RENEWAL ABILITY OF ORGANIZATIONS: COMBINING EFFECTIVE MAINTENANCE, INCREMENTAL DEVELOPMENT AND RADICAL INNOVATION IN KNOWLEDGE-BASED ORGANIZATIONS

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Abstract

Organizational ability for continuous self-induced innovation, learning and development has emerged as a popular topic in recent management science literature. Nevertheless, there is no widely shared view on how organizational renewal should be defined and what it consists of. Consequently, this paper aims to produce an integrative definition of organizational renewal ability and to examine its most important characteristics. Based on review and comparison of various theories of organizational renewal, it is argued that organizational renewal ability is defined both by the ability of the organization to implement the spectrum of knowledge processes from 1) effective standardization, replication, implementation and maintenance of the existing knowledge, through 2) continuous incremental development of them, to 3) production of radically new knowledge and innovations, *and* by whether these are balanced in a manner that is consistent with the strategic intent of the organization as well as the external demands posed by its environment. Further, it is argued that organizational renewal ability is pro-active, knowledge-based, dynamic, future-oriented, social, systemic, strategic, and multi-dimensional by nature.

Keywords: renewal ability, organizational change, dynamic capabilities, innovation, learning.

Renewal Ability of Organizations: Combining Effective Maintenance, Incremental Development and Radical Innovation in Knowledge-Based Organizations

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1 Introduction

Globalization and advances in ICT mean that organizations have to face world-wide competition in rapidly transforming, unpredictable environments, and thus, the ability to constantly generate novel and improved products, services and processes has become essential for organizational success. Performance in turbulent environments is, above all, influenced by organization's capacity to continuously and proactively modify its goals and operations, i.e. its ability for self-renewal. This capacity does not only mean

that an organization is able to keep up with the changes in its environment, but also that it can act as a forerunner by creating innovations at the tactical and strategic levels of operation (Hamel, 1996), and thereby change the rules of the market.

Organizational ability for continuous self-induced innovation, learning and development has emerged as a popular topic in recent management science literature. Nevertheless, there is no widely shared view on how organizational renewal should be defined, what it consists of and how it can be facilitated. Consequently, this paper aims to produce an integrative definition of organizational renewal ability and to examine its most important characteristics. First, 5 theoretical models of continuously renewing organizations[1] are reviewed extensively in order to provide a holistic understanding of renewal ability from various viewpoints[2]. Then, based on comparison of 9 theories of organizational renewal, a synthesizing definition for renewal ability is put forth and its most important characteristics are discussed.

2 Literature Review

2.1 Nonaka: Knowledge Creation in Organizations

Nonaka's (1991; Nonaka & Takeuchi, 1995) theory of knowledge-creation processes within organizations is a hallmark of knowledge management. It is relevant to the understanding of self-renewal ability in organizations, as it approaches organizations as active creators of knowledge from within themselves, rather than as relatively passive adaptors to changes in the external environment. For Nonaka, organizations are living organisms with a collective sense of self, and he advocates a holistic approach to knowledge and organizations. He argues, "to create new knowledge means quite literally to re-create the company and everyone in it in a non-stop process of personal and organizational self-renewal" (Nonaka, 1991, 3).

Nonaka portrays knowledge as a dynamic human process, which is in sharp contrast with the traditional definition of knowledge in western culture as justified true belief. Leaning on Polanyi's (1966) division of knowledge into tacit and explicit forms, he argues that to understand the process of knowledge creation, it is not enough to focus

[1] Nonaka's theories on knowledge creation in organizations; Leonard-Barton's accounts of continuously renewing organizations; Weick's construct of renewal type of organizational learning and associated processes of organizational mindfulness; Eisenhardt's strategic approach to continuous organizational change; and Ståhle's system theoretical interpretation of self-renewal in organizations.

[2] These 5 frameworks were chosen for review based on their ability to illustrate organizational renewal from complementary viewpoints.

on the explicit, i.e. formal and systematic, type of knowledge, but that also the contextual, experiential and personal nature of knowledge has to be taken into account. The famous SECI-model or knowledge creation spiral presents the growth of knowledge as a social process where knowledge is transformed in a recursive interaction between its tacit and explicit forms, via socialization, externalization, combination and internalization.[3] Lately, Nonaka and colleagues (Nonaka & Konno, 1998; Nonaka et al., 2000; Nonaka et al., 2001) have theorized about the social context of knowledge creation, which they call with the Japanese concept of *ba*. Ba is a mutual space where knowledge is shared, created and utilized between actors. It can be either a physical, virtual or mental space, and it is both closed and open in the sense that it is characterized by certain boundaries but also by constant interaction with its environment. In addition to providing a space for knowledge processes, ba also provides the actors with energy. The concrete knowledge content of the ba is contingent on the situation and on the strategy of the organization.

