MOBILIZING LOCAL AND REGIONAL KNOWLEDGE FOR INNOVATION

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ABSTRACT

The aim of this theoretical paper is to contribute to an understanding of collaborative innovation in a knowledge based economy. The main theme in collaborative innovation we take to be mobilizing local and regional knowledge supported through research and education. The aim is supporting local and regional economic growth, co-operative advantage, social cohesion and sustainable development.

Drawing on Systems Design Philosophy we apply a systemic approach to design, innovation and entrepreneurship in complex adaptive systems. We search for a theoretical framework for participatory innovation, with local and regional community building and have identified eight systemic methodologies which may be interrelated: (1) The PentaHelix Model; (2) Knowledge Based Communities of Practice; (3) Value Network Analysis for Innovation Potentials; (4) Generative Themes in Transformative Learning, (5) Social Learning and Narratives as Knowledge Enabling; (6) Knowledge and Fitness Landscapes; (7) ICT for Design, Innovation and Entrepreneurship; (8) Strategy as Guiding Principles for Action. We explicate our way of thinking through illustrations and descriptions, but recognize that we do not fully succeed with a theoretical integration. Our next step is practice – applying the methodologies in collaborative project which may allow us to unfold a coherent theoretical frame for our work.

INTRODUCTION

The transition from the industrial to the knowledge society has produced new concepts and phenomena addressing globalization and the new economy. There are several designations for the outcome of the transformation: *information society, knowledge society* and *network society*. The term Information society came into use in the 1950s and relates to early digitalization and data management (Masuda 1980). The knowledge society (Stehr 1994) refers to a society where knowledge has become a commodity and the dominant value and component of human activity. Networked society (Castells 2000) is a broad sociological term that refers to the principal organizational forms: ad hoc networks in a global economy that are made possible by the worldwide e-permeation.

Castells (2000) points to central characteristics that have already emerged from the transition from industrial to networked society and describes the new societal structure in three dimensions. 1) *Informational*: The capacity to generate knowledge and process information determines productivity and competitiveness. 2) *Global*: Development of a worldwide IT infrastructure provides strategic activities with the capacity to work as a unit on a planetary scale. 3) *Networked*: The connectivity of the global economy generates a new form of organization, the *network enterprise,* comprising either firms or segments of firms. The unit of production is no longer the firm but the business project.

With the Lisbon strategy for the European Research EU addresses the

knowledge economy and provides two themes for collaborative efforts in creating the most competitive knowledge economy in the world:

1. A welfare equation, where economic growth plus competitive/cooperative advantage equals social cohesion plus sustainable development. In actual practices in local and regional settings this is often transformed into goals like a percentage in economic growth, amount of new jobs and/or new companies created.

2. A knowledge triangle, where Research, Innovation and Education join forces. In actual practice this is often taken to be transfer and diffusion of knowledge from universities to companies enabled by public authorities.

But how do we move from strategy to practice? Which methodologies may frame this process? In our understanding the main driving forces in the collaborative efforts are knowledge based design, innovation and entrepreneurship. However efforts must take place in a context of participation of all interest groups in and across local and regional spaces.

Hence participatory innovation is an essential aspect. But the Lisbon strategy also calls for developing theories and practices – hence methodology and methodologies - that are embedded in a context of the informational society, where the business unit of the future is the network.

The aim of this paper is to draft a theoretical frame which may help us understand collaborative innovation in a knowledge based economy. The paper is our first attempt to develop a theoretical frame. Our approach involves theories and also practices of eight systemic methodologies for participatory innovation. In order to support our argument we will take these methodologies back to their origin in philosophy and systems thinking.

We start the paper by introducing our approach to innovation. On this basis we move into the eight systemic methodologies which together form a system of interconnections. The sequence in which they are introduced is the one we prefer in our but other sequences are possible. We explain each methodology and how it contributes to collaborative – or participatory innovation

in the knowledge economy. In a final paragraph we reflect on the integration of the methodologies into a coherent frame.

