power of Commons in general, and Industrial Commons in particular, to improve creativity as essential foundation (not only) of Network Economics. The latter should help to overcome some of the obstacles and threats posed by globalization. We shall furthermore provide a theoretical background to explain why it is necessary not only to provide 'tools' or techniques to generate the parameter values stemming from the well-trodden path of classical economics but also – following Lakatos, Soros and others – why it is necessary to change our established attitudes concerning the 'use' of these tools.

Key Words: ecosystems of innovation; industrial commons; network economics; creativity; knowledge management

JEL Classification: O14; R11

Introduction

Taking up the idea that we 'can only adapt and survive by constant transformation,' which is built upon 'creativity and innovation,' we suggest that we investigate why we need both creativity and innovation, e. g. with respect to new business models, and *explain* how the mistakes in decision making we observe in the economy have come about to prevent them being repeated in future. And last but not least, we have to decide what would count as a 'good' outcome.

One of our main points is to show that we use the explanations of economic success in a wrong-headed way. We often think that they can be applied and transferred in an all too straightforward way, i. e. as literally

Dr Eva Gatarik is Research Associate at the School of Management, University of Applied Sciences Upper Austria, Austria.

Dr Rainer Born is Professor at the Center of Competency for Knowledge Management and Department of Theory and Philosophy of Science, Johannes Kepler University, Austria.

Managing Global Transitions 11 (2): 141–160

action guiding ideas. Giving an example, one can argue that economic, social and cultural images and the economic success of some European regions can be linked *causally* to networking/network economy (Barabási 2002) and digital support as well as to the analysis of the flow of information and knowledge. If one then tries to copy and transfer this *success* by copying the formal techniques to other regions, then, in certain cases, it can happen that one actually is transferring a *wrong explanation of success*, which in the sequel becomes the foundation for decisions guiding our actions (Born and Gatarik 2012). This is what we mean when we argue that one has not investigated the *real causes and means* of the support of success in all its manifestations carefully enough.

In other words, if in the context of *managing creativity* we just improve the technique of, for example, digitally supporting network economy/networking without looking for the real source of success, which can be found in the nodes of knowledge, then we surely overlook the fact that we also have to understand the necessary innovative and reflective extra-knowledge of users and decision makers which allows for some sort of stepping out of the system with respect to the given system of knowledge. The knowledge of the decision makers needs to be extended, or rather improved, i. e. the knowledge to handle the explicated ‘rules or routines’ must not remain unchanged or static and needs to be enriched/extended.

Summing up, we believe that a paradigm shift concerning the way *we think about economics and its manipulative relation to reality* is necessary just as George Soros highlighted in his speech at Davos 2012 and further elaborated in Soros 2012. We have to re-consider *what* it really is that explains economic success and the ways in which way misapplications in the sense suggested by Soros led to the current economic crisis.

We therefore want to show that it is important to really take into account the specific knowledge which is available in so called ‘nodes of knowledge,’ for example, of special European regions, and later we will link up this idea with Elinor Ostrom’s research concerning Commons (e. g. Ostrom 1990) and ‘understanding knowledge as a Commons’ (Hess and Ostrom 2007). In effect, we have *to identify and to analyze* (e. g. with the help of the tool LIR++, see below) the knowledge available in knowledge nodes and knowledge networks to use it for good decisions. LIR++ does not just ask people what they think they know but enables to explain the use of their knowledge, and therefore allows to combine a view from within and from outside of a system.

Our approach rests upon our research in *Model Theory, Systems Theory*

and depends on the constructive generalization of case studies to explain the transfer of knowledge by means of *Knowledge Management* (KM) and *Commons* (e. g. Ostrom 1990; Hess and Ostrom 2007), especially *Industrial Commons* (Pisano and Shih 2009; Shih 2012). As already mentioned above, we shall use the model-theoretic scheme of analysis LIR (Language – Information – Reality) and its extension to LIR++ (Gatarik and Born 2012b), which in its new version is explained in detail below.

The Loss of Creativity and Innovation: Its Origins and Economic Consequences

Considering some of the many problems which are facing us today we will start with a problem only recently brought up again, i. e. the anxiousness to lose all industrial (competitive) power in the so called ‘West’ – essentially due to a loss of the creative and innovative force of Industrial Commons (Pisano and Shih 2009; Shih 2012). Of course, this may sound too harsh but it expresses some mood as far as the current economic crisis is considered.

The example or starting point, which is typical for many similar cases, is the idea that overexploiting the originally theoretical idea of *outsourcing manufacturing* for economic reasons, and implicitly presupposing that an economical control of the world is enough is the source of a decline of our original competitive advantages in the WEST. However, what does this mean in our context? The point is that the ability to innovate gets lost by way of a lack of manufacturing resources, i. e. by missing out intuitions and visualizations, which via generalization can lead to expertise and knowledge.