The bulk of Nonaka's work presents a comprehensive account of knowledge-intensive organizations. The elements he discusses include the creation of a knowledge vision (Nonaka et al., 2000) and a knowledge strategy (Von Krogh, Nonaka & Aben, 2001), as well as managing ba's, and supporting the key knowledge processes by facilitating knowledge creation and knowledge exchange within the organization. In sum, Nonaka's work provides important insights about renewal ability of organizations. The SECI-model underlines the fundamentally social and dynamic nature of knowledge and the concept of ba helps to understand the enabling conditions for some of the knowledge processes in organizations. However, Nonaka's approach to knowledge creation is not adequate as such to capture the whole nature of self-renewal in organizations. In fact, his model is perhaps more representative of learning rather than of producing radically new knowledge. This is because his starting point is the tacit knowledge *that already exists* within individual minds, which is then shared with others in tacit form in the socialization phase, and converted into explicit form in the externalisation phase. Thus, ironically, there is no space in the knowledge creation spiral where genuinely new, i.e., *not pre-existing knowledge*, in the form of radical, discontinuous innovations, could emerge. In other words, the SECI-model presents a

[3] Nonaka's theory of knowledge creation has been criticized for misreading Polanyi's idea of explicit and tacit dimensions of knowledge. According to for example Brown and Duguid (2001) and Orlikowski (2002), Polanyi is actually claiming that there is a tacit dimension in all knowledge, i.e. that there is no knowledge without the tacit dimension, which is inextricably tied with action. In other words, it makes little sense to differentiate knowledge to two distinct types and describe knowledge creation as a movement between these two.

model of how the members of an organization learn from each other and refine their existing knowledge (by combining it with other's explicit knowledge in the combination phase of the SECI-model), but is not adequate for understanding radical organizational changes and innovations.

Nonaka's model can also be criticized for painting too uniform a picture of knowledge creation. In his model, knowledge creation is based on mutual understanding and adaptation. However, it has been well established by other researchers that *conflict* of diverse viewpoints is necessary for the emergence of new ideas (e.g. Kanter, 1988; King & Anderson, 1990, 85; West, 1990, 314; Nemeth, 1997; Amabile, 1998, 81; Von Krogh, 1998, 48; Pöyhönen, 2002). This conflict- and critique-driven nature of innovation is effectively ignored in Nonaka's work.

2.2 Leonard-Barton: Continuously Renewing Organizations

Leonard-Barton (1992a; 1995) talks about organizations that are able to renew themselves continuously. She portrays such organizations as constantly evolving, organic learning systems, which are in a state of continuous flux and self-regeneration. According to Leonard-Barton (1995), the starting point of knowledge management is an understanding of the *core capabilities* of the organization, i.e. capabilities that constitute a competitive advantage for the firm and have been built up over time and cannot be easily imitated (p. 4).[4] Each core capability comprises four interlocking dimensions, namely 1) employees' knowledge and skills, 2) physical and technical systems of the organization, 3) managerial systems, and 4) values.

Core capabilities "are not static pools but wellsprings, constantly replenished with streams of new ideas and constituting and ever-flowing source of corporate renewal" (Leonard-Barton, 1995, 3). They are embedded and re-created in the *knowledge-building activities* of the organization. It is these activities that are at the heart of organizational renewal. They are played out by various actors, equipped with different kinds of skills, and cannot be fully understood outside this local context. The four key knowledge-building or innovation activities are:

[4] Whereas the concept of core competence (Prahalad & Hamel, 1990) includes only the knowledge base of the organization, the concept of core capabilities also includes the managerial and technical systems for exploiting the competencies (see Leonard-Barton, 1995, 271, note 30).

1) Shared problem solving: Creation of intellectual variety within the firm and managing the diverse skills in a manner that builds up "creative abrasion", i.e. conscious channelling of cognitive conflicts to create new knowledge[5] .
2) Implementing and integrating new methodologies and tools: Implementation of new organizational tools and processes should be regarded as an act of innovation rather than as a mere execution of a preformed plan; the end users of the new methods should be empowered to actively participate in their development and to make immediate process improvements.[6]
3) Formal and informal experimentation: Creation of new knowledge assets by experimentation and prototyping; as some of the experiment unavoidably fail, it is essential not to penalize failures and to build mechanisms for learning from mistakes.
4) Pulling in expertise from outside: Importing and absorbing knowledge from external sources such as other firms and research institutions by, for example, engaging in extensive external scanning and using gatekeepers and boundary spanners; enhancing capacity to learn from the market by utilizing non-traditional techniques for probing information about customer needs and using prototypes to co-develop concepts with customers

Leonard-Barton (1992b; 1995, 29-58) stresses that core capabilities must be designed and understood as evolving, organic reservoirs, which means that they have to be re-examined and assessed constantly in relation to the strategy. Otherwise they risk turning into core rigidities, which make the organization static and resistant to change and emergence of new core capabilities in the face of necessary realignment. Also the knowledge-building activities can be (mis-)managed so that they inhibit the flow of critical knowledge.

To avoid this trap, it is necessary that the organization possess certain characteristics or patterns of thought and behavior, which guard it against clinging to unproductive routines. Leonard-Barton (1995, 261-266) discusses six characteristics that create a learning-oriented atmosphere which enables continuous renewal: enthusiasm for

[5] The same idea that innovation requires that cognitive conflict be balanced with some kind of positive interpersonal connectedness can be found in West's (1990) team climate factors of aim for excellence and participative safety, Tjosvold's (1985) concept of constructive controversy, and Pelled's (1996) discussion of cognitive and affective conflicts. Also Nemeth (1997) talks about the fine balance of creating unity without uniformity in innovating groups.
[6] In the article published in 1992(a), Leonard-Barton calls this knowledge-building activity "internal knowledge integration", and puts more emphasis on securing information flow throughout the organization by encouraging informal knowledge sharing, minimizing hierarchical boundaries, and ensuring that everyone participates in the creation of new knowledge.

knowledge; drive to stay ahead; tight coupling of complementary skill sets; iteration in activities; higher-order learning; and leaders who listen and learn.

It is noteworthy that Leonard-Barton concurrently refers to organizations as organic systems, and that she obviously considers coherence and connectivity of the system elements as crucial for organization's capacity for continuous renewal. For example, discussing a case of Chaparral Steel, a factory that operates as a "learning laboratory", i.e. "an organization dedicated to knowledge creation, collection, and control" (1992, 23), she argues that such an organization is comprehensible only as an organic whole. She states, "Managers designing a learning laboratory need to adopt holistic, systems thinking… Moreover, such systems thinking must permeate the organization's every level... It is this intense interconnectedness that makes such systems difficult to imitate and fragile – but effective." (pp. 24-25.)

