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## **Emergent Innovation—a Socio-Epistemological Innovation Technology. Creating Profound Change and Radically New Knowledge as Core Challenges in Knowledge Management**

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# Emergent Innovation—a Socio-Epistemological Innovation Technology

## Creating Profound Change and Radically New Knowledge as Core Challenges in Knowledge Management

**Markus F. Peschl**

(University of Vienna, Vienna, Austria  
Franz-Markus.Peschl@univie.ac.at)

**Thomas Fundneider**

(tfc consulting, Vienna, Austria  
tf@tfc.at)

**Abstract:** This paper introduces an alternative approach to innovation: Emergent Innovation. As opposed to radical innovation Emergent Innovation finds a balance and integrates the demand both for radically new knowledge and at the same time for an organic development from within the organization. From a knowledge management perspective one can boil down this problem to the question of *how to cope with the new and with profound change in knowledge*. This question will be dealt with in the first part of the paper. As an implication the alternative approach of *Emergent Innovation* will be presented in the second part: this approach looks at innovation as a socio-epistemological process of “learning from the future”.

**Keywords:** Innovation, radical innovation, emergent innovation, knowledge creation, change.

**Categories:** L.2.3, M.4

## 1 Introduction—Innovation and Knowledge

What makes successful radical innovations so fascinating? What does creating “radically new knowledge” mean in the context of knowledge management? Why are so many innovation projects doomed to failure, although a lot of resources are allotted to these projects? How can a *culture of radical innovation* be introduced into an organization, in its processes, products, services, and business models which—despite its radical nature—fit into the existing structures of the organization?

Innovation is among the most challenging processes in the context of knowledge management. Nevertheless the creation of (radically) new knowledge is the key for almost every domain in a business or organization—even more so, if the main product or service is focused on knowledge. What makes innovation processes so difficult and challenging? Primarily, because they have something to do with the future and how to “behave” in the future; more specifically, with constructing knowledge which has to fit both into external future changes (including the resulting new requirements) and to what and where the organization will be at this point in time (e.g., concerning its technology, knowledge, human resources, etc.). In most cases these future states are almost impossible to predict accurately, because the underlying social, economic, technological as well as knowledge dynamics is too complex. In a way we are in a similar situation as science and technology always is: one is trying to predict an

aspect of reality in order to increase the level of control over this aspect—the only way one can achieve this is to create new knowledge and apply it in various contexts.

Hence, *innovation* and *knowledge* are intrinsically coupled in a complex knowledge process: (i) acquiring knowledge (via observation, etc.), (ii) abstracting and constructing knowledge (understanding), (iii) creating new knowledge, and (iv) realizing this knowledge in concrete prototypes; (v) after fast cycle learning processes on these prototypes (vi) this newly generated knowledge gets embodied in the organization.

Taking this radically knowledge oriented perspective on innovation seriously, one can boil it down to the question of *how to cope with the new and with change*. This question will be dealt with in the first part of the paper. As an implication an alternative approach to innovation will be presented in the second part: *emergent innovation*. This approach looks at innovation as a socio-epistemological process of “learning from the future”.

## **2 Ways to Cope With the Challenge of Change and with the Demand for the New**

Coping with change is at the heart of any innovation process. In most cases the challenge is how react to this change with a strategy which is based on new knowledge or—even better—to *anticipate* this change and proactively shape the future with new knowledge. From a knowledge perspective this is a triple challenge: one has not only to react to a change which has occurred already; rather, (a) one has to *anticipate* this change and (b) to *relate* it to a possible future state of one’s own knowledge (be it in one’s own business, human resources, technology, etc.). (c) Above that, one has to *shape* a whole future scenario which integrates these domains in a (radical) innovation (radically new knowledge, business model, service, product, etc.). Of course, this is the most sophisticated form of dealing with the challenge of change. In the following paragraphs we are going to discuss different *levels and strategies* of how to deal with change (see also [Scharmer, 07; Senge, 90]):