This links up with the old idea that plainly economic reasoning or parameterizing of the world is not enough or, in other words, it is incomplete (Gödel 1990; first published in 1931) or provides an insufficient map of the world. One should consider it as a sort of task for KM to provide extra knowledge surpassing plainly monetary considerations.

The original idea of KM as a simple means or practical technique to get hold of important knowledge inherent in an enterprise and to transfer it easily does not work in practice, or not with the means available and the philosophy or understanding in use. Taking up the research by Elinor Ostrom and our own practical experience, we propose that it needs to be combined with the idea of Commons. In the end, we shall be able to transform Knowledge Management into a sort of Ecosystems of Innovation to provide flexible, creative, innovative and sustainable problem

solutions, especially in fostering Network Economics (Barabási 2002).

One of the deeper going essential assumptions of our approach is that the initial successes (not only of outsourcing) can be explained by natural, ecologically flexible and justified corrections of the application of rules to producing acceptable results, i. e. we assume that real success (economic or otherwise) does not stem from rigidly applying rules but from using them with foresight or vision whereby it should be clear that the latter presuppose the deliberate introduction and special use of Commons. We assume that a commons-like culture including *motivation, emotion and cooperation* of the people within and inbetween some Commons does support this kind of application of rules (maybe unconsciously) by being still (though perhaps not literally) aware of the simplifications, which underlay the application of our maps, models and theories. To see this more clearly we need to look at the basic theory as explicated below and illustrated in figure 2 and especially in figure 4.

Thus, our empirical analysis resting upon our practical support of firms and long-standing research and teaching of KM as dissertation subject at the University of Linz concerns the idea that the commons-like structure of organizations provides the possibility for local corrections and can guarantee the ecological soundness of innovation and, in the sequel, can produce practical parameter values. Simultaneously, a theoretical analysis of the argumentations to justify the application of the knowledge inherent in Commons needs to be exhibited. Only in this case *Ecosystems of Innovation* can be considered as a follow-up concept of Knowledge Management and even as an extension of the parallel approaches *Ecosystems FOR Innovation* by Aneesh Chopra, the former Chief Technological Officer of President Obama, and the ideas of *Innovation Ecosystems* proposed at Stanford University which go back to research on business ecosystems and business innovation. The point of our theoretically and empirically well-founded approach is to stress that we need a *re-modelling of knowledge-intensive environments* which especially in connection with European pluralistic cultural background may provide an extra competitive advantage, if we learn to handle it properly. In consequence, innovation does not only provide a competitive advantage which will pay off economically but it will also be a real chance to survive in an ever changing world.

Following these ideas, we summarize the line of further empirical investigations in combination with the theoretical generalization of existing research in figure 1, which is based on a modern understanding and com-

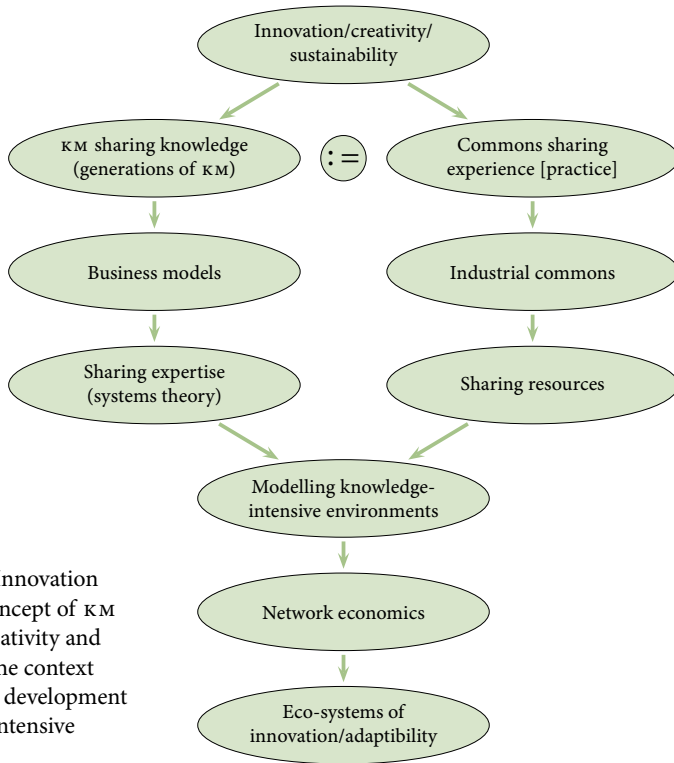


FIGURE 1
Ecosystems of Innovation as follow-up concept of KM to deal with creativity and innovation in the context of fostering the development of knowledge-intensive environments

bination of KM and Research on Commons and gives an idea of possible developments of results so far towards *Ecosystems of Innovation*.