She also underlines that it is important that everyone throughout the organization has a consistent perspective about the conduct of daily activities: "[Even] factories can operate as learning laboratories. The most important characteristic of such organizations is that they are *totally integrated systems* [italics added]… The line operator appears to take the same perspective on the conduct of daily activities as the CEO. Chaparral is tremendously consistent." (Leonard-Barton, 1992, 35.) And further, "The remarkable aspect of vibrant and self-renewing organizations is the *consistency* of certain characteristics – no matter what level or unit of analysis one addresses… one hears certain themes over and over again… I do not mean to suggest absolute conformity or homogeneity among individuals and groups. Rather, one finds a pattern of thought and behavior that is observable at all levels and that gives the organization its character." (Leonard-Barton, 1995, 260.)

Leonard-Barton's work provides a rich account of what knowledge-building activities in continuously renewing organizations might look like. It also acknowledges the potentially stagnating nature of organizational capabilities, i.e. the tendency to get stuck on doing the same thing once it is mastered well. However, she does not examine the possibility that in some cases, it might actually be a good thing to keep on doing the same thing. This idea might seem antithetical to renewal at first sight. However, other authors (e.g. Weick, 1996; Brown & Eisenhardt, 1998; Ståhle et al., 2003a) have suggested that in addition to constant re-focusing of knowledge assets, in some cases

organizational renewal might be more about renovating, revisioning and preserving the already existing assets.

2.3 Weick: Organizations As Mindful and Renewing Systems

Karl Weick approaches the issue of self-renewal from the juncture of cognitive social psychology and organization science. The father of sense-making views the key to survival in rapidly changing, unexpected environments to be the way in which organizations deal with new information: how information is gathered, interpreted and acted upon. Even though the bulk of Weick's work on the social psychology and sense-making of organizations is connected with the topic at hand, two of his works are especially relevant: an essay on the role of renewal in organizational learning (1996) and a book with Kathleen Sutcliffe (2002) on managing organizations in unexpected circumstances.

In his earlier essay (1996), Weick contrasts two forms of organizational learning: transformation and renewal. He criticizes literature on organizational learning for taking too narrow a view of this phenomenon, and argues that most of the discussion has concentrated on what he calls transformational learning, characterized by radical disruptions with the past. He states, "when people equate learning with [transformational] change, they strip the learning process of much of the constancy, continuity, and focus that are necessary for adaptation" (p. 738). He goes on to argue that there is another type of learning, which he calls renewal, that is more appropriate in most situations. Learning as renewal involves "a non-traditional balance of change and continuity" (p. 738), characterized by reinvention of the past, "an action which simultaneously both acknowledges that past, yet discounts it by changing it" (p. 741).

Weick's treatise of renewal in organizations is mindful of the cognitive and psychological limitations of human beings, and of the importance of preserving a sense of continuity and meaning in the midst of changes. According to Weick, an organization capable of renewal type of learning must be able to awake strong emotions in a new context; stabilize the new stimuli by linking it with previous experience; and to create psychological safety through continuity (pp. 742-744). Thus, for Weick, renewal is not about abrupt and ahistorical changes, disconnected with the past of the organization. He emphasizes the fact that organizational learning and development usually builds on what the organization already knows, as well as the affects and values related with the

earlier experiences. In fact, in his view, transformational learning is a rare occurrence and its initiation is full of risks:
"If we are preoccupied with transformation, then we are likely to overload people with [new] beginnings rather than helping them to reinvent old beginnings. We need to be mindful of beginnings, and protect the ones we have by exercises of renewal that *preserve and update* [italics added], rather than by exercises of transformation which destroy and outdate." (p. 745.)

For Weick, renewal signifies renovation, revision and preservation. His conception resembles Nonaka's account of knowledge-creating companies as both of these theories emphasize continuity in organizational development. Leonard-Barton's theory of organizational renewal, in contrast, emphasizes more the radical and disruptive changes, or, in Weick's terms, the transformational type of organizational learning.

Weick and Sutcliffe (2002) examine organizations in highly complex and dynamic environments, and present 5 processes which help organizations in coping with unexpected changes in the environment or in the system itself. This theory can be seen as an account of how renewal type of learning can be successfully conducted in the midst of unexpected situations. The 5 processes are derived from a meta-analysis of studies about high-reliability organizations, such as nuclear plants and military aircrafts, for which the ability to bounce back in case of sudden emergencies is of utmost importance. These processes comprise an operational mode that the authors call *mindfulness*, the ability to constantly question, refine and replace one's mental categories[7]. According to Weick and Sutcliffe, mindfulness is crucial to high performance in changing environments because it enables the early grasping of weak signals and unexpected events, and thereby increases the time and capabilities to deal with them. This enables the quick reparation and replenishment of organizational functioning in unexpected situations.

The 5 interrelated processes characteristic of mindful organizations are:
1) Preoccupation with failure: staying alert to problems in the system, however small they may seem
2) Reluctance to simplify: searching for and encouraging diverse and complex, even controversial interpretations

3) Sensitivity to operations: appreciation of front line employee knowledge, awareness of situational demands and interpersonal processes throughout the organization
4) Commitment to resilience: keeping errors small and improvising quick solutions to keep the system functioning
5) Deference to expertise: decision-making authority migrates according to expertise, not according to position in the organizational hierarchy

Weick and Sutcliffe employ many concepts and ideas associated with systems thinking, even though they do not explicitly adhere to this kind of approach. For example, the account of how rigid hierarchies are vulnerable to errors at lower levels, which then escalate throughout the organization clearly echoes a view of organizations as systems, where every system element influences the whole (see e.g. p. 16).

