“Innovations in the global knowledge economy: consequences for organizations”

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SECTION 2. Management in firms and organizations

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Innovations in the global knowledge economy: consequences for organizations

Abstract

The authors know with a high degree of certainty that when new knowledge emerges, innovations in organizations will be created and economic growth stimulated in the global knowledge economy.

The question the authors will examine is: How might a move from industrial knowledge clusters to global knowledge clusters impact on the development of innovations in organizations? The question is answered by means of a discussion of three components that the authors, supported by knowledge and innovation theory, conceptualize as 'new knowledge', 'global knowledge clusters' and 'new global markets'. In the paper, the authors discuss how these three components are the prime driving forces that have consequences for innovations in organizations. The authors suggest a conceptual model that depicts the interactive links between the three components.

The contribution is threefold. The first element is related to the development of new knowledge and expertise, the second element to the development of global knowledge clusters (of expertise), and the third element to an enhanced understanding of the new global market that is emerging. The originality of the study lies in the conceptualization of new constructs and a thorough discussion of three components that, the authors opine, may impact the development of innovations in organizations that are influenced by changes in the global knowledge economy.

Keywords: knowledge, global clusters of expertise, field of innovation, global markets.
JEL Classification: 031.

Introduction

When turbulence, discontinuity, uncertainty and ambiguity in the business environment are taken into account, it becomes important to reflect on the development of innovations in the global knowledge economy. According to knowledge theory, intuitive and creative ideas about how new knowledge will emerge are based on different sources of information (Pfeffer and Sutton, 2000). Thus, knowledge of the relevant information sources is necessary in order to anticipate where new knowledge will emerge and be realized through innovation at different societal levels. For instance, throughout the history of commerce and industrialization, we know that substantial changes and transformations have taken place at certain time intervals, and that new knowledge has emerged as a result. However, we do not know when, such transformations will occur in the future, or what knowledge will be translated into new technologies in the global market. As evidenced in previous innovation research (Reinert, 2002, 2012), fundamental technical changes often lead to new knowledge, and sometimes this knowledge is so extensive that it can result in what is known as paradigm shifts (Kuhn, 2013). We also know that when paradigm shifts are extensive, they may lead to institutional innovations (North, 1990), which we will term here as the 'innovative transformation of society'.

We also know that some substantial industrial changes merge and lead to what Schumpeter (1954) terms as 'business cycles'. Other types of changes also merge and lead to economic cycles, which are more seldom than Schumpeter's 'business cycles' but more pervasive; these cycles are described as 'long waves' of 40-60 years by Kondratiev (Hirooka, 2006). Although there are questions and debates concerning such cyclical theories, we know with a great degree of certainty that incremental and radical changes are continuously taking place. We are, therefore, concerned with discussing the development of new knowledge, because this is crucial to the development of innovation and economic grow at different levels in societies (Audretsch, 2006).

In order to apply new knowledge in a market, there are three elements that must be present in organizations (Gratton, 2007; Hirooka, 2006; Schumpeter, 1954):

- organizational and management requirements;
- an understanding of the new global market;
- the ability to focus on that which is unique and special.

The organizational requirements that will facilitate the development and application of new knowledge can be described in relation to the necessity of the simultaneous existence of co-operation and co-creation (Gratton, 2007). Co-operation and co-creation are two different phenomena (Adler and Kwon, 2002; Uzzi, 1997), although co-operation

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can lead to co-creation in some cases. Co-operation is possible without co-creation, and co-creation is possible without a great deal of co-operation (op.cit.). On the other hand, co-operation and co-creation can lead to personal triumphs and organizational productivity (Gratton, 2007). Co-creation is defined here as 'activities that focus on productive practices related to an organization's purpose'; and co-operation is defined as 'all the other activities in an organization that players perform together, but which is not directly linked to productive practices related to an organization's purpose'. Nevertheless, the degree of co-creation and co-operation can vary greatly (op.cit.).

The management requirements may be described in relation to two concepts: 'value creation' and 'value destruction', which may be structured into five focus areas (Thakor, 2000):

- an understanding of the purpose of value creation;
- an understanding of the various value creation perspectives;
- an understanding of an organization's strategy and the development of sub strategies that support this strategy;
- the ability to develop methods for measuring value creation;
- the ability to develop rapid responses to market signals.