The Original Task of Knowledge Management

One of the oldest problems of humankind is surpassing insecurity in trying to cope with the future either by gaining knowledge about the world, or by being able to adapt or adjust oneself or by changing the environment (a sort of manufacturing approach) according to our interests and possibilities.

But how does KM fit into this ‘spectrum’ of ideas and approaches? Hopefully somewhere in the middle or, to take up a suggestion by Ostrom (1990; 2009; with Janssen and Janssen 2011), with respect to the role of *Commons*: Somewhere between market (or: blind evolution) and state (in governing the world), i. e. *between deregulation and regulation*.

But that means we might have to reconsider the originally plainly cognitive approach of *Knowledge Management*: Either as Senge et al. suggest

in *The Necessary Revolution* (2008) where they investigate the interplay between individuals and organizations via an ecological path, or in the sense of Ostrom and others as an approach via studying the Commons, i. e. studying *Knowledge as a Commons* (Hess and Ostrom 2007). In both cases, we have to deal with *sharing* resources like expertise, experience, knowledge or natural resources, which are considered to be in common use, and we have to take care not to *overexploit* them because we are aware that it would immediately harm us otherwise.

Before going into detail especially about the necessity to foster *innovation, creativity and sustainability* (some of the aims of ‘cognitively biased’ КМ), the *history of Knowledge Management* and the set of problems *Knowledge Management* was intended to solve we will refer to fairly recent examples brought up into the discussion at *Harvard Business School Association of Boston* in the context of the new term *Industrial Commons*.

Already in July 2009 in *Harvard Business Review* Pisano and Shih concerning the ‘Restoring [of] American Competitiveness’ discussed the matter of *Industrial Commons* to solve the problems arising from a lack of manufacturing due to outsourcing ‘the higher value knowledge worker jobs of the future.’ If a company outsources manufacturing too much or too easily, it depletes the *Industrial Commons* (built up by the participants from the companies, who share skills and knowledge and thus contribute to the knowledge base and supply chain) just as surely as e. g. overfishing does in the context of Hardin’s analysis of the ‘Tragedy of the Commons’ (Hardin 1968). ‘Innovation depends on a robust manufacturing sector’ (Bulkeley 2011). Shih (2009; in Bulkeley 2011) even says: ‘The [new] tragedy of the commons is that when a company takes the short-term view, they don’t worry about the value of the commons.’ Pisano and Shih (2009) also argue that a great deal of knowledge or expertise is transferred in face-to-face meetings. Bulkeley (2011) enforces this fact by pointing out that a ‘smaller ecosystem in which manufacturing is delegated to offshore organizations make such [knowledge] transfers more difficult.’

There have been a lot of investigations into *knowledge* as primary source of the economic success of enterprises and how to get hold of that *knowledge as [an important] competitive advantage*. These investigations go back to the early nineties with respect to the development of the *Management of Knowledge* (Prusak 2001).

But there are also much older approaches which come back to our mind when we consider common-pool-resources in Europe handled and

investigated as *Allmende* in Switzerland and which can now be understood as an *approach between state and market* (besides the work of Ostrom see also Vaněk 1970; 1971). The inquiries into the working of *Allmende* are a more *ecological approach to knowledge*, i. e. Knowledge as a Commons. Commons in this context appear to provide an *Ecology of Innovation*.

This can lead to re-investigate the chances to reinforce *creativity* as a means to see solutions for some of the acute/prevaling problems in economy, culture and society trying to take the best from both sides and providing an empirical as well as theoretical support to interpolate between the current approaches to handle resources via knowledge.

Therefore we will introduce the idea of *Ecosystems of Innovation* which will deal with new problems referring to the relation between knowledge and human beings. The topic is now quite different since we are concerned with *adaptation* and *changes* of the environment due to recent developments in Cognitive Science and Economics.

Interpolating between Market and State

Taking up some of the ideas that were expressed at the 7th International Forum on Knowledge Assets Dynamics and the 5th Knowledge Cities World Summit (2012), what seems to be essential is to understand innovation, creativity and sustainability by way of a *knowledge-based approach* to reach the aims of modern enterprises. But that means that *Knowledge Management* primarily is expected to offer ways to improve economic success and leave everything else unchanged. We could call this the *approach of local optimization* as it is considered by Holsapple (2002; 2003), Firestone and McElroy (2003), Allee (2003). The theoretical assumptions about the use of 'knowledge' (though not of the underlying theories) concern the idea that one is able to produce innovation in one's own firm just by understanding the knowledge available in another firm. But that exactly means that one thinks that documentation of knowledge is enough. However, already via the *Scissors of Knowledge and Life* (Gatarik and Born 2012a; Born and Gatarik 2012) and much earlier via *model-theoretic investigations* by Rainer Born we could show that this approach is *insufficient*.