2.4 Eisenhardt: Strategizing for Continuous Organizational Change

Kathleen Eisenhardt and colleagues have been studying the antecedents of organizational success in high-velocity, i.e. rapidly changing, environments. Their approach combines elements from organizational and strategy theories with complexity and evolutionary theories. A core thread running through Eisenhardt's work is that organizational change is not so much characterized by the rarely conducted fundamental massive-scale transformations described by e.g. the punctuated equilibrium approach[8], but that "change is ongoing, relentless, and even endemic to the corporate culture… [and that] the best firms change routinely, relentlessly, and even rhythmically over time" (Brown & Eisenhardt, 1998, 20).[9]

In Eisenhardt 's view, managing change is the central strategic challenge for firms of today. This can basically take three forms: reacting to change, anticipating it, and finally, at the highest level, leading it, i.e. creating change to which others must react (Brown & Eisenhardt, 1998, 5). Brown and Eisenhardt (1997; 1998) argue that the main performance driver for organizations in industries of rapid, unpredictable changes is their *ability to change* (rather than, for example, unique firm competencies), and their success is demonstrated by the continual reinvention of the organization (rather than

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[7] The concept 'mindfulness' was originally used for describing cognitive propensities of individuals (see Langer, 1989). Group task reflexivity (West, 1996) characterises a similar characteristic on the level of groups.
[8] See Gersick, 1991
[9] The same argument is made also in Eisenhardt and Tabrizi, 1995, 84, when the authors claim organizational adaptation mostly occurs through product innovation, i.e. small and frequent shifts. See also Brown and Eisenhardt, 1997, 2.

e.g. profits or long-term dominance). According to them (1997, 7-8), organizations aiming to master continuous change should, first of all, adopt a "semicoherent strategic direction", characterized by unpredictability, uncontrollability, inefficiency (in the short term), proactiveness, continuous processing and diversity. This model of strategy is in sharp contrast with the traditional view of strategy, where planning and senior executives play a fundamental role.

Secondly, the strategy of organizations capable of continuous change is characterized by the following three core concepts (Eisenhardt & Tabrizi, 1995; Brown & Eisenhardt, 1997; Brown & Eisenhardt, 1998; Eisenhardt & Brown, 1998):

1) Edge of chaos – creating semistructures: The organization needs to find a balance between structure and flexibility: too much rigidity and structure disenable change altogether, and too much chaos leads to incoherence and confusion.[10] Here, the main managerial tools are improvisation and coadaptation: improvisation helps orgs achieve both adaptive innovation and consistent execution, and coadaptation helps in balancing collaborative synergies with individual success in cross-business settings.

2) Edge of time – creating links in time: Secondly, the organization has to balance on the "edge of time", which means that it has to stay focused on current tasks, while simultaneously keeping in mind the past experiences and looking ahead to the future.[11] According to Brown and Eisenhardt (1997; 1998), a recurring problem is that managers tend to "slip off the edge" and focus too much either the past or the future. Too much emphasis on the past results in outdated strategies and actions, and too much emphasis on the future leads to the neglect of current business imperatives. Thus, the challenge is to manage all timeframes simultaneously without being trapped solely in one of them. In this respect, the main tools are regeneration of the past to current contexts and probing for the future by experimenting.

3) Time pacing - establishing the pace of change: The organization should have an internally orchestrated rhythm for conducting changes, rather than be merely reacting to external demands. Brown and Eisenhardt (1998, 14) describe time pacing as "the internal metronome that sets the pace of change within the firm" (p. 14), and claim that this is one of the least understood facets of strategy in changing environments.

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[10] This reasoning is based on research on complex and self-organizing systems (see Prigogine & Stengers, 1984, for the original theory created in the field of physical science; e.g. Ståhle, 1998, for another application of the theory to social systems).

[11] This concept aims to capture a more gradual form of organizational change than the notion of "edge of chaos". While the edge of chaos concerns quicker change processes, the idea of balancing on the edge of time is based on evolutionary theory, which describes how systems change through variation, selection and retention (Brown & Eisenhardt, 1998, 14).

It is noteworthy that Eisenhardt and Brown's theory encompasses temporal issues. This explicit focus on the timeframe of organizational strategizing and functioning sets it apart from the other reviewed models[12]. The concept of edge of chaos describes management of today's business, while edge of time spans from past to distant future. Moreover, the concept of time pacing deals brings up the possibility of using time consciously as a competitive asset[13].

Eisenhardt also acknowledges that *there are several distinct processes through which organizational renewal can occur*. In an empirical survey of 72 product development projects, Eisenhardt and Tabrizi (1995) compared two strategies for product innovation, and found that projects characterized by high uncertainty had different success criteria from predictable projects. They conclude that in predictable projects, it is beneficial to view product development as a rational process comprising series of steps that can be sequenced and compressed; and the speed of these projects can be increased by simplifying the steps, shortening the completion time of each steps and overlapping them. However, unpredictable projects should be seen as improvisation rather than disciplined problem solving. This kind of projects can be sped up combining building intuition, flexible options, real-time experiences and extensive communication with clear focus and priorities[14]. Moreover, in projects with a mix of predictable and unpredictable characteristics, it is the combination of the two strategies that produces the best results. The main point to learn from this study for the purpose of the current discussion (even though it is not made explicitly by Eisenhardt and Tabrizi) is that *there is no one best way for organizational change*: Firstly, organizational change can take many forms. And secondly, the various types of change are facilitated by different organizational processes and structures. This realization has important implications for understanding renewal ability, and also poses challenges for its measurement.