1. *Reacting and downloading* is the simplest way of responding to change. Already existing and well established behavioral, organizational, perceptual, or cognitive patterns are applied to solve the problem or the learning/adaptation task. This is the most convenient and most economic way of reacting to change, because it requires only downloading of already prefabricated solutions, knowledge, patterns, etc. The price of this simple response is quite high: (i) the reactions are highly rigid and (ii) the resulting solutions or changes do not go very deep and in most cases do not even scratch the underlying issues of the problem. However, this mode of dealing with change is what most cognitive systems and organizations do most of their time.
2. *Restructuring and adaptation* goes one step further by not only applying already existing knowledge patterns, but to use these patterns as a blueprint which is *adapted* slightly to the current situation. From a cognitive perspective this is a highly efficient learning strategy, because it is not as rigid as downloading, but it can be done with minimal cognitive effort; namely, to make use of already existing knowledge, patterns, change them

slightly and apply them to the new situation, task, etc. From the field of cognitive (neuro-)science these processes are well understood—these are the classical learning and adaptation processes well known from the domains of connectionism or computational neuroscience (e.g., [Bechtel, 02; Peschl, 01; Rumelhart, 86] and many others). From this perspective it becomes clear that these processes are mathematically equivalent with processes of *optimization*. I.e., we are searching for an optimum in an already pre-structured space (of solutions). These processes of optimization normally lead to *incremental innovations* [Ettlie, 84].

3. *Redesign and redirection*: The focus of this strategy to cope with change is to primarily explore one's own patterns of perception and thinking in order to be able to assume *new perspectives*. In that process the focus of attention shifts from the external object to the source of one's cognitive and perceptual activities—this shift is referred to as *redirection* [e.g., Depraz, 03, Varela, 00]. This can be done individually, however, it is much more effectively in a collective setting. The goal is to arrive at a position from which it is possible to take different standpoints and to understand what one's own patterns of perception and thinking are—these insights act as a starting point for creating new knowledge and for the following level of reframing.
4. *Reframing*: The process of redirection does not touch the domain of assumptions in most cases; downloading, adaptation, and optimization are sufficient for mastering everyday problems and challenges. In a way these solutions are not very interesting from the perspective of radical change, because they do not bring forth fundamentally new knowledge, insights, or understanding. Fundamental change is always connected with reflection of *deep assumptions* and stepping out of the—more or less consciously—chosen framework of reference. I.e., going beyond the boundaries of the pre-structured space of knowledge and “reframe” it in the sense of constructing and establishing new dimensions and new semantic categories. This process concerns the level of mental models, premises, deep assumptions and their change. In dialogue-like settings (e.g., [Bohm, 96]) these assumptions are explored in a double-loop learning manner [Argyris, 96]. Going one step further, this process of reflection leads to the construction of completely new conceptual frameworks enabling the reframing of already well established cognitive structures. These are the basis for *radical innovations*.
5. *Re-generating, profound existential change, and “presencing”*: On a more fundamental level, change goes beyond reframing; it is not only concerned with intellectual or cognitive matters and modifying assumptions any more. In that more fundamental context, questions of *finality, purpose, heart, will*, etc. come to the fore—what they have in common is that they concern an *existential* level rather than a cognitive level. From a learning perspective these processes are realized in the triple-loop learning strategy [Peschl, 07]. In this mode change is not solely based on cognitive reflection any more, but more importantly on *existential reflection* and learning. In a way the goal is to bring the existential level of the person and the organisation (i.e., its acting as well as its core) into a status of inner unity /alignment with itself and with its future potentials as well as with future requirements. What might sound

esoteric is in fact a very old theme and philosophical issue going back at least to Aristotle's philosophy. Very often these questions concern the domain of the core/substance of the innovation object and of *wisdom*. Due to its existential character [Scharmer 00, 07] and [Senge, 04] refer to this mode of change/learning as "*presencing*". It represents an approach to innovation which does not primarily learn from the past, but which shifts its focus towards "*learning from the future as it emerges*". I.e., the goal is to be very close to the innovation object and at—the same time—completely open to "what wants to emerge" (out of the surrounding, out of the organization, its humans and its knowledge)—the difficult part in this approach is (i) to profoundly understand the situation (i.e., the core of the innovation object) plus its context, (ii) to match these insights with the potentials which want to emerge, and (iii) to bring them into a consistent and integrated picture. In short the process of presencing is about a fundamental examination of the *core* of the innovation object leading to a profound, holistic, and integrated understanding of this object including its context— only a highly nurturing environment for generating profound new knowledge may give rise to *radical innovations* which are not only radically and fundamentally new and completely "out of the blue", but which are also *fitting well* into what emerges in society, in the organization, and in culture in general.