What we want to emphasize in this context, however, is that it can happen that we may want to change our evaluation of what characterizes success, i. e. when economic evaluation may not be enough to guide our actions. Our aim therefore is also to reflect the presuppositions of our action-guiding argumentations.

One also has to ask the question which original problem $\kappa\mu$ wanted to solve, or which problem might correspond to something we consider as a solution. In the case of the so called ‘Tragedy of the Commons’ (Hardin 1968) as the starting point of many investigations particularly by Elinor Ostrom, we have to consider the aim of Ostrom, namely to refute the argumentations by Hardin as ‘lopsided.’ In her eyes it is more important to consider the fact and the idea of the so called ‘private properties’ to overcome the ‘Tragedy of the Commons,’ in which case it can be shown empirically that Hardin’s explanation is unsound.

Ostrom’s concerns certainly deserve severe attention, but they might be better addressed by taking a closer look at the following two-fold question: Is it possible to provide solutions to the problems in question by way of applying rules such that we do not have to change our background knowledge H in order to be able to correct the produced results by simple mechanical application of the rules? What kind of *extra knowledge*, innovation, experience/expertise and reflection (in the sense of *Ecosystems of Innovation*) do we need to prevent misapplications of *theories* (or to kill evolution by being driven into some ecological niche to die out)?

Unlike $\kappa\mu$, which – as a primarily cognitive approach – can be understood to support innovation within an organization by transferring the ‘explanatory’ knowledge involved in another organization, the idea of Commons is a more practical and even emotional approach on a democratic basis (the original version of Commons goes back to the common use of Alpine pastures and was called *Allmende* in the sense of ‘common use of resources’). Commons also concern the change of our environment and thus the feedback ‘into’ our (knowledge-intensive) models for acting in this environment.

In considering the interplay between theory and practice (see figure 2) in a broader context we are also motivated to settle the following question: Is it possible to produce solutions Q concerning the problem P in our field of investigation, which can be reduced to the applicability of an internally unchangeable background knowledge F , which – ideologically speaking – will leave everything unchanged in the sense that we do not have to learn anything about ourselves?

In the book *Sharing Expertise als Kern von Wissensmanagement* (2012a) Gatarik and Born tried to show that this is impossible due to the influence of the so called *Scissors of Knowledge and Life* and that a slow change or rather development of Common Sense C (see also Shanker 1992) is necessary, if we want to have our organization to survive and furthermore us in

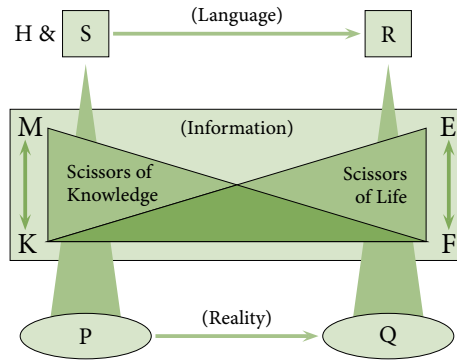


FIGURE 2
LIR with the Scissors of Knowledge and Life

this world. We therefore definitely – as in many other cases – are looking for a better understanding of the relation between perception and interaction of humans within an environment and an ecological niche.

The Theoretical Foundation for the Applicability of (Industrial) Commons as Ecosystems of Innovation

Primary definition: A Commons is ‘a resource shared by a group of people that is subject to social dilemmas’ (Hess and Ostrom 2007, 3). An Industrial Commons is ‘the R&D and manufacturing infrastructure, know-how, process-development skills, and engineering capabilities embedded in firms, universities, and other organizations that provide the foundation for growth and innovation in a wide range of industries’ (Shih 2012, 2).

In order to be able to understand the meaningful connection between research on Commons and Knowledge Management, i. e. the realistic meaning of experiences with Commons and the success of Commons, one can look at an essential problem of Knowledge Management especially with respect to research on expertise, which needs to be conveyed with the help of KM techniques. This is the topic of the model theoretic approach LIR (Gatarik and Born 2012a), which we discuss now.