2.5 Ståhle: Self-Renewing Organizations as Three-Dimensional Systems

[12] Weick's discussion of continuity in organizational learning emphasizes historicity of renewal processes from cognitive rather than strategic point of view.
[13] On a similar vein, Ståhle (1998) (based on Prigogine's work [Prigogine & Stengers, 1984]) talks about bifurcative consciousness as an enabler of self-organization, i.e., she claims that situational awareness and the ability to make timely decisions are essential for innovativeness. The two ideas relate to different dimensions of organizational life: Eisenhardt's account provides a more straightforward implementation to organizational strategy, while Ståhle's assertion describes timing as a general factor influencing innovation.
[14] see the above discussion on semistructures

Ståhle approaches renewal ability of organizations from a system theoretical standpoint. In her doctoral dissertation (1998), she examined self-renewal on the level of work groups. In this book, she discerned three paradigms of systemic thinking, which she labeled mechanistic, organic and dynamic. All these paradigms address systems, but their starting point and foci are distinctly different, and consequently, each of them depicts systems in a different manner. The mechanistic paradigm is based on Newtonian physics and focuses on universal laws, rules and regularities, and comprehends systems as stable and closed. The organic paradigm, in contrast, considers systems as open and evolving, and emphasizes interaction with the environment and internal regulation via feedback processes. Finally, the dynamic systems paradigm focuses on the non-linear and unpredictable behavior of systems, and on their internal dynamics for producing change. In the dissertation Ståhle employs theories only from the dynamic systems tradition[15] for describing self-renewal in groups, but later she has widened her view of the phenomenon to include also elements of the other systems paradigms, as will be explained below.

In her subsequent work Ståhle (Ståhle & Grönroos, 1999; 2000) has applied the idea of the three systemic models to organizations. In this framework, organizations are portrayed as knowledge systems, encompassing three kinds of operational environments[16]. The first knowledge environment is called mechanical, and it is this part of organizational functioning that produces sustained effectiveness for reaching predetermined goals. Incremental developments, in contrast, are created in the organic knowledge environment, while radical innovations take place in the dynamic sphere of organizations. In sum, different kinds of systems form different knowledge environments which in turn produce different outcomes.

According to Ståhle, the four essential elements that constitute an organization as a system are know-how, information flow, relationships and management. Each of these take different forms in the various knowledge environments: In the mechanical environment, the essential knowledge is clearly defined and in an explicit form, information flows are unidirectional and typically top-down, relationships follow the organization chart and authority and control are located in the top of the organizational hierarchy. The continuous developments conducted in the organic environment are based on tacit knowledge, lateral two-way information flows, double contingent

[15] namely theories of self-organizing systems and self-referential systems

relationships, and empowering leadership. In the dynamic knowledge environment, potential and intuitive knowledge plays an important role, and it is shared and created via spontaneous and networked relationships in chaotic, unstructured flows and supported by a visionary leadership.

At a first look it would seem that organizational renewal is only related to the dynamic operational environment. However, this is not the case. Even though Ståhle notes that dynamic operating environment is where the creation of the novel idea, solution or artifact happens, the mastery of this process is not enough for a continuously renewing organization. Innovations only represent the potential competitiveness of an organization; they become competitive assets only to the extent that they are developed into marketable and profitable products. In order to achieve this, also the mechanistic and organic environments need to be in place, and furthermore, they need to be appropriately connected with the dynamic operating environment. As Ståhle (Ståhle & Grönroos, 2000, 162) puts it, "The organic environment ensures that the production and service processes work effectively, and the mechanistic environment guarantees that quality is maintained in mass production and routine operations. If innovations remain in the dynamic environment, then the product development processes are not completed." (p. 162).

And further, "It is essential to understand that *constant self-renewal requires the organization to possess skills both in creating the new and replicating the old*. Innovation and replication are the two sides of renewal, the necessary opposites of each other. Innovations are wasted if the company lacks the skill to replicate. On the other hand, even if steady production is maintained, competitiveness is not created without constant renewal [a more appropriate term here would be 'innovativeness', not 'renewal']." (p. 163.) Thus, compared with the other reviewed frameworks Ståhle's account of renewal ability seems to encompass a wider set of phenomena: in addition to the radical innovations, it also includes subtle developments and even the ability to efficiently copy existing assets. This is a significant difference and even antithetical to for example Leonard-Barton's conception of organizational renewal – in fact, core rigidities that Leonard-Barton talks about resemble very much Ståhle's description of mechanistic operational environment. However, while Leonard-Barton sees core

[16] also the terms operating environment, business environment and knowledge environment are used interchangeably with operational environment throughout Ståhle's work

rigidities as impeding continuous renewal in firms, for Ståhle, the mechanistic environment also fosters renewal.

It should be noted that Ståhle is not completely consistent when discussing renewal ability, and it is not obvious what her exact position on its structure is. For example, in her dissertation (1998) Ståhle associates renewal only with the characteristics of dynamical systems. In the subsequent works (1999; 2000), while it is mentioned that a renewing organization needs to be functional also in mechanistic and organic environments, the reasoning does not answer the question whether renewal ability is still mainly a feature of the dynamic environment and only marginally supported by the two other environments. Nevertheless, based on her texts it can be discerned that *renewal ability might be either replicative (mechanistic), adaptive (organic) or radical (dynamic) by nature, depending on in which environment it is demonstrated*. The issue of which of these types of renewal is the most important for a given organization depends on the organization's strategy.