These strategies of coping with change and innovation do not exclude each other; in most cases aspects of almost every level are present in one or the other way in innovation processes—the interesting question for an organization is where it shifts its focus to. For instance, [Nonaka's et al., 03] (revisited) SECI model focuses on the interplay between implicit and explicit knowledge and how this interplay can act as a source for the generation of new knowledge. It is clear that levels 3–5 are *intellectually challenging* and demands for an explicit culture of openness, innovation, and real commitment to (radical) innovation both on an individual and a collective level. From an innovation perspective, these levels are most interesting—hence, the question: how can these innovation processes of levels 4 and 5 be realized in organizational settings?

### **3 Emergent Innovation**

Besides their manifestations as entirely new, surprising, and convincingly coherent services, products, or business models the fascinating aspect of "real" fundamental innovations are the "mental innovations" and the "mental change processes" of knowledge (creation) having led to these manifestations. How can they be brought about?

#### **3.1 Incremental and Radical Innovation**

[Ettlie, 84] (and many others) differentiate between processes of *incremental* and *radical* innovation. Incremental innovation is characterized by minor changes and optimizations which do not touch the underlying concepts; "...incremental innovation refines and extends an established design. Improvement occurs in individual

components, but the underlying core design concepts, and the links between them, remain the same.” ([Henderson, 1990], p 11).

While incremental innovation goes for optimization (see also level 2 section 2) the focus of radical innovation is on changes in the more profound domain of core concepts or base principles. In most cases, making changes in these fundamental domains implies radical changes in the whole product or service (plus its context; e.g., by opening up completely new markets). In other words, radical innovation starts off with changes the assumptions (see also level 3 and 4 above). „A change in principle, then, fits with our intuition of what constitutes a novel technology. I will therefore define a new (radically novel) technology as one that achieves a purpose by using a new or different base principle than used before.“ ([Arthur, 07], p 278)

### **3.2 Emergent Innovation: Radical Yet Organic Innovation from Within**

We are proposing an alternative approach and knowledge technology to those two classical paradigms of innovation: *emergent innovation*. This concept of innovation follows a fundamentally different approach: it is a *socio-epistemological technology* focusing on the cognitive and social processes leading to a new type of innovation (process).

#### *Emergent Innovation and Profoundly Understanding the Core*

This kind of *innovation emerges* out of a process of (i) a profound understanding of the innovation-object and (ii) reflecting and letting-go of predefined patterns of perception and thinking (compare also U-Theory [Scharmer, 07]). This leads to *radical, yet “organic innovations” in the sense of both respecting and developing/changing the core/essence of the innovation-object* (be it a business, service, product, idea, etc.). This socio-epistemological technology of emergent innovation is a highly fragile and intellectually challenging process which has to be held in a container which we are referring to as *enabling space* [Peschl, 07a]; it is a multi-dimensional space enabling and facilitating these processes of knowledge creation. This enabling space comprises of a physical, social (trust, etc.), mental/cognitive, epistemological, as well as technological dimension.

#### *Emergent Innovation as a Collective Socio-Epistemological Process*

In most cases, innovations do not just happen by chance. A culture of openness, learning, creativity, readiness for error, etc. must be fostered and rewarded in order to make innovation happen in an organization. On an individual level, this is typically depended on the personal ability, traits, and commitment of a single person or a rather small group of interested individuals; on an organizational level, establishing this culture primarily is a leadership task (setting goals, setting examples, rewarding, enabling structures for free spaces, etc). Regardless of the many techniques available to stimulate innovations, most innovation processes are based on the classical process steps of: idea generation, idea selection, idea management and realization of plans. In many cases the techniques being used in this process are massive brainstorming sessions (quantity first), market research, user testing, external studies etc. Most outcomes of such an approach are *incremental* innovations, as the basic thinking behind these processes does not go beyond level 2 (see section 2).