We do think and argue for the case that it is necessary to understand the way in which knowledge mediates between language and reality. Furthermore, in which way knowledge defines/determines our dealing with information, but also how it is codified linguistically and how it determines the relation/reference of language onto reality. In the process of communicating knowledge, one has to take into account the multidimensional background knowledge of an addressee: the knowledge components or rather the knowledge roles in figure 2, i. e. experiences/expertise E, com-

mon sense/user knowledge/folk knowledge F, rules/routines/knowledge by calculi K, structure/explanatory/model knowledge M. If – abstractly speaking – one wants to communicate the changing of state P (e. g. some problem situation in an enterprise) into a new state Q (in the world, in one’s attitude, in one’s understanding and in knowledge) or even if one wants to make it understandable or wants to establish some insight into the transition in an addressee. Thus to enable their learning, one has to explicate the means of representation in use (e. g. a language) and clarify which *components of the background knowledge* are responsible of relating the signs of the language onto sections of the world, i. e. mapping them onto these sections. The causal connection between P and Q is linguistically mirrored and shows up in the acceptance of the logical/inferential transition from S to R and is a foundation of communication. The state transitions from P to Q correlate with the fact that the transition from S to R in language is logically admissible and semantic ally acceptable. This acceptance of language can be either amplified or weakened by changing the relevant components of background knowledge, which are responsible for acceptance and sense making in language. The real acceptance and therefore the success of the communication of knowledge – especially if we are dealing with building up or transferring new points of view or even new frames of reference – depends on the interplay of the respective knowledge components F, K, E, M of the background knowledge H (accepted hypotheses) enacted as knowledge rôles. The Scissors of Life and Knowledge therefore concern the difference in the acceptance of (problem) solutions Q according to the background knowledge F, E, M applied to the routines K.

Roughly speaking, this means that the classical form and the set of documentations of information and of the rules for handling and using information do not suffice to grasp completely the expertise present in people, e. g. in the case of manufacturing skills, and especially do not grasp the innovative potential of correction depending on experience, which is essential for applying knowledge correctly. This potential of expertise is necessary to prevent that rules/routines are overused in an unreflective manner and therefore can lead to wrong applications of knowledge and especially of explanations as it happened in overexploiting outsourcing where the taking care of ecological aspects inherent in the natural application of commons was eliminated and therefore also the possibility of proper innovations in the sense of new solutions to pressing problems.

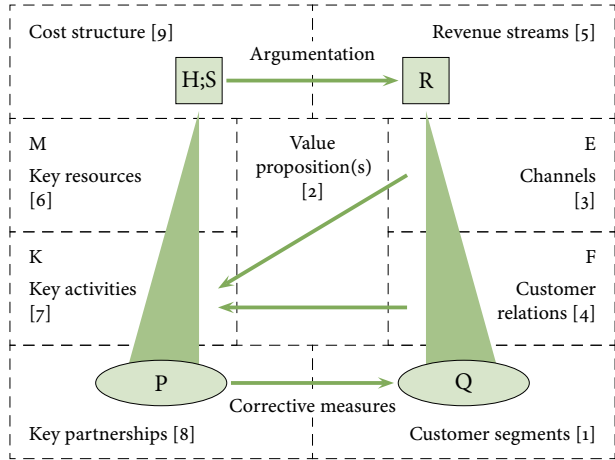
Now, if one looks at the interplay between expertise and experience E

and the commonsensical or cultural knowledge F in the framework of the scheme LIR and then introduces Commons to handle this interplay, one can use dialog and sharing experience/expertise to change the relation between E and F and the given background knowledge F into an extended F* (cf. the discussion of Heinz von Foerster to link understanding with experience by acting in von Foerster 1993, especially 101–3). Applying F* to the routines K in the framework of the scheme LIR can produce new problem solutions, which still can be accepted in F by way of applying the techniques that lead to success in Commons. Practically speaking, Commons can – using the logic and its practical instantiation of LIR – enforce the necessary dialogue and the sharing of experiences/expertise between E and F and in this way they can essentially influence the success of problem solutions of a system. We think that this dynamical dialogue can improve developments of a system, especially in *supporting innovation in the realm of routines and rules* K, and in a further consequence it can improve the competitive advantage and the general fitness for survival not only of a specific organization understood as a regional ‘node of knowledge’ but also of a geographical or political ‘region’ as a whole.

In this case, one can embed the empirically developed Canvas technique for mapping business models into the scheme LIR. Such an extension and adaptation of the Canvas method gives rise to an innovative scheme of analysis LIR++ which enables to grasp and analyze the regional, practical and locally successful knowledge contained in a Commons. In this way, one can also understand and try to copy the local success of ‘knowledge nodes’ in a region. The next step would be to link those nodes to build up a successful network economy, not in the least by support of digital means, i. e. we have to be careful about the limits of the application of the identified knowledge. One must not simply draw out the formal flow of information but look for the actual knowledge in the nodes which needs to be grasped and which in fact is the real cause of the success of networking. If we look e. g. at the Emilia Romagna example (Belussi and Porcellato 2012), we will find that it is the flow of real information and the factual combination of carriers of knowledge which is essential for the success of linking knowledge nodes. What is really important and is fairly often overlooked is that there needs to be knowledge in the nodes beforehand. This knowledge cannot be built up by digital networking alone. One could of course analyze these forms of success under the aspect of investigating Commons, i. e. of investigating communities of knowledge as well as rules for the common use and the handling

FIGURE 3

LIR++: From ‘business modelling’ to ‘knowledge models in business’ as a multidimensional approach in network economy in order to be able to adapt to rapidly changing market conditions and apply regionally available sources of creativity and innovation



of this knowledge. This idea conforms to the conception that the term Commons refers to ‘a resource shared by a group of people and it is often vulnerable to social dilemmas’ (Hess and Ostrom 2007, 349). It is decisive, as we think, that content needs to be transported. The question is how can this kind of knowledge be grasped locally and be conveyed directly, i. e. if one gives up the idea of a universal common sense.

In using the analysis of Commons, e. g. with the help of LIR++ (see figure 3), we can also reintroduce the importance of responsibility and empathy into Business Administration and go beyond the primarily cognitive aspect of knowledge as it seems to be at the center of e. g. Communities of Practice (Wenger 1998; Rullani 2012) in standard KM.

The Tool LIR++

We are now discussing in detail figure 3 which also contains the Canvas method (Osterwalder and Pigneur 2010) in a short but transformed way to be able to embed it into our model-theoretic approach LIR++.

Our combined tool or – better – framework of investigation LIR++ was both invented and derived from practical experiences and applications. It summarizes a host of approaches and research results from different fields of investigation, ranging from Model Theory, Cognitive Science and Philosophy of Science through to Systems Theory in Senge’s presentation to mention just one source with relation to Business Administration, Management and Applied Economics. Besides being well-founded theoretically, it also rests upon our experience of building up the subject Knowledge Management at our university as it grew out of Busi-

ness Informatics, which was developed as a combination of Business Administration, Management and Computer Sciences. The way in which we present our scheme LIR++ here was the foundation for practical work – we call it theory-guided practice – at, for example, the Austrian SME Beham (Gatarik and Born 2012a) in autumn 2011 whose economic results in the current financial and economic crisis after the taking LIR++ as a basis for the run of this enterprise were awarded the Upper Austrian Business Prize PEGASUS in gold in 2012.

The core process of analyzing the business model of a firm in order to be able to improve or change it is now depicted in a deliberately abstract way which allows for more applications and expresses our conviction also shared by Pisano and Shih (2009): top management needs to revise some of its outdated conceptions especially about outsourcing to mention at least one example. The numbers in square brackets below refer to figure 3.

Let us therefore – abstractly speaking – start with an observable, given positive economic result, e. g. a successful event in some region, within a sort of ‘customer segment’ (1). The customer segment should contain the offer of problem solutions available in the ‘knowledge nodes’ of some enterprise. In our own analysis, we shall go further and identify knowledge as a driving factor, and not just as a business model as ‘explanation’ for whatever we investigate. We assume that there are (available) solutions or products, which are *accepted* according to agreed-upon values by customers, i. e. there are ‘value propositions’ (2) connected with these products. These value propositions – to bring in the systemic approach of Senge (1999; 2006) and Senge et al. (2008) – provide a connection or a link to all other factors/elements of the scheme LIR++ and in a loose way correspond to the fifth discipline (Senge 2006). By ‘loose’ we mean that we apply the idea of ‘family resemblance’ of Wittgenstein (1953), which roughly means that the concepts in use stemming from Canvas, Senge and LIR overlap, i. e. they are not identical in the sense that there is one single thread that makes up the ‘rope’ of argument as such (to use a well-known metaphor of Wittgenstein).

The next step in the analysis is to identify in (3) ‘channels of [personal] knowledge [or experience]’ E (if we are looking for knowledge-based creativity). Now it is essential to take into account ‘nodes of knowledge’ which also correspond to the idea of ‘personal mastery’ (Senge 2006), i. e. we have to find out where and how knowledge is relevant for creative problem solutions (experiences and expertise) and where it is concentrated within an enterprise such that it can be transferred or communi-

cated. We are looking for the knowledge, which we think/identify to be essential for the generation of problem solutions.

Thereupon, we concentrate on ‘customer relationships’ (4) which we can combine with cultural and social ‘folk-knowledge’ F as the background knowledge important for the common use of results as well as containing the possibility of cultural corrections with respect to the ‘acceptance’ of solutions (not just by customers). This is the spot where the practice of Commons or the commons-like structure of an enterprise are relevant. It is also the place, where ‘ethics’ come into the picture, ‘ethics’ as a means of understanding the limits of the application of rules, i. e. ‘ethics’ which ‘let us know’ how far we can go to realize certain economical aims.