The 'new global market' is a relatively well known concept relating to the global knowledge economy. However, what is less known is that it involves a new way of thinking in relation to value creation in the global market. In relation to this Drucker (1995, p. 143) mentions four dimensions that we should reflect on in relation to the emergence of a new global market:

- the structure of the global market;
- changes in trade in the global market;
- the importance of financial capital in the global market;
- the relationship between the global markets and organizations in a local context.

In order to apply and exploit the development of new knowledge in new global markets, it is crucial that individual organizations develop 'hot spots' (Gratton, 2007), as this will enable them to continuously develop innovations and thereby gain competitive advantages (op.cit.). Furthermore, those organizations that develop hot spots will most likely become more involved in high-tech value creation processes, which will result in high labor productivity and relatively low labor costs, enabling the organizations to compete outside the designated area of operation for organizations in low-cost countries. At the society level, one may observe in the new knowledge economy a greater emphasis on global knowledge clusters of expertise, at the expense of local industrial knowledge clusters. It is reasonable to assume that the global knowledge clusters of expertise will function as the social mechanisms for high-tech value creation in organizations, because the knowledge required to produce, distribute and reintegrate high-tech value creation is found in the global knowledge economy. Nevertheless, in this paper, we will focus on the organization level, and we pose one research question accordingly: how might a move from industrial knowledge clusters to global knowledge clusters impact on the development of innovations in organizations?

Following the discussion above, we suggest three components that, we opine, may have an impact on the development of innovations in organizations in the knowledge economy. We have illustrated this introduction in Figure 1, which also shows how this article is organized.

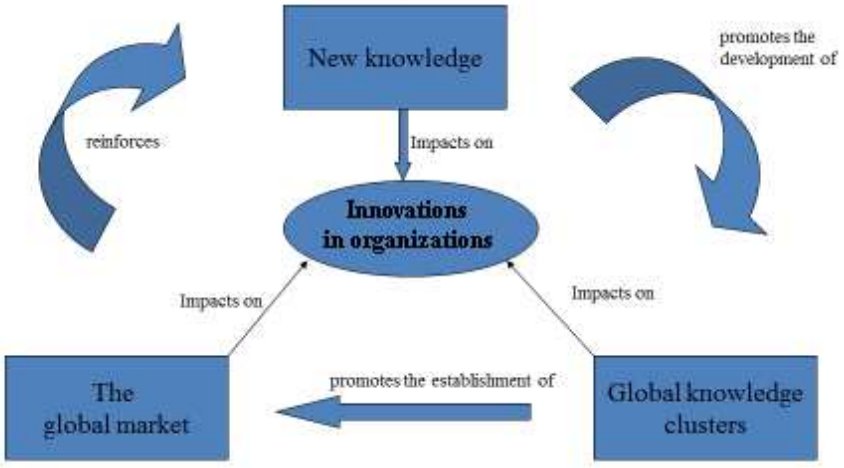

Fig. 1. Innovations in organizations: influencing components

1. New knowledge

Without the hindsight of history, we cannot be certain as to whether we are living in a period of fundamental changes where new paradigms are emerging, or to what degree transformations are already taking place. An understanding of new knowledge may be compared analogously to the 'Owl of Minerva', which only spread its wings at the fall of dusk. In other words, a complete understanding of emerging knowledge is often only possible with hindsight. However, there are many signals to suggest that we are living in an age where new ways of thinking are emerging. Drucker (1995, p. 75), as one example notes that 'our age is such a period of transformation'.

We do not know with certainty what drives the transformation that Drucker (1995) refers to. Drucker (1995), Thurow (2000) and others point to the development of new knowledge, greater integration within and between social systems, and the development of new technology as being important mechanisms that contribute to this transformation. Knowledge, knowledge integration and new technology mutually reinforce each other, and encourage the breakthrough of new ways of thinking about economic, political, social and cultural phenomena (Drucker, 1999; Schumpeter, 1954; Tsoukas and Shepherd, 2004).

We know that knowledge and customers are the critical resources for most organizations operating in the global knowledge economy (Collins, 1993; Drucker, 1995). The knowledge that creates uniqueness in organizations is often specialized knowledge (Cooper, 1986). Today, there are increasingly more specialists and more specialized professions, such as gene research and bio-technological research. There has also been an increase in specialization in increasingly smaller fields of knowledge. Yet, conversely, we have increasingly less knowledge about the totality, that is, the larger patterns and relationships (Drucker, 1999; Senett, 2007; 2008). Thus, an understanding of contexts, context expertise and insight into the development of patterns seems to be contrary to specialization and expertise development. It seems that the more specialized knowledge that is developed, the less understanding we have of the context in which the knowledge is developed.

It is in this situation that organizations can intervene with three measures (Audretsch, 2006; Bicak, 2005; Drucker, 1995, 1999). Firstly, they can apply their specialist knowledge, or that of others, to meet a demand. Secondly, organizations can use their understanding of patterns to place specialist knowledge into a broader context. Thirdly, organizations can be transformed from the inside so that they can adapt to new markets.

Drucker wrote (1995, p. 75): "if history is any guide, this transformation will not be completed until 2010 or 2020". If we are in the midst of such a process of transformation, we cannot have any detailed knowledge of how this will unfold in future. However, we can say a lot about the 'big picture', because there will always be a lag between new knowledge and new technology. On a theoretical level, we know that there will be further tension between stability and change (Bateson, 1972, p. 272; Luhman, 1996). We also know with a great degree of certainty, that social networks will become increasingly more important in the global knowledge economy (Strathdee, 2008), as will skills, talents and innovation (Jansen et al., 2007; Johannessen et al., 1999), environmental awareness, and social responsibility of organizations (Wertherjr and Chandler, 2005).

Thus, on a general level, we know a great deal about how new knowledge will emerge, but as mentioned above, we know little of the details, i.e. how, where and when it will happen. What we do know is that the needs, wants, preferences and expectations on one level may indicate something about the specific developments that will emerge on other levels. However, taking this knowledge as a starting point will only reveal half the truth, because new knowledge also creates new needs, wants, preferences and expectations (Drucker, 1999). If, for instance, in the 1970s, you asked a man in the street about his need for a cellular phone or laptop computer, his response would have given us little indication of current developments in the area of communication technology. There was, of course, both telephony and computing in the 1970s, but these tools took radically different forms from what we know today. As evidenced in innovation research, it can often take 20-40 years before technological innovations are turned into physical products (North, 1990; Roberts, 1991; Schumpeter, 1954). It is also important to remember that many types of innovations do not fill existing needs to any large extent, but they create new ones (Schumpeter, 1954; Sennett, 2007).

On the basis of what is described above, organizations can relate to two kinds of knowledge processes. Firstly, the knowledge that reveals the needs, wants, preferences and expectations which relate to the functions of early warning systems used in organizations. Secondly, that knowledge developed in various public and private research foundations around the world can lead to new technology advancements, which create needs as well as meeting existing demands.

Knowledge is often divided into two main categories: explicit and tacit knowledge (Nonaka and Takeuchi, 1995). Explicit knowledge can be relatively easily formulated using words, figures and symbols; it can also be digitized (Nonaka and Takeuchi, 1995) and easily communicated to others using ICT. This is probably one of the reasons why explicit knowledge is often given emphasis in collaboration projects, while other kinds of knowledge that cannot be digitized are given less emphasis. On the other hand, tacit knowledge is rooted in practice and is connected to specific contexts (Polanyi, 1962, 1966). Research has showed that it is difficult to communicate this type of knowledge to others in the form of information, because it is difficult to digitize. Tacit knowledge is often the most important strategic resource of organizations, because it is difficult for others to acquire and utilize, and because it is rooted in the specific problems that an organization has to solve (Nonaka and Takeuchi, 1995). Tacit knowledge can thus be described as 'an important strategic capability of organizations' (Grant, 2003, p. 211).

In addition to these two types of knowledge, two other types are also important; hidden knowledge (Grant, 2003; Kirzner, 1982) and implicit knowledge (Biack, 2005). Hidden knowledge is that which we do not know, and are unaware that we do not know it, and which many claim constitutes the basis for creativity and innovation (Kirzner, 1982, p. 273), or alternatively for 'the management of ignorance', which is 'the key issue for companies as it is for society'(Grant, 2003, p. 222). Hidden knowledge is also referred to as 'previously unthought-of knowledge' (Thomsen, 1992). Kirzner (1982) expresses explicitly that this type of knowledge provides opportunities for developing something that is creative and represents novelty.

Implicit knowledge is the knowledge that an organization possesses, but is not utilized or put into productive practice, because knowledge boundaries prevent integration of such knowledge (Pfeffer and Sutton, 2000). Consequently, organizations are 'dumber than they need to be'; that is, they do not exploit their potential (op.cit.). Tacit, explicit, hidden and implicit knowledge can all be developed through collective learning processes within an organization, where, amongst other things, ICT-based interaction and knowledge development are essential. The transferral of experience and systematic organizational learning systems are also important. Thus, innovation and the development of knowledge in organizations can be accomplished through a continuous dialogue between tacit, implicit, hidden and explicit knowledge (Hedberg et al., 2002; Polanyi, 1966; Wenger et al., 2002).

We opine that the new skills needed for organizations to compete in the global knowledge economy lie in the intersection between the four types of knowledge described above. Furthermore, we assume that new knowledge, which organizations may exploit and use for innovative purposes may emerge in what we have termed as 'global knowledge clusters' (see Figure 1), which we will examine in the next section of the paper.

2. Global knowledge clusters

When potential customers' needs, wants and preferences in a market are coupled with new technological knowledge, this often forms the start of high-tech success stories (Rifkin, 1988). In addition, relationships, networks and co-creation are the central features of high-tech value creation (Kanter, 2006, p. 874). High-tech value creation also seems to attract complementary technological expertise and service companies (Audretsch, 2006; Breschi and Malerba, 2007; Wenger et al., 2002). After a period of time, local knowledge clusters develop into separate social systems, growing through reputation, innovation and networking contacts. Examples of such local knowledge clusters are numerous: Silicon Valley, Route 128 (the Boston area), the Milan region, and Paris, just to name a few.

We can observe the contours of nations and regions that specialize in high-tech value creation within global knowledge clusters of expertise, for instance, Finland, India, China, Vietnam and South Korea. These global knowledge clusters are connected to, but independent of, local industrial knowledge clusters. Examples of emerging global knowledge clusters (of expertise) are the contracts and projects that are distributed globally online on different network platforms such as Elance.com.

The expertise, knowledge and technology that forms the basis for local industrial knowledge clusters often becomes apparent after a period of time, as a part of the social systems that develop in the global knowledge clusters. The expertise and technology in the local industrial knowledge clusters are a necessary precondition for the development of global knowledge, but this is not sufficient to ensure their survival. Metaphorically speaking, the technology and expertise in the local industrial knowledge clusters may be said to be the midwife of the expertise that is developed in and around the global knowledge clusters. In other words, the technology that was developed in the local knowledge clusters often triggers skills and expertise that are used in the global knowledge clusters. The new expertise creates in turn new

technologies that promote economic growth within and outside the global knowledge clusters.

There are a number of differences between local knowledge clusters and global knowledge clusters. Firstly, local knowledge clusters are located geographically while global knowledge clusters are organized into a system of various networks: technological, psychological, cultural and social. Secondly, local knowledge clusters are physically visible and provide a tangible return, while global knowledge clusters are 'invisible' and their value is not recorded in separate auditors' reports and the like. Thirdly, local knowledge clusters are often governed by hierarchical principles, while global knowledge clusters are governed by 'a flocking principle' (i.e., in a flock of birds, a school of herring and so on, where the behavior of the group is guided by fundamental principles and procedures rather than a leader).

Co-operation and co-creation seem to be the characteristics of the thinking in global knowledge clusters, and they carry consequences for organizations. Illustratively speaking, in Kanter's (2006) international cultural studies, the following characteristics of effective[1] organizations emerged:

- departments collaborate;
- conflicts are viewed as creative;
- people can do anything not explicitly prohibited;
- decisions are made by individuals who possess most knowledge (Kanter, 2006, p. 860).

In relation to high-tech value creation, the following conclusions may be drawn from Kanter's (2006) cultural studies; the global knowledge clusters have a front line focus, and the organization in question must be designed around a specific purpose. Kanter (2006, p. 860) has termed this as 'communities of purpose'. This means that organizations evolve to become part of a larger integrated whole in the global knowledge clusters. However, organizations are independent and stand alone in global knowledge networks. They are also part of a larger complex social system with a common purpose within limited areas. Metaphorically speaking, the factory walls are blown apart and production is distributed globally in relation to a logic of costs, quality, expertise, talent and innovation. In this way, some organizations are included in the global knowledge network of expertise, while others are excluded and risk to become a global economic backwater.

With a common understanding of the purpose of global knowledge clusters (of expertise), that is, networks, alliances or federations, it becomes easier to respond quickly to emerging elements of knowledge at one location in order to transform this into new technology and get a reward and get a pay-back at another location in the network. This type of knowledge integration promotes the development of new technology and high-tech value creation, because the loosely coupled global knowledge clusters will be able to react quickly and use skills and talents toward a common purpose, thereby creating innovations in organizations (Drucker, 1999; Sennett, 2007).

The organizations that participate in the global knowledge clusters should ensure that the different types of knowledge expertise exist under the various degrees of co-operation and co-creation, which are illustrated in Figure 2.

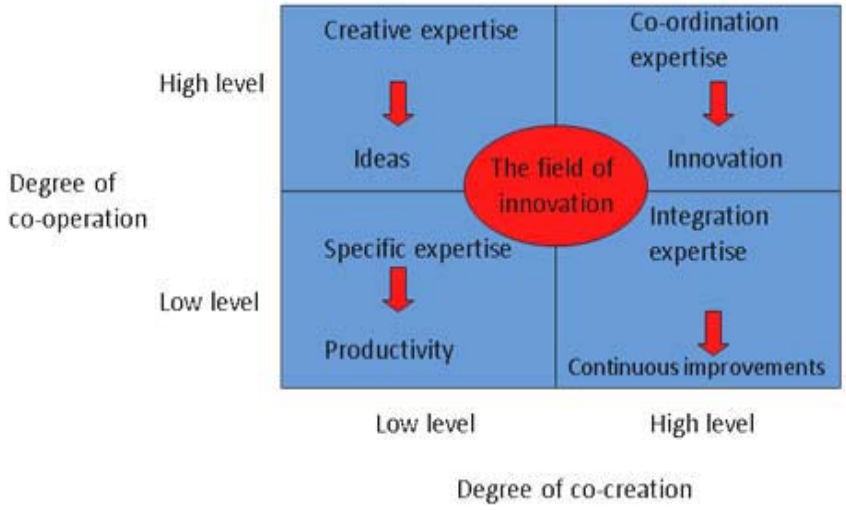

Fig. 2. Typology of knowledge expertise: degree of co-creation and co-operation

[1] Effectiveness in Kanter's studies was subjectively evaluated by the respondents.

A low level of co-operation and co-creation will necessitate that an organization possesses specific knowledge expertise in one area, which can promote productivity. When there is a low level of co-operation but a high level of co-creation, a high level of integration of expertise will be required in the organization, because co-creation in itself does not allow the necessary integration between the organization's teams and members. This expertise will promote continuous improvements in the organization. Similarly, a high level of co-operation with a low level of co-creation will require the existence of creative knowledge expertise in the organization. This expertise will be able to promote the development of ideas in the organization. When there is a high level of both co-operation and co-creation, the requirements to promote a high level of innovation are fulfilled. To avoid 'chaos', however, organizations in the global knowledge clusters must focus on the field of innovation, where the four types of knowledge are integrated (Lave and Wenger, 1991).

In order to promote co-operation in organizations, it is important that the physical and psychological distances between teams and project members are reduced (Gratton, 2002). Furthermore, it is essential that conflicts, problems and disagreements are taken care of in a satisfactory manner, that is organizations should develop conflict management skills (op.cit.). Co-operation also requires that organization members develop positive relationships based on mutual support (Egan, 1977).

The first condition for promoting co-creation in organizations is that players focus on productive practices, or the purpose of what they have set out to do, because co-creation is linked to results, which is not necessarily the case with co-operation (see Flynn et al., 2001). The second condition for promoting co-creation is the synchronization of work so that both the parts and the whole are taken care of, because the complexity of most high-tech projects in organizations is very high (Vinton, 1992). The third condition for promoting co-creation in organizations is the introduction of "rhythm" to the work process, because workers in the knowledge economy need to combine autonomy with an understanding of results (see Waller et al., 2001).

3. The new global market

Changes in the global market occur at a rapid pace, due to new skills, competencies, technology, economic and institutional innovations (Drucker, 1999; North, 1990; Sennett, 2007). One of the emerging institutional innovations has been described above as the global knowledge clusters of expertise. In particular, the pace of change is increasing because there is a growing link between new technology and new expertise (op.cit.).

Due to the rapid changes in the global market, it seems that we must develop a new 'sense of direction', because our fundamental experiences collapse when the pace of change increases so rapidly. Our 'sense of direction' is understood here as our understanding of new global trends. With this understanding, we can move around without a 'map' in a new environment, because we have developed a sense of what is happening, what will happen in the future as well as how and why, and what possible effects it can have on organizations.

This understanding may be developed in many ways, for instance, through what is often termed 'foresight' (Tsoukas & Shepherd, 2004), a word which may be used in relation to developing a 'sense of direction' (i.e., gaining an understanding of the newly emerging global market). In this context, creative individuals in organizations with 'foresight' have been described as 'those that can accurately predict forthcoming changes and effectively implement a series of steps/actions to exploit them in their organizations before their competitors' (Tsoukas and Shepherd, 2004, p. 13).

Nevertheless, if the terrain changes so quickly that our maps become outdated, we cannot wait until we have up-to-date information in order to make accurate decisions, because an organization may lose its position in the market relatively quickly. Consequently, if the market changes faster than our mental models of how the market behaves, we must attempt to conceptualize, rather than specify concretely what we think is about to happen.

The new market is concrete and virtual at the same time. Therefore, organizations must also free themselves from physical, mental and geographical boundaries. At the policy level there is a free flow of goods, labor and services that drive market development. The virtual connections at the macro level consist of what might be termed the production, distribution and consumption of symbols; this consists of information and knowledge organizations. While factories in the industrial society were linked to the land they were built on, the global knowledge industry is mainly virtual (i.e., distributed globally according to a 'logic' of costs, quality, expertise, talent and innovation).

When organizations flow out into the global space in this way, a vacuum occurs locally, and they will become more "vulnerable to invaders attacking their previous local dominance" (Normann, 2004, p. 297). To use a biological analogy, consider that organizations originally existed in a territory, in

which they occupied a niche that encompassed their habitat, but now, with the advent of the new global market, a vastly different situation has occurred.The habitat now becomes both the territory and the niche through the fact that organizations become both global and virtual where all, absolutely all the boundaries are transient.

When organizations become virtual, driven by a logic of the five elements of costs, quality, expertise, talent and innovation, it does not mean that they are less real or that they are moving around in the global space without an anchor. The organizations are visible locally, but they also operate where they cannot be seen physically. They are fragmented in real and virtual modules, like 'Lego bricks'. These Lego bricks/modules are governed by an overall design and they are reintegrated locally according to preference and conditions. Some of these Lego modules are distributed where costs are low, some are distributed where quality is highest, some are distributed where skills such as design expertise are the highest, while other modules are distributed where talent and innovation potential is the highest. The individual modules can collectively be concerned with one or several products or services. Only rarely will a local geographic area meet the requirements of the five elements described above, which is why we opine that the habitat has become both territory and niche.

Thus, the new market is not visible in the traditional sense and cannot be defined as a system of demand and supply, which was the case in the industrial society. It is the balance between the creative chaos and the needs, wants, preferences and expectations among potential and existing customers, which drives the new market forward (Kirzner, 1982; Lucia, 2004; Norman, 2004; Schumpeter, 1954). In this way, demand is de-emphasized as a social mechanism for organizations. More emphasis is given to the early warning systems in organizations, which can identify the needs, wants, preferences and expectations of potential future customers.

4. Implications I: theoretical consequences for organizations

We have showed that the logic of distribution focuses on costs, quality, expertise, talent and innovation (Drucker, 1995; Kirzner, 1982). Consequently, various modules ('Lego-organization') are developed for the functions of organizations in the global knowledge economy. The core processes and expertise of the organizations are not left out in this logic of distribution, but may be distributed in modules in the global knowledge clusters of expertise.

The logic of reintegration triggers a classic paradox. Chandler (2004) has pointed out that industrial organizations could choose either scale or scope, but something new has occurred in the global knowledge economy. Due to 'Lego organization', which the logic of distribution results in, and the opportunities for information flow and communication, which the logic of coordination results in, the small, exclusive and the unique can now be the economy of scale in the global market. Consequently, 'scale' and 'scope' are no longer two different domains, but rather prerequisites for each other's existence. Consequently, we opine here that the 'scope' becomes the 'scale' in the global knowledge economy.

Reintegration leads to disintegration in the local sphere, where you often get an extreme level of specialization. A new global division of labor is being developed, which reinforces and is reinforced by the logic of distribution's focal areas of costs, quality, expertise, talent and innovation (Sennett, 2007, 2008).

The development of the field of innovation, both locally and globally, provides the sense of direction that is a necessary condition for high-tech value creation in the global knowledge economy. With regard to such an innovation-driven economy, Hamel & Prahalad's (1996) ideas on the core processes are right and wrong at the same time. They are right in the sense that there will always be one or more core processes in various organizations. However, they are wrong in the sense that the core processes can be atomized (modules), fragmented and distributed as numerous small Lego parts. Individually, these small Lego parts can develop in the global space and become viable entities. Similarly, we opine that the 'cluster thinking' of Porter (1990, pp. 131-179) and Breschi and Malerba (2007), amongst others, is also right and wrong at the same time. It is right in the sense that it is made empirically apparent by Breschi and Malerba (2007) amongst others, that economic growth and development of innovations are promoted by local industrial clusters. For instance, consider the industrial districts and high-tech regions such as Silicon Valley, Boston's biotechnology cluster and the Hsinchu-Taipei cluster (Taiwan). The point here is that the clusters are not necessarily geographically linked in so-called local clusters. In the global knowledge economy, both production and distribution are realized through global knowledge clusters of expertise. This will not be sufficient, even if it is not necessarily wrong, to develop policies for local industrial clusters. A policy for local clusters is only a necessary condition, not a sufficient condition for success in the global knowledge economy. The

sufficient condition is a concomitant development of policies for both local and global knowledge clusters of expertise; the combined necessary and sufficient conditions then trigger high-tech value creation. The reason is that in the global knowledge economy, value creation, innovation and transference of experience occur as much in global knowledge clusters of expertise as in local knowledge clusters.

One of the results of high-tech value creation is not necessarily the creation of so-called virtual organizations (Hedberg et al., 2002), but rather a transformation of how organizations are structured away from traditional models to a structure similar to the way the market is organized. The Figure 3 shows a modular flexibility that follows the logic of distribution, coordination, reintegration and disintegration.

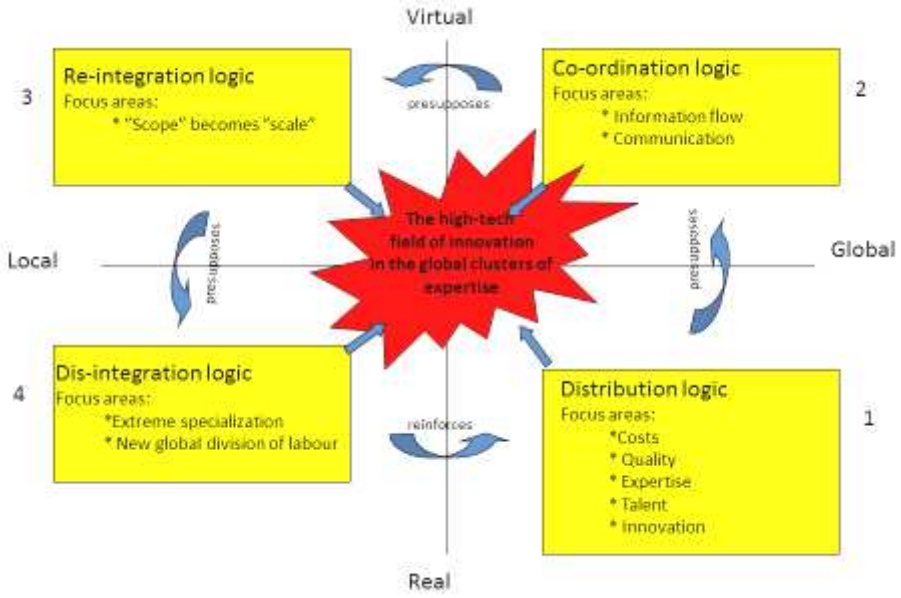

Fig. 3. The development of the field of innovation for high-tech value creation in global clusters of expertise

Normann's (2004, p. 56) image of the same development is the 'exploded company'. This metaphor corresponds to our understanding of the Lego organization of high-tech value creation. After the exploded company has fallen down, what is left? It is reasonable to assume that it rises from the ashes like a phoenix, in the form of modules distributed globally and held together by the logic of coordination and reintegration.

The social consequences are made apparent in the logic of disintegration, which Sennett (2007, 2008), amongst others, has shown in his research. Our point is that Normann's (2004) pieces become integrated in the same market in which they fall down. Consequently, an organized chaos emerges, which we have termed here as the field of innovation, and which is connected through global knowledge clusters of expertise. The small exploded pieces begin to develop but they have an explosive dynamic built into them, which enables them to explode again and again, and glide into the same market that they fall down in. However, the explosions and fallout areas are not random. They follow the five elements in the logic of distribution. We can expand Normann's image to be more like laser-guided small 'cluster bombs', which, with surgical precision, both explode and fall down according to a specific logic. It is an offspring of Normann's exploded companies in which we see the contours of high-tech value creation, where the structures and processes implode in the market and they become more or less integrated in the market. On an abstract level, one can say that the production, distribution and consumption implode into each other in the global knowledge economy.

We opine that a growing market is not a precondition for the field of innovation, as Castells (2000) has pointed out. The market and the exploding modules merge into each other in such a way that they become symbiotically linked and ultimately emerge as 'the business of one and the market of one'. Studies of what makes some businesses exceptional as Jim Collins (2001) and others have pointed out, are less relevant in the context of the global knowledge economy, because the explosions lead to the collapse of fundamental experiences.

It is reasonable to assume that organizations that survive such an explosive storm are those who will become one with their market. The individual modules will not become embedded in the market, but become immanent in the market (i.e., the market becomes the organization).

5. Implications II: practical implications for organizations

The greater the turbulence, complexity and pace of change in the outside world, the less room there will be for organizations to plan for the future. However, we will always have some measure of knowledge concerning future developments. For instance, we know with great certainty that in the next 5-10 years, the large post-war baby boomer generation will reach retirement. We know something about what will happen if the ice on the North and South Poles starts melting. It is also known what will happen if a company is insolvent over a long period of time, etc. It is not so much that our planning and strategic models will become useless, but rather that when the pace of change, turbulence and complexity increase while fundamental experiences collapse, then the space where we can use such planning tools will become limited.

To simplify, one can relate to the outside world in two ways. One can adapt to changes in the outside world, or one can create one's own future by influencing the outside world (see Ackoff, 1982). If the pace of change, turbulence and complexity increase, then adaptation to the outside world becomes less relevant, and thus, it will be more appropriate to create one's own future.

Organization members with a high degree of intuition and understanding of patterns perceive that new developments are taking place; that is, they become aware of the emergent structures. Consequently, they situate themselves where the pattern manifests itself, before it becomes evident as information. This means that they act on cues, signals and signs in the outside world, and by situating their organization where the pattern eventually manifests itself they will have secured a position from which they will be able to profit. In other words, they will be able to create their own and the organization's financial future by taking advantage of the difference and time lag that exists between the cues, signals and signs (i.e., the little hints that something new is developing) on the one hand, and the pattern that is realized in practice on the other hand. When the pattern is realized, the gap in the market will soon be filled by other organizations. However, in the meantime, large profits will have been made by those who acted on the basis of cues, signals and signs.

The emergent pattern first shows itself as a repetition of small signals and cues. After a while, these show themselves as a particular pattern becomes stronger. When this pattern has manifested and revealed itself as explicit knowledge, then everyone will have access to it. In other words, this does not concern 'wild speculation', but instead, disciplined, systematic and structured observations of small signals and cues, which underlie the actions that can result in making large profits from the global knowledge economy.

Conclusions

The new global knowledge economy demands a thinking beyond Porter's (1990) value chain and industrial clusters. The value chain in the new knowledge economy has become global and the clusters that drive innovation processes have, to a larger extent, become global competence clusters. This implies that global and local innovation systems integrate and the clusters that drive the innovation processes are spread in the global geographic room. This new cluster system possesses a production logic in the geographical room rested on a set of logics:

- Part of the production will be transferred to areas where the costs of production are low.
- Another part of the production will be transferred to areas where the quality standards (of production) are high.
- A third part of the production will be transferred to areas where the competency of the labor force is high, e.g. in design and computer technology.
- A fourth part of the production will be transferred to areas where the conditions for developing innovations are favorable.

These four part-productions of the same productions will be development where the conditions for innovation development are "best". In such a global production system, new competencies will be developed.

The emerging trends which are described above have consequences for research. First, there will be a need for research which is grounded on system thinking where the whole and the parts are linked. Second, there will also be a need for research which examines patterns in the global knowledge economy, in particular patterns which tie together production to global, dynamic competency cluster. A third type of research will be requested which will enhance an understanding of where the different logics operate in the global geographic room for different products; i.e. a focus on cost logic, quality logic, competency logic and innovation logic. When knowledge is obtained as to where the different logics function best, one will be able to establish global competency clusters for specific lines of production.

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