SYSTEMS DESIGN FOR PARTICIPATORY INNOVATION

Tuomi (2002) argues that there are two approaches to innovation: (1) linear models and (2) iterative/interactive models, and he is not alone in this understanding (Bilgram et.al. 2008), (Borgers et.al. 2010), (Chesbrough 2003), (Christensen et. al. 2008), (DECA 2010), (FORA 2005), (FORA et. al. 2009), (von Hippel 1986, 2005). The first approach is based in 'heroic innovators and entrepreneurs' that singlehanded and in a stepwise process develop products, processes, services – even organizations. This is still the main stream understanding of innovation. The other approach understands innovation to grow out of the interaction and dialogue among participants engaged in meaningful activities based in existing social and cultural practices. Thus the creative initiative of participants and communities becomes the essence in the development of innovations.

In this paper we will follow the second approach to innovation in which a pre-requisite is cross-disciplinary, even trans-disciplinary methodologies. We also build on the understanding that the current state of systems thinking (Ackoff et.al. 2010; Churchman,1971, 1974, 1979; Jantsch, 1975, 1980; Juarrero, 2002), network theory (Castells (1995-98); Benkler, 2002, 2006; Benkler & Nissenbaum, 2006), complex adaptive systems (Stacey, 1992, 2001; Stark, 2008) and knowledge management (Boisot, 1995, 1998; Boisot et.al., 2007; Snowden, 2002; Kurz & Snowden, 2003) calls for radically new innovative methodologies, which may contradict many well-established paradigms of design, innovation and entrepreneurship.

Ayas (1997) suggests that innovation may be understood to occur in four qualitatively different ways.

1. Based on existing knowledge: We innovate based on 'what we know we know'

2. Based on recombination of existing knowledge: We innovate based on 'what we don't know we know'

3. Based on white spaces of knowledge:

We aim at innovation based on 'what we know we don't know'

4. Based on totally new knowledge: We search for innovation based on 'we don't know what we don't know

Our focus is ways of innovation in local and regional spaces, where the challenges are diverse, uncertain, contradictory and complex. Our first step is to turn to philosophy to help our inquiry for methodologies, when there are no stated purposes or means. System thinking seems to offer an approach, especially Churchman´s understanding of system design where he argues that it is " .. implementing improvement in social systems by means of the best available method of inquiry". (Churchman, 1974, p. 452).

Philosophically Churchman argues that implementing is based on pragmatics, improvement is based on ethics, social reality is based in ontology and best available method of inquiry is based on epistemology. We have turned this philosophy of systems design into our credo for community driven innovation: "Co-creating value with inquiring systems through partnering". In praxis this requires methodologies and in the following we suggest a number of methodologies to enhance the cocreation.

ON PRAGMATICS AND IMPLEMENTATION AS CO-CREATING

Just like innovations are developed in social and cultural practices they are also adopted when people integrate them in meaningful ways into existing social and cultural practices. We suggest two methodologies: ICT for design, innovation and entrepreneurship in order to balance informational and social connectivities in innovation (Spivack ongoing; Davis Mills, 2008) and Strategy as Guiding Principles for Action (Oliver & Roos, 2005). They are at the heart of mobilizing local and regional knowledge for innovation because they allow us to integrate practices and data in endless variety.

ON ETHICS AND IMPROVEMENT AS VALUE CREATION

However, integrating theories, practices and data from a multitude of participants creates a huge amount of data, e.g. of the roles played, of interactions, the dialogues, the material produced, the deliverables exchanged and the potential value created. This complex-

Philosophy	Systems Thinking	Our Credo	Methodology
Pragmatics	Implementing	Co-Creating	• ICT for Design, Innovation and Entrepreneurship • Strategy as Guiding Principles for Action
Ethics (Progress)	Improvement	Value	• Value Network Analysis • Knowledge-/Fitness Landscapes
Ontology	Social Reality	Partnering	• PentaHelix Model • Knowledge Based Communities of Practice
Epistemology	Best available method of inquiry	Inquiring Systems	• Generative Themes in Transformative Learning • Social Learning Cycles and Narratives as Knowledge Enabling

Table 1: Philosophy, systems thinking and methodologies for participatory innovation in local and regional spaces.

ity can only be handled by ICT – and we suggest using social network analysis, semantic analysis techniques and visualizing techniques. Two methodologies seem relevant: Value Network Analysis (Lee, 2008; Skåne Region, 2009) and Knowledge-/Fitness Landscapes (Kaufmann, 1985; ongoing) in visualizing innovation potentials.

ON ONTOLOGY AND SOCIAL REALITY AS PARTNERING

We argue that innovation is inherently social, i.e. grounded in existing social and cultural practices. These practices involve all people. That is why we focus on partnering and on the following two methodologies: PentaHelix Model (Lindmark et.al. 2009, Samsø Erhvervsråd, 2009) and Knowledge Based Communities of Praxis (Beer, 1994; Prahalad & Krishnan, 2009; Wenger 2004; Wenger et.al., 2010). Participants are not only dialogue partners for the company; they are also engaged in dialogue on challenges among themselves. In the words of Prahalad & Krishnan (2009, p. 6) we build a 'new house of innovation' by focusing on 'flexible and resilient business processes and focused analytics' based on 'personalized co-created experience' and 'global access to resources and talent'.

A recent Danish/Finish approach can be found in "The new wave of innovation" (FORA et.al, 2009).

ON EPISTEMOLOGY AND BEST AVAILABLE METHOD OF INQUIRY AS INQUIRING SYSTEMS

Inquiring Systems use a combination of personal and organizational inquiring styles (Kienholz, 1998; Courtney et.al, 2001, 2005; Malhotra, 1997) and build on the idea of the learning organization (Argyris & Schön, 1996; Senge, 1995). The methodologies that we use are generative themes in transformative learning (Freire 1970, 1985; McLaren & Leonard, 1993; Méija, 20045; Singh, 2004) and systematic and narrative knowledge enabling (Boisot, 1995, 1998; Boisot et.al, 2007; Boje, 2000; Kurz & Snowden, 2003; Snowden, 2002).

In Table 1 we summarize our frame for participatory design in local and regional spaces.

With the methodologies we also try to handle the self reflecting paradox:

"One underlying problem is that of the "self reflecting paradox"; e.g. the content and validity of the scientific method [best available method of inquiry, authors' remark] can only be discovered by the application of the scientific method. Similarly, Systems Design has its own "social reality" through which it perceives that of its client. "Improvement" is bound up with ethics but ethics does not admit the limitation of obligation to one sub-system, therefore improvement requires the recognition of sub-system linkages. Paradoxically, again, the "improver" is himself part of the total system and bears its impress. Implementation (of improvement) meets the paradox that Systems Design on Systems Design is needed to judge the worth of the Systems Design proposal." (Churchman, 1974, p. 451).

To address this paradox we suggest

that the eight methodologies can be used in a non-linear, yet stepwise way. The important message is that all methodologies should be part of participatory innovation, and actual practices should be able to secure and be informed by their philosophical and systemic foundation. In fact only practice - according to pragmatics - can show whether the approach suggested will create worth to society.

EIGHT SYSTEMIC METHODOLOGIES IN PARTICIPATORY INNOVATION

By systemic methodologies we mean that they all taken together form a system of interconnections. One can start the design, innovation and entrepreneurship process using either one methodology knowing very well that the other methodologies must be applied sooner or later. The sequence chosen here is the one we prefer in our work[1], but other sequences are possible.

THE PENTAHELIX MODEL

The model builds on the TrippleHelix Model but is expanded with citizens and NGO's. This can be illustrated as in fig. 1. It is especially useful in processes for design, innovation and entrepreneurship in local and regional development. Thereby the focus also is on cross-disciplinarily and border-crossing processes.

In the model the partners will bring different types of 'capital' into play, as shown in fig. 2.

Thereby we take the user in 'user driven innovation' not just to be representing the market, but as being a collection of co-operative and co-creating partners that together form a knowledge based community of practice.

Fig. 1: PentaHelix Model of co-operation and co-creation. The central position of (city) government is not to be taken as mandatory, rather it is an illustration of the fact that someone among the interest groups must take the initiative. (Adapted from Lindmark et.al. 2009)
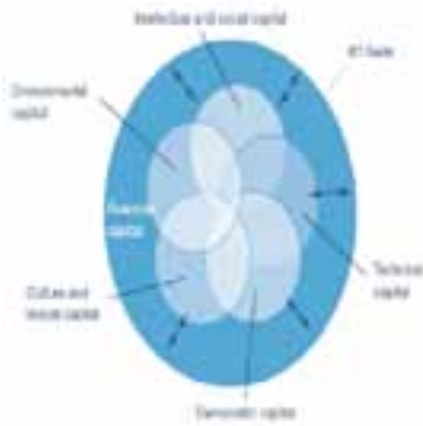
Fig 2: Diversity of capital in the PentaHelix Mod (adapted from Lindmark et.al, 2009)

KNOWLEDGE BASED COMMUNITIES OF PRACTICE (KBCOP)

Knowledge Based Communities of practice (KBCoP) has been approached by economists, technologists and innovation theorists and practitioners, hence from many different perspectives. The concepts and percepts of inquiry and knowledge management indicate that new processes and practices must be based on heterogeneous social networks. Trust building and knowledge sharing between innovation actors are essential. With the parallel processes of globalization and localization, the local and regional availability of inquiring capabilities, knowledge sharing and skills is becoming increasingly important.

The notions of the co-operative innovation networks, co-operative learning networks, co-operative networks of interest and communities of practice in innovation emphasize the interactions and trust relationships between innovation actors to create a learning environment that underpins innovative communities (Gloor, 2009). In addition to the creation of a favorable external innovation environment, the organizational network and innovation capability is also critical for developing innovative networks.

Given the complexity of the diversity of National Innovation System (NIS) and the variety of different local and regional contexts it is hard and unwarranted to describe the development of KBCoP in a single model. This leads to the requirement for academic researchers and innovation theorists to investigate different sources that contribute to innovation in different economic sectors.

It is in this context, that we suggest research AND practice on Knowledge Based Communities of Practice with a strong focus on ICT supported inquiry and knowledge sharing. Thus it is our hypothesis along with Manuel Castells, that the business unit of the future will be the Network. As stated in Manuel Castells (1995-98, Vol. I, p. 198-9): "For the first time in history, the basic unit of economic organization is not a subject, be it individual (such as the entrepreneur or the entrepreneurial family) or collective (such as the capitalist class, the corporation, the state). As I have tried to show, the unit is the network, made up of a variety of subjects and organizations, relentlessly modified as networks adapt to supportive environments and market structures. What glues together these networks? Are there purely instrumental, accidental alliances? It may be so for particular networks, but the networking form of organization must have a cultural dimension of its own. Otherwise, economic activity would be performed in a social, cultural vacuum, a statement that can be sustained by some ultra rationalist economists, but that is fully belied by the historical record.

[It] is…[the] 'ethical foundation of the network enterprise' this 'spirit of informationalism.'"

This spirit of informationalism we take to be best expressed by Wenger et.al. in their "Digital Habitats stewarding technology for communities". It can be illustrated as in fig. 3 (Wenger et.al, 2010, p. 162).

The main idea in this kind of KBCoP is to combine a diversity of synchronous ICTs with a diversity of individual and collective participation and reification. So each KBCoP in the network can choose their own mix in such a way that it is possible to extract and analyze knowledge across the KBCoPs.

GENERATIVE THEMES IN TRANSFORMATIVE LEARNING

When we take the EU welfare equation as a starting point it seems that most efforts in user driven innovation has been put on the left side of the equation. But the four themes have to be balanced. It is in this process that the idea of generative themes of Paulo Freire is very helpful. By taking each of these themes to be generative it is possible to balance the equation – and even expand it according to local and regional challenges and needs.
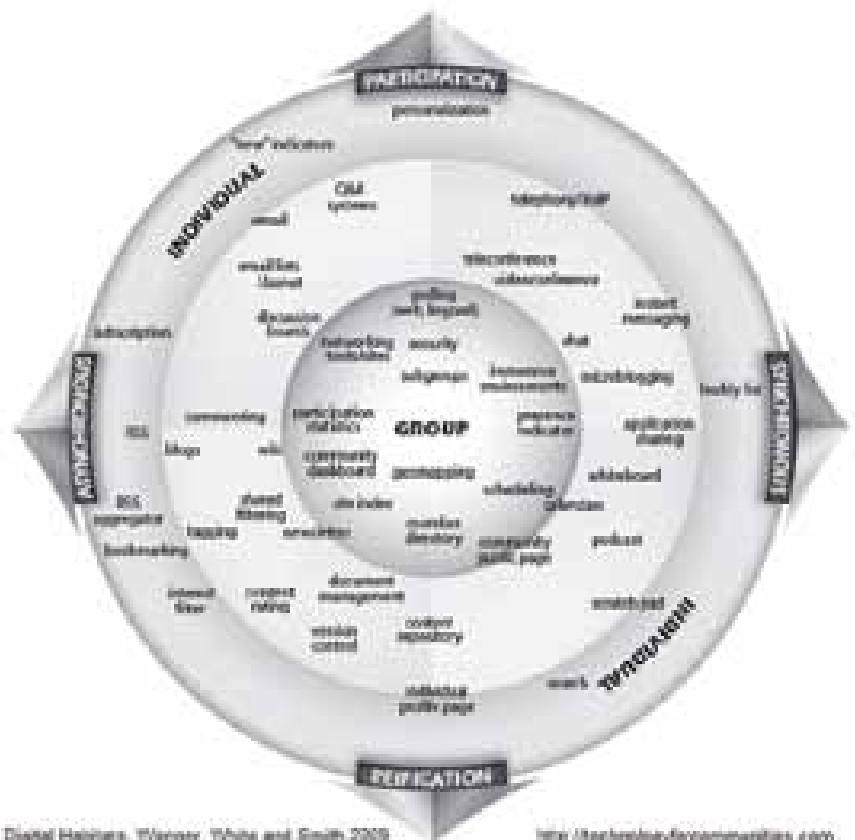
Fig. 3: Potentials in Knowledge Based Communities of Practice (adopted from Wenger et.al, 2010)

However it requires the prevention of knowledge imposition. Paulo Freire uses two different attacks on the problem of imposition of knowledge in his radical educational proposals:

1. an examination of formal aspects of the interactions in which knowledge is produced and/or reproduced - the problem of interactions – here he asks for dialogue.
2. the provision of critical methodologies with which the validity of any proposed knowledge can be questioned - the problem of validity. Here he asks for critical consciousness.

In a similar way, systems thinking aims at preventing knowledge imposition by the use of boundary critique and critical pluralism.

We take these strategies into our methodology by using the principles of transformative learning in the design, innovation and entrepreneurship processes. This implies becoming critically aware of one's own - and others - mental models, belief systems and lifestyles. It also implies that it is not possible to be a user in user driven innovation without engaging oneself – and others - in social and cultural action for innovation.

SOCIAL LEARNING AND NARRATIVES AS KNOWLEDGE ENABLING

Social Learning

According to Max Boisot (1995, 1998) we have to supplement capital and labour with data as essential in the production function. Thereby we have to develop and understand models for economizing on data in the same way as traditional economic theory has economized on capital and labour. Boisot has developed one suggestion for that in what he calls an Information Space. The Information Space consists of three dimensions: coding, abstraction and diffusion (see fig. 4). The value in economizing on data is created in this space through a movement called the Social Learning Cycle. This movement consists of six phases, where new knowledge and thereby new innovation potentials are activated in all three dimensions. It focuses in bring tacit knowing into explicit knowing. The six phases are:

Scanning: identifies threats and opportunities along with patterns herein. It gives insights and potential visions on
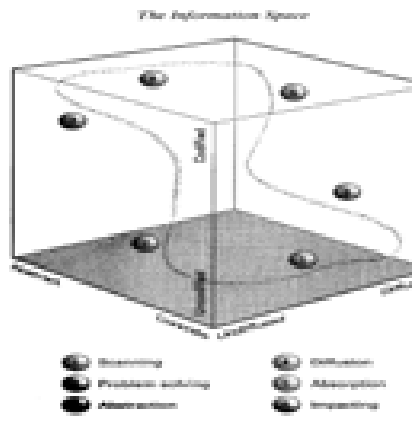

Fig. 4: Information Space and Social Learning Cycle (adapted from Boisot, 1999)

products, processes, services, markets, cultures etc. It consists of both coded/uncoded and concrete/abstract data.

Problem-solving: gives structure and logical connectivity to insights and potential visions. It reduces the uncertainty, but is a risky and conflict laden process, because it often runs counter to well-established beliefs and convictions.

Abstraction: is generalizing on the insights obtained, which involves a reduction to the most essential content of the data. It might end in a suggestion for a new product, process, service, organization, learning process etc.

Diffusion: aims at sharing and/or selling the new insight to a target group (ex. customer, user). This also involves feedback mechanisms from the market.

Absorption: learning of the new insights through practical use, learning-by-doing.

Impacting: embedding in actual behaviour, techniques, organizations, cultures etc.

Fig. 4 shows the ideal Social Learning Cycle according to Boisot (1995, 1998). It also illustrates the cycle as a way of enhancing user driven innovation as it is a Schumpeterian creative destruction process, where user are integrated through the diffusion dimