MANAGING RADICAL CHANGE BY INTEGRATING A NOVELTY-ACTION DESIGN: A FIRST DRAFT ON ENTERPRICE INNOVATION PLANNING

Kiemen, Mixel, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium, info@mixel.be

Doctoral Abstract

Innovation management depends on the quantity of change it produces and the novelty it brings. Incremental growth is based on previous knowledge and can be managed accordantly. When radical change happens, our knowledge system becomes restructured and prior knowledge can work against or stimulate the change. Radical change occurs now by "natural selection", could we do better? A bundle of state-of-the-art models on innovation raise the impression that we can. The goal is to manage radical change by creating something similar as Enterprise Resource Planning (ERP) for Innovation (so EIP). For radical change theory & practice or knowledge & actions are co-evolving, therefore the research methodology needs to be mutually reinforcing theory & practice. The results of prior projects give proof of the methodology. While prior research used innovation management for cognitive research, the relation is now reversed: the novelty-action design becomes the frame to integrate the innovation management models. The design is the outcome of prior research. It has a background in cognition and has been recognized as a central element to create novelty. As the novelty research is itself novel its theory can be applied to itself. From the theory the method of reversing relations is a common learning approach. Reversing leads to an untested concept than needs to be tried out. The research will be to try out the EIP to make both theory & practice more concrete.

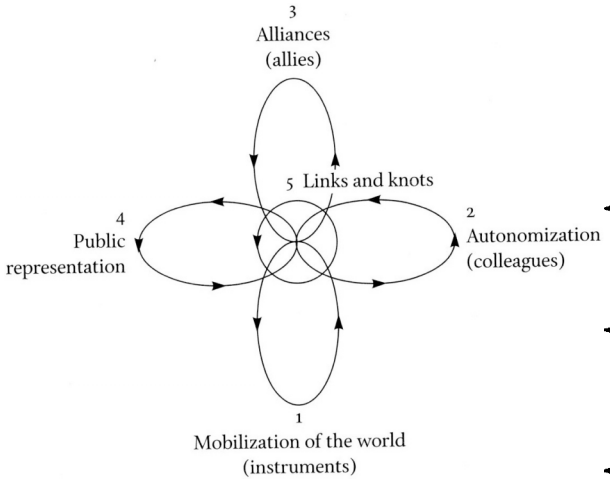
1 BACKGROUND

A first experiment has been created with the Master thesis in Artificial Intelligence (Kiemen 2003). The experiment constructed creative agents, based on learning-by-acting. A controversial approach was taken by using SCRUM management technique (DeGrace 1990) to guide the development. The outcome created a design and some questions about the complex environment & embodiment of the agent. The questions shift the focus from artificial agents to people as agents on the web. The next experiment was to create the "Cartography of Research Actors in Brussels" (CRAB , Van de Velde 2004). With the goal to lower access cost for interdisciplinary information. The last project was "Knowledge sharing over Social Software" (KnoSoS, Coenen 2006), to make a network between SMEs and high schools. Both experiments had a practical application. The underlying theoretical question in both was to understand how a software design could stimulate the aggregation of control by web agents. The experiments and the theory were disconnected. The theoretical investigations were mostly literature studies. In the theory the similarity between three distinct analytical designs (cognition, science & technology and cybernetics) was

discovered (Kiemen 2008). For the cybernetic research it turns out that higher-level cognition and the innovation management had a similar problem of controlling novelty. The design, which in general will be called the novelty-action design, tightens the relation between research and the methodology. For example the cognitive concept of anticipation control (Hawkins 2004, p.148) and the application of SCRUM have similar control behavior. The distinction between both is related to their novelty category: the former was a discovery, the later an invention. From the history of technology it is understood that discoveries and innovations mutually reinforce each other. It is related to the cognitive learning where reflection & mastery mutually reinforce each other. With this newfound insight the question arose if it is possible to use the cognitive research as theory for managing radical innovation. To clarify the relation, let a business metaphorical be similar to a human body. From prior research the importance of a complex embodied agent has always been central. Like the neural network is connected with the whole body so are some IT systems connected throughout the organization. The higher-level control parts of the brain get information from several other parts of the brain, which allows visibility of implicit information and the transformation to explicit information. Similarly the IT systems in place will have to be linked to novelty-action design to allow a similar transformation.

2 LITERATURE AND THEORY

The main field of the novelty theory is cybernetics where it relates to concepts as self-organization and stigmery. Two other fields (anthropology & history) can elaborate it for science & technology: the anthropology of science facts by Bruno Latour (1987, 1999) and the history of technology by Joel Mokyr (1990, 2002). The practice of novelty is innovation management, in particular SCRUM, open innovation (Chesbrough, 2003) and big-small companies (Applegate et al 2003) are relevant.



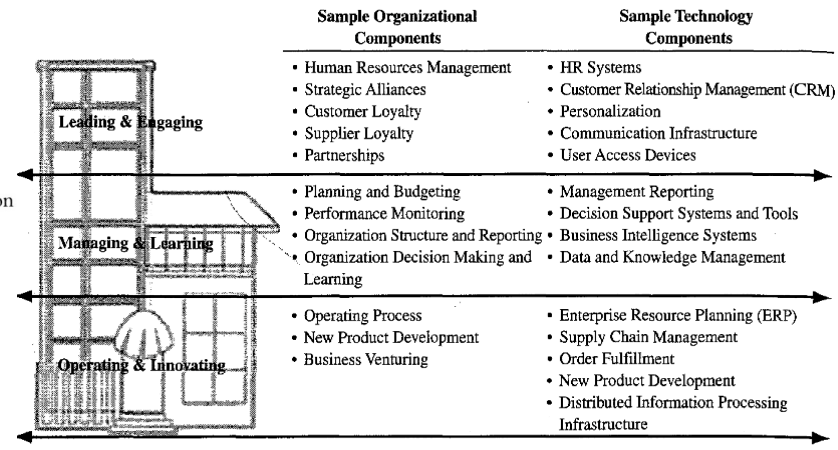


Figure1 Left *The Circulatory System of Science Facts (Latour, 1999, p.100) The drawing is used as one of the examples for the novelty-action design. It is given without further explanation.*

Figure1 Right *Blueprint of "Big-small" Business. From Leading & Engaging over Managing & Learning to Operating & Innovating (Applegate et al, 2003 p.323)*

The goal of the novelty-action design is to create a system that allows dynamic control by constructive knowledge. The challenge of understanding this control is great and requires a deep understanding of general information processing machines. The system allows redefining the control structures it is using

by the actions it is undertaking. However the design does tell little about the actual control as it is shifted to knowledge. One way to deal with the complexity was to categorize three levels of control: the evaluations (actions), the learning and the awareness. The learning is an intermediate layer between actions and knowledge. It can build virtual concepts from experience (reflection) and learn the actions from virtual concepts (mastery). A virtual concept is a recombination of knowledge (new or existing) that does change its meaning significantly. The virtual concept has to be contextualized. For example, one knows how to ride a bike and comes to the conclusion (reflection) the bike can be ridden without hands. The according actions have to be mastered, meaning the physical properties need to be discovered. It is the intention for the new innovation management design to integrate the three levels. The novelty-action design as first layer to feed a learning layer, where the learning is the intermediate layer between actions and fitting concepts (upper layer).

3 DESIGN AND GOAL

Two pictures of the literature are used to illustrate the design. The four loops (figure1 left) are in the theory recognized as anticipation control systems. For the management design those will be four SCRUM loops, each responsible for a specific task (figure2 left). For each of the four loops the information has to come in from the operational part (figure1 right). The structure ensures the embodiment of the change, allowing it to focus on possible solutions for that specific business. The four SCRUM modules will have to use a Content Management System (CMS) module to evaluate their sprints. The levels reoccur in the big-small business model (figure right) as innovation, learning and engaging. The information created by the SCRUM-actions has to relate with the vision of top-level management (figure2 right). Such visions are the virtual concept explained earlier. The top-level should be able to become aware of possibilities (by reflection) and engage that vision (by mastery). The intermediate learning layer ensures the contextualization of virtual concept (reflection & mastery), using the same CMS for knowledge sharing, putting the appropriate tasks of the sprint-backlog, etc. Using a CMS for both sprints and for learning has been done in the latest experiment (KnoSoS), it will now be improved. The relation between learning and actions can be found in the detailed explanation of the anticipation control and SCRUM. The anticipation control is a hierarchy that feeds up and down its structure. SCRUM ensures the bidirectional feed by having the SCRUM-master as part of the team. Each SCRUM master is part of the management, for each of the four loops (first level) they participate with the knowledge sharing (second level). The SCRUM master becomes a mediator between the first and second level. The work on the second level should ensure clarity and it is what will be experienced by top-level. To ensure relation between knowledge sharing and clarity, tools like mind maps are needed. Those will help top-level to engage.

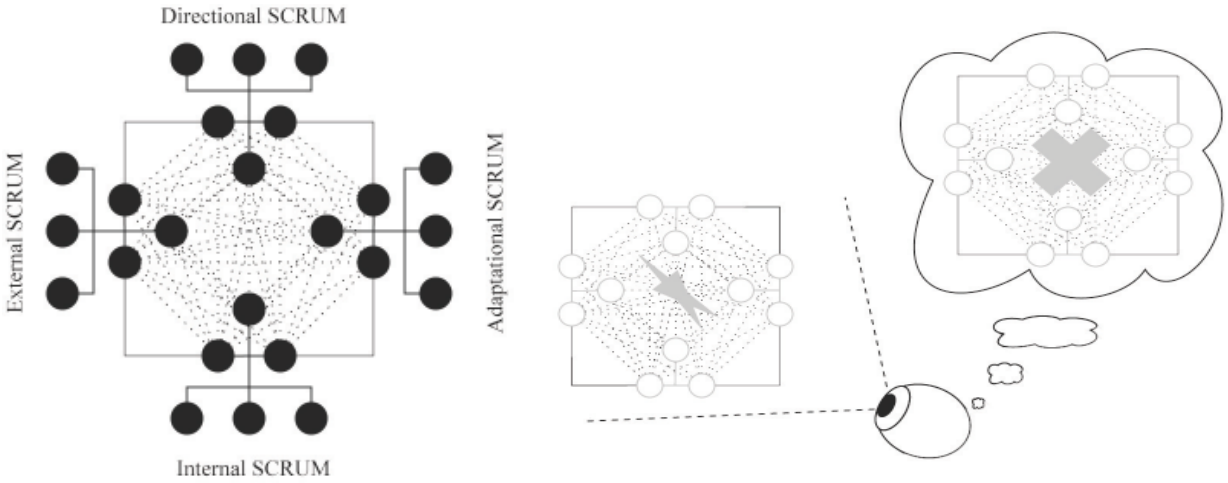


Figure2 Left *Alternative view to figure1 left, this time as SCRUM modules in a hierarchical setting. The hierarchy shows the connection between management and makes the relation between first and second level more concrete.*

Figure2 Right *An illustration on how the top-level perceives the actions. A concept may come out of the SCRUM actions (star) and may be different from the vision set as goal (cross) by top-level management.*

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