Besides the fact that *radical* innovations are non-predictable and rare, they are based on mental “outbreaks” (level 4, 5; section 2); in most cases radical innovations are tied to *single persons*, so-called “mavericks”—individuals who think outside the box. In case such a maverick (being very good in generating radically new ideas) teams up with a partner who has the personal traits of realizing things, radical innovations may lead to successful products or services; history shows, however, that most (radical) innovation initiatives fail on an organizational level. The reasons for this lie in the fact that these processes are highly dependent on a rather small group of individuals and on their involvement; hence, these innovation processes are standing on a rather shaky and fluctuating ground. Furthermore, they are implicitly based on the assumption that radical innovation is based on “far out”, “creative”, and completely orthogonal ideas (grafted onto the business from the outside), on a high quantity of—in most cases low quality—ideas going through a rigorous selection/evaluation process, etc. which makes the whole process even more erratic and unpredictable.

The core idea is that *emergent innovation* is not primarily dependent on exceptional individuals who are supposed create radical innovations, but that selected members of an organisation acquire the understanding and skills in the basic thinking that underpins the processes of levels 4 and 5 in section 2. In some cases radical innovation and emergent innovation may lead to similar outcomes (product, service, process, strategy); the processes having lead to these results are completely different, however: on the one hand, a few outstanding individuals generate radically new knowledge on an occasional basis, on the other hand a team of well-selected and trained members of the organisation are responsible for a continuous flow of radical innovations.

#### *Why “Emergent” Innovation?*

What is emergence in the context of innovation? In general, emergence means that some system display qualities which cannot found in its components [e.g., Stephan, 99]—i.e., features emerge out of the interaction of the system’s components (on the micro-level) as “new qualities” on the macro/collective level.

The approach of Emergent Innovation takes this phenomenon seriously in a several dimensions: (i) (radically) new knowledge is not primarily the result of analytic processes, but is understood as an emergent phenomenon. (ii) It develops/emerges “from within”: i.e., much of what emerges is implicitly already present—the challenge is to explore the space of potentialities and enable the process of emergence; (iii) this is achieved by applying another notion from the theory of emergence: the importance of constraints—if they are well orchestrated this might lead to an emerging phenomenon (however, it does not determine it; compare also the concept of enabling spaces [Peschl, 07a]). (iv) Finally, emergent innovation is a highly social process in which the collective dimension plays a crucial role: new knowledge emerges out of the interaction between a group of individuals in a structured socio-epistemological process of interactions and constraints.

Comparing the concept of emergent innovation with, for instance, the standard model of knowledge creation/management, such as [Nonaka’s et al., 03] SECI model, there are, of course, compatibilities; however, one can clearly see that the process of

emergent innovation goes far beyond creating new knowledge out of the tension between tacit and explicit knowledge—rather:

- The cognitive capacities of observation, thinking, reflection, etc, are developed in a systematic manner; the space of potentialities is explored in a thorough way;
- The creation of new knowledge goes beyond combination of existing knowledge by radically letting go of existing pieces of downloaded knowledge and patterns of thought and yet organically fitting it into existing structures;
- The process of creating knowledge is future oriented: i.e., what wants to emerge is more important than the (re-)combination of already existing knowledge structures, etc.

#### **4 Conclusion and Future Work**

The following points have turned out to be crucial in the emergent innovation approach:

- Focus on processes of cognition and perception as well as changing them profoundly (via techniques of radical reflection, questioning, dialogue, deep observation, etc.).
- Primacy of profound and holistic understanding of the innovation subject/object as opposed to the production of a high quantity of ideas with relatively low quality.
- Focus on the process of *emergence* of innovation and on enabling this process (instead of imposing or forcing it; see “enabling space”).
- Seeing, profoundly understanding, and respecting what is (already) there — understand what is already there as a chance rather than an obstacle.
- “*Organic radical innovation*”: Respecting and at the same time exploring and developing the most radical and unforeseen potentialities of the (profound understanding of the) core/essence of what is already there. In this sense emergent innovation is a kind of “radical innovation from within”.
- *Thinking innovation from the future potentialities* instead of repeating and extrapolating patterns from the past. The question “what wants to emerge” is a pointer into the future and implicitly instructs the whole process of emergent innovation/knowledge creation.

Several innovation projects have proven that this socio-epistemological technology can be applied in a wide field of industries, sciences, etc. Still, there are many points to be developed and refined in this project.

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