Ståhle does not present a conclusive definition for renewal ability. However, her work suggests that the following criteria should be included:
1) The ability of the organization to function in all of the three operational environments to a certain extent
2) The ability to prioritize the operational environments in line with the organization's strategy

Then, what do these abilities hinge on? According to Ståhle, an organization capable of renewal should possess what she calls "systemic power", demonstrated by the extent to which the various actors within the organization are connected with each other to achieve common goals (p.207). This argument resembles Leonard-Barton's emphasis on organization-wide consistency as a defining characteristic of continuously renewing organizations.

Later on, Ståhle states, "Two things are needed for a company to possess renewal capacity: firstly, it must have *power to change*, flexibility and a sense of purpose, and secondly, it must have *strategic capabilities*, a vision regarding its goals, and a coherent understanding of how those goals are to be achieved." (pp. 209-210.) She emphasizes that both of these things are needed: if there only is power to change, then there will be plenty of "activities full of 'sound and fury'" (p. 210), but no clear direction

or goals. In the opposite situation, there is a coherent understanding of the current situation and what should be done to change it, but “no energy for realizing the ideas. Liabilities and commitments are avoided, escapist delegation is common; responsibility and decisions are pushed to others.” (p. 210.)

Unfortunately, it is left unclear *how these two factors, power to change and strategic competence, are related with the three operational environments*. It seems like Ståhle’s work includes two different accounts of renewal ability, the first one approaching the issue from a systemic point of view, and the other one, which is relatively undeveloped, from the viewpoint of power to change and strategic capability. There are no clues in her work as to whether and how these two strands are connected with one another.

3 Multi-Dimensionality of Renewal Ability

All of the reviewed frameworks depart from the core assumption that unpredictable change is a pervasive feature of today’s industries, and that to survive in such environments, organizations must learn how to manage change in an effective manner. What varies depending on the framework is what this effective management is thought to consist of, as well as the academic discussions where the models are posited. For example, Weick emphasizes the cognitive capabilities of organizational members, while Eisenhardt mostly talks about strategy formation and implementation, and Ståhle derives her framework from systems theories without using explicit references to organization theories.

Probably the most important difference between the various theories is *the set of phenomenon that is covered by the concept of renewal*. For Weick, renewal signifies renovation, revision and preservation, as opposed to transformational, abrupt and discontinuous changes. In contrast, Leonard-Barton seems to include mainly the radical and disruptive types of change in her conception of organizational renewal. Nonaka’s theory speaks about yet another form of changes, namely subtle developments grounded well on the existing knowledge of organizational members. Eisenhardt’s work is mainly related to the small, frequent developments in organizations, although she also acknowledges the existence of large and infrequent changes. Ståhle’s model covers the whole spectrum of change-related phenomena, from efficient exploitation of existing knowledge assets to incremental developments and finally radical innovations. Considering all these approaches together, it seems that

renewal is a three-dimensional phenomenon, consisting of 1) effective standardization, replication, implementation and maintenance of the existing knowledge base, 2) continuous incremental development of it, and 3) production of radically new knowledge and innovations. (See table 1.)

This division of renewal into three types is different from some of the dichotomies made on knowledge-based activities of organizations. For example, March (1991) has portrayed organizations as focusing either on exploration, i.e. search for new knowledge, or exploitation, i.e. application of existing knowledge. Similarly, Grant (2000) talks about the difficulty of reconciling the dichotomy between knowledge generation and diversity, and knowledge application and specialization. However, the reviewed theories of renewal in organizations suggest that the creation of new knowledge and competencies and radical change differs from incremental development processes, and therefore it is suitable to separate renewal into three types instead of two.

If knowledge is understood as something residing in and between human beings, it is inextricably linked with action and change[17]. This argument is quite easy to accept if one considers the acts of creativity, innovation and creation of radically new knowledge (radical type of renewal). Even learning, i.e. acquiring knowledge that is new to the recipient (incremental type of renewal), is commonly associated with change and renewal. In contrast, at a first look, it might seem that exploitation and application of knowledge, or the maintenance type of renewal would have nothing to do with renewal. However, this is not the case. Even when knowledge seems to stay the same, it is not immobile; the maintenance of knowledge requires that it be re-produced; and *even if that which is re-produced stays the same, the mere act of re-producing is a change in the state of affairs*. For example, re-reading the same book is unavoidably a different experience each time, producing a change in the reader's cognitive organization. Similarly, upholding and maintaining a standardized way of conduct in an organization consumes energy and requires action to re-produce the replicated behavioral code. Therefore, maintenance can be considered an essential aspect in organizational renewal.

Table 1. Comparison of Theories on Renewal Ability of Organizations.

Renewal ability conceived as	Key assumption	Main focus	Type of renewal considered	Theoretical roots	Representative author(s)
Knowledge conversion capability	Renewal is achieved by knowledge conversion between tacit and explicit knowledge, which takes place in various ba's	Process of knowledge conversion	Incremental development	Polanyi's idea of tacit and explicit dimensions of knowledge; organizational theory	Nonaka & Takeuchi, 1995; Nonaka & Konno, 1997; Nonaka , Toyama & Konno, 2000
Continuous replenishing of core capabilities	Constant updating of core capabilities via knowledge-building activities keeps organizations renewing	Core capabilities and the supporting knowledge-building activities	Radical innovation	Organizational theory, especially technology management and new product development	Leonard-Barton, 1992a; 1992b; 1995
Mindfulness of the organizational system	Mindful operational mode enhances organizational capability to repair and replenish system functioning and contain change	Collective enactment of organizational processes supporting mindfulness	Maintenance	Cognitive social psychology	Weick, 1996; Weick & Sutcliffe, 2001
Strategic capability for containing and creating change	Semicoherent strategic direction and its implementation by means of semistructures, links in time and time pacing	Strategy formation and implementation	Incremental development	Strategy, complexity and evolutionary theory	Brown & Eisenhardt, 1997; 1998; Eisenhardt & Brown, 1998
Systemic power of the organization to form knowledge environments which support its strategy	Dynamics of the organizational system create knowledge environments within the organization, each of which leads to different type of renewal	The capability of the organization to function as a coherent knowledge system according to its strategy	Maintenance, incremental development and radical innovation	Systems theory	Ståhle, 1998; Ståhle & Grönroos, 2000; Ståhle, Ståhle & Pöyhönen, 2003
Continuous innovation	Continuous innovation requires synergistic combination of operational effectiveness, i.e. exploitation and strategic flexibility, i.e. exploration	Routines for innovation and learning	Incremental development and radical innovation	Industrial process management	Boer, forthcoming; Boer & Bessant, forthcoming
Understanding and supporting the autopoietic nature of the organization	The sensory function of organizations enables creation of new knoweldge, while the memory function enables maintenance of existing knowledge; both are needed for continuous self-production of the organization	Autopoietic nature of organizations	Maintenance and radical innovation	Theory of autopoietic systems	Maula, 1999
Dynamic capability	The organizational capability to leverage, develop and change its competences is the key to success in rapidly changing environments	Firm-specific routines and capabilities	Incremental development and radical innovation	Resource-based and capability-based views of the firm	Teece et al., 1997; Eisenhardt & Martin, 2000
Ability to manage the organizational renewal cycle	Crisis, value-based leadership and creative networking are necessary for radical organizational renewal	Renewal cycle	Radical change	Organization theory, ecology	Hurst, 1995

[17] This argument is inspired by Tsoukas & Chia, 2002

The multi-dimensionality of renewal in organizations reflects one of the classical problems of business economics and organizational theory, namely how to combine such elements as innovation and effectiveness, exploration and exploitation, and creativity and structure in organizations. Traditionally, these have been perceived as contradictory and mutually excluding, but lately several authors have proposed that organizations should be able to engage in many kinds of change processes or knowledge-based activities simultaneously.

Sutcliffe et al. (2000) have pointed out that in the frameworks that explicitly consider several types of organizational change-related phenomena, there are three distinct views of whether and how these can be dealt with within the same organization. The first view proposes that the different change processes are contradictory and mutually excluding. For example, according to March (1991), exploitation and exploration processes are contradictory and an organization should not attempt both of them. The second view is that the various change processes exist sequentially in the organization. For example, Brown and Eisenhardt (1997; Eisenhardt & Brown, 1998) adhere to this binary mode when they talk about pacing phases of incremental development with occasional rare periods of radical change. Finally, the third group of theories suggests that different types of change processes can co-exist simultaneously within the same organization. Building on Sutcliffe et al.'s (2002) work, it is proposed here that kind of dual view of organizations can be further divided into two strands. Some theories, such as Benner and Tushman's (2003) construct of ambidextrous organizations and loosely coupled units described by Weick (1979), assume that the pursuit of different change processes should be conducted in functionally separate organizational units. On the other hand, there are several theories claiming that they can and should operate within the same social units. For example, according to Ståhle and Grönroos (2000), renewal ability necessitates that the organizational unit is able to efficiently replicate knowledge as well as to create new knowledge on a constant basis. Also Hansen et al. (1999) state that effective knowledge utilization requires that the organization pursues both codification and personalization strategies to knowledge management at the same time.

When it is argued that the various change processes should be conducted simultaneously, it is especially important to address the question of how exactly they are to be balanced; it is hardly realistic to assume that an organization could devote itself *equally* to all renewal processes at the same time. For example, a case study by

Petersen et al. (2002) illustrates how radical change consumes energy and resources that could otherwise be used for producing incremental changes, and thereby demonstrates the difficulty of simultaneous mode.

Some theories that discuss how the simultaneous combination of different types of renewal should be conducted depart from the idea that the strategy of the organization should be at the core of the balancing. Hansen et al. (1999) propose that depending on its competitive strategy, the organization should focus mainly on pursuing either codification or personalization type of knowledge management[18] predominantly, and use the other strategy to support the first. They propose a 80-20 split where 80% of the knowledge sharing follows one strategy and 20% the other. Correspondingly, Ståhle et al. (2003a; 2003b) argue that the three types of knowledge environments in their model should be prioritized according to the strategic intent of the organization.

In addition to the organizational strategy, also the external market environment influences the optimal combination of types of renewal. Talking about modes of organizational competence, Sanchez (2002) notes that each of them plays a more or less critical role in a firm's ability to create value in stable, evolving and dynamic competitive environments. Similarly, also a certain type of renewal ability is likely to be especially relevant in a given type of environment, even though all of them are likely to be needed to a certain extent. Specifically, effective maintenance is especially important in stable competitive environment, incremental development in progressively evolving environments, and production of radical change in highly turbulent and unpredictable environments. In sum, it seems like the combination of the three types of renewal should be based on the organizational strategy as well as the external market environment in order to optimize the renewal ability of an organization.

4 Integrative Definition and Characteristics of Renewal Ability

Putting the differences of the 5 reviewed theories of renewal ability aside, it is obvious that there are several noteworthy similarities all of them share. Based on these similarities, it is possible to present definition for organizational renewal ability, which synthesizes the most important characteristics posited in the various theoretical models. *Renewal ability can be defined as the collective capacity of an organization to maintain, replicate, develop and innovate knowledge assets in a manner consistent*

[18] These knowledge management strategies are roughly equivalent with the mechanical and organic knowledge environments in Ståhle's theory.

with its strategy and business environment. Renewal ability is pro-active, knowledge-based, dynamic, future-oriented, social, systemic, strategic, and multi-dimensional by nature. Each of these characteristics warrants closer examination[19].

First, the *pro-activeness* of organizational renewal is reflected in the background assumptions of all reviewed models of renewal. They all suppose a certain level of autonomy to the firm and view its behavior as internally induced rather than arising purely as a reaction to external pressures. In this respect, all of the theories adhere to a resource-based view of the firm (Prahalad & Hamel, 1990; Barney, 1991), even if this is not explicitly mentioned in most of the reviewed studies. This means that firm-specific assets and competencies are the main sources of a firm's renewal ability, rather than e.g. its market position. Also, the pro-active approach to organizational activity differentiates models of renewal ability from the massive body literature where organizational change is viewed as something that is implemented in the organization (rather than created by the organization) and as massive, sudden and planned (rather than built up by everyday action).[20] Further, discussions on renewal ability do not differentiate organizational members into change agents and change targets, nor is resistance to change seen as an important issue. Notably, renewal ability is not synonymous with change: change is a general concept that refers to the difference between two states, whereas renewal ability concerns self-generated organizational change.

Second, renewal ability is a *knowledge-based* capability. In other words, organizational renewal deals with intangibles or intellectual assets of the organization, i.e. knowledge, skills, competencies, capabilities, rather than with tangible resources. Renewal ability might demonstrate in tangibles, such as when a heightened renewal ability leads to improved quality or larger market share, but as an organizational capability it is essentially intangible by nature. It is intimately linked with such issues as learning, memory and knowledge creation, both on the level of individuals and the whole organization. Learning refers to a specific type of change, which can be very important especially in the development type of renewal. Innovation can refer to a specific type of change or an end product. In the former sense, it is an important process in radical organizational renewal.

[19] Multi-dimensionality of renewal ability was already extensively explained in the previous section of the paper.

Further, for all the reviewed authors renewal ability is a capability which is demonstrated in *knowledgeable action*[21]. Thus, it is not only a question of what kind of knowledge and competencies there are within the organization, but more importantly, whether and how these assets are actually employed in the course of daily activities. Hence, the third characteristic of renewal ability is that it deals with *dynamics* of organizational functioning, i.e. with what happens in the organization, instead of, for example, what the organization owns or how it is structured. As renewal ability deals with knowledge as an ongoing, emergent process, and focuses not on the intangible assets per se but on the capability to leverage, develop and change them, it is also *future-oriented*: the examination of organizational ability for producing meaningful change provides means for grasping the future potential of the firm.

Renewal ability is a thoroughly human issue. To capture it, it is necessary to understand knowledge as a product and vehicle of human activity, bounded by the limitations of human cognitive and other psychological capacities. Even though information technology systems and other related mediating tools can act as important facilitators and enablers of renewal, their role is secondary compared with knowledgeable actors. Moreover, these more or less knowledgeable actors never act in a vacuum; knowledge as embedded in and constructed in collective practices and organizational renewal is achieved by interacting individuals, combining their efforts while striving towards (more or less) common goals. All authors emphasize social interaction as a defining feature of renewal ability, even if the precise form of interaction recommended varies from one framework to another. In sum, renewal ability is a *social* capacity: it deals with relationships between people and their interaction processes, not with inhuman processes, or atomistic functioning of separate individuals.

Sixth, renewal ability is a *systemic* propensity. In other words, it is formed by the interrelated actions and views of the system participants which form the organizational system as a whole, rather than isolated propensities of autonomous individuals. All of the reviewed authors employ systems perspective in examining renewal ability. Some

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[20] See e.g. the review of the 1990's literature on organizational change by Armenakis & Bedeian, 1999.
[21] Some authors (e.g. Boland & Tenkasi, 1995; Orlikowski, 2002; Nahapiet & Ghoshal, 1998) argue that to understand knowledge-intensive organizations, a more appropriate term instead of knowledge would be *knowing*. This concept encompasses the idea that knowledge only produces advantage to the extent that it is used in actual practice, as opposed to being stored in databases.

of them do it in a somewhat metaphorical manner (like Weick), while others use it more comprehensively (notably Ståhle)[22].

Finally, there is a strong two-fold connection between the renewal ability of an organization and its *strategy*. On the one hand, if an organization strives to achieve renewal ability, this should be recognized in its strategy. Continuous renewal cannot be achieved accidentally, and it requires significant changes to the traditional logic of strategizing and managing. On the other hand, strategy dictates when, how and what kind of renewal the organization should aim to achieve.

5 Conclusion

Based on the reviewed literature, it was argued that organizational renewal ability is a three-dimensional phenomenon, consisting of three analytically distinct types of knowledge processes: 1) effective standardization, replication, implementation and maintenance of the existing knowledge base, 2) continuous incremental development of it, and 3) production of radically new knowledge and innovations. Furthermore, each type of renewal requires distinct operational and management processes, and thus the question of prioritization among them is essential. Therefore, *renewal ability as an organizational capability* is defined both by the ability of the organization to implement the spectrum of knowledge processes from replication of existing knowledge and competencies to quantum-leap innovations, *and* by whether the three processes are balanced in a manner that is consistent with the strategic intent of the organization as well as the external demands posed by its environment.

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[22] E.g. Contractor (1999) talks about the two uses of systems perspective: metaphorical and modelling, and their respective benefits, challenges and limits.

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