Only afterwards one should analyze the ‘revenue streams’ (5). They must, however, not become the core or drive of invention. In (6) we introduce a sort of view from outside concerning the ‘key resources’ which make up the explanatory power M and correspond to Senge’s ‘mental models.’ These make up what we consider as a *European competitive advantage* due to a host of cultural diversity in E and F.

What furthermore is relevant are the routines in (7), K according to LIR, which can be understood as the visible ‘key activities’ of an enterprise both in the production as well as the relation to the commonsense knowledge F and therefore to Senge’s ‘shared meaning’ (4). The relation between K and F is the real core of our analysis via LIR++.

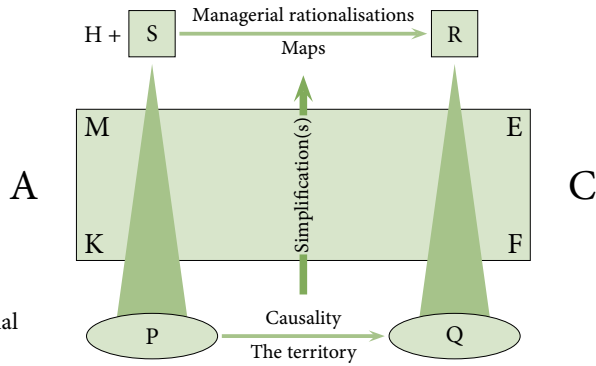
In the sequel, one should look at the ‘key partnerships’ (8) where the special knowledge of other knowledge nodes, especially from supplier firms comes in.

The last but not least factor of analysis concerns the ‘cost structure’ (9), such that one can calculate R from S by using relevant background knowledge H, structural hypotheses and extra knowledge by content, i. e. expertise.

To understand the limits of the applicability of the Canvas method, if it is just used as a means for the identification and analysis of business models, we also need to introduce the ideas basic to the Scissors of Knowledge and Life (see above and figure 2). We are rather looking for an extension of the local background knowledge F to some extended background knowledge F*, which guarantees the successful (and reflective, i. e. open for corrections) use of rule/routines/heuristics to (re-) produce results (products, solutions) with the help of the use of commonsense background knowledge (as guiding our decisions in real life actions). F* will contain the specific knowledge/skills prevalent in a region (cf. in this context the story of Swatch in Switzerland as analyzed e. g. by Schulz 1999

FIGURE 4

‘The map is not the territory!’ Analysing how oversimplifications can lead to wrong managerial decisions



or Wegelin 1999 as an example), which is more than just a receipt to produce ‘results’ on the basis of selected/prefixed parameter values. What is created is consciousness about the meaning/sense of the results of our analysis of business and ‘knowledge’ models (Weick 1995 and 2009; Rullani 2012). The aim is of course to prevent mistakes in the application of rules by evaluating ‘results’ according to the background knowledge E and F*.

To go on we should identify the necessary problem solution knowledge explaining the local acceptance of results, and to provide the foundation for a ‘Geography of Knowledge.’ Geography concerns the relation between a map and the reality/territory it refers to, and therefore the reliability of maps in order to be used for our orientation in some world. This idea is depicted in figure 4, which is the theoretical basis for our extension of the Canvas method. C combines E and F as common-sense knowledge and is realized in Commons. A combines K and M and concerns abstracted knowledge as realized in theories.

Summing up, we can use the idea of the *Scissors of Knowledge and Life* to make clear that the Canvas technique as a means to analyze and identify business models is not enough. Actually, it should only be used to find out which specific background knowledge helps to apply the ‘rules’ correctly and also allows for some reflective correction. Otherwise we would not get hold of the knowledge characteristics for some knowledge node or region, but would get only a general receipt to (re-) produce parameter values.

And this brings us to the important point that it does not suffice to provide techniques to produce the relevant more or less agreed upon (?) parameter values but we also have to re-consider the knowledge and ideas to use those (new) techniques e. g. of *Network Economics*.

Our idea therefore is to propose a new way of looking at an organization, a way that goes far beyond of considering it as e. g. a Complex Adaptive System (CAS) and focuses on re-creating engagement, innovation and sustainability via *Sharing Expertise* (Gatarik and Born 2012a).

Getting back to the importance of manufacturing for innovation and why innovation is killed by too much outsourcing, we will have to reconsider the theoretical/managerial arguments that lead to over-exploiting outsourcing and why one thought it would work. The theoretical backbone was that – at least the cognitive part – of knowledge could be completely grasped and documented by syntactical and semantical techniques alone. In contradistinction, the point of *Ecosystems of Innovation* is trying really to understand why, for example, outsourcing as a managerial technique does not work in the long run.

Considerations about Empirical Research

If we want to come to solutions of the problems facing us, we should concentrate and determine two things:

- Firstly, which argumentations and assumptions may have led to long-term ineffective managerial decisions and what could have prevented them both logically and empirically.
- Secondly, in analysing the standard theories from KM on the one hand and research on Commons on the other we found that an empirical investigation will be necessary both to understand and apply the results of research on Commons and identify their influence upon decision making in real-world systems.

This idea finally leads us to a hypothesis (as provisionally accepted basis for further research) concerning further empirical investigations:

Our main idea is referring back to our previously mentioned experience at the Austrian SME Beham was that the sometime short-term economic success of outsourcing, to think again of a concrete example, depended on two essential factors:

- Firstly, in practice the instructions given by the top management have some connection to what the people know and so they understand what they are about to do and therefore the employees usually can correct minor mistakes by themselves. This is of course not the case, if they are neither engaged nor if they do not have any knowledge of what is happening.

- Secondly, a short-term success must not be taken too literally/seriously and arising mistakes need to be interpreted with hindsight and corrected on the spot. All works well, if there is still a commons-like structure in the firm as e. g. in the case of some ‘Management Team’ as introduced at Beham’s.

If however no structure in the firm is available to support this kind of possibility for actions on a basis of dialogue and reflective correction and understanding, e. g. if there is no commons-like structure available, there is no chance to understand realistically what is going on and people (management as well as employees) will stick to the unreflected use of their rules.

So, the first thing is to find out when in an enterprise or a social unit in general it is possible to prevent misapplications of ideas with the help of dialogue (in the sense of Bohm 1996) and communication culture in the system. We also need to identify and investigate commons-like structures and analyze and verify (in a weak sense) the way they work, what they provide, and hopefully identify their causal influence (if available). The main point of this kind of investigation, however, is that one needs a fairly sophisticated tool LIR++ (Gatarik and Born 2012b) to identify the business models in action and their transition into implicit knowledge models, which in some sense are characteristic of Commons.

Conclusion and Outlook: The Innovative Power of LIR++ and Commons

In classical KM approaches, one tries to construct so-called ‘knowledge-maps’ to manage and support the exchange of relevant knowledge between collaborating enterprises and economic mergers. But fairly often in sticking to formal rules and decisions this approach does not yield the expected operational and economic success. Examples are first the cooperation between Apple and Rank Xerox in developing modern computer interfaces and later on the separation, which led to the success of Apple due to misjudgments of the Rank Xerox management. Another negative example would be the merger leading to Daimler/Chrysler and its economic disaster. In this case the result of classical strategy was a freezing in of innovation.

In order to overcome these obstacles one again needs constructive background knowledge (supported e. g. by Industrial Commons in the sense of Pisano and Shih 2009; Shih 2012) to properly handle the rules of

production and exchange of expertise to understand the limits of plainly strategic decisions. This is the point where LIR++ can step in, both to select and to provide the relevant (explanatory) background knowledge for decision makers as well as helping to build up the latter, well knowing that not everything can be ‘grasped’ by standard documentation alone.

If we now look back and remember that our original problem was to recognize that *innovation* is a necessary means to regain and restore competitive advantage not only in America (Pisano and Shih 2009; 2012) but also in Europe and that we did suggest to foster *Ecosystems of Innovation* (ESI) (cf. also Bulkeley 2011) as an emergent, i. e. constructive (re-) combination of KM and Commons with new qualitative properties to take up the best of both, then we may wonder what could be the further consequences of our possible approach, i. e. especially with respect to innovation and regarding the loss of competitiveness in the context of destructive outsourcing decisions and the loss of manufacturing skills as source of *capabilities of innovation* in the sense of Creating Capabilities due to Martha Nussbaum but first of all Amartya Sen.

The possible contribution of ESI is to enrich/enhance our human problem solution capacities and at the same time to provide *a better understanding of the limits* of the application of those solutions. This is why it is important to re-model the connection between humans and their environment as a *knowledge-intensive relation* whereby knowledge must not be restricted to cognitive and technological aspects alone but naturally must also contain *social and cultural aspects* as a means for a better evaluation of the consequences of our actions:

1. Whenever we try to reproduce ‘results’ in practice and try to invent more or less formal rule systems or even expert systems (in the sense of Artificial Intelligence), we must not institutionalize them as means to replace creativity. Instead they should be used as means to take over from ‘routines’ and create elbowroom to re-enforce real creativity as a necessary precondition for innovation, flexibility and thus sustainability in ESI.
2. Whenever we think we have identified rules to produce results in a strict way we might remember that they rest upon simplifying categorizations of parts of reality and the success of the application depends on our ability to use them with foresight and vision and sometimes hindsight, which explains their real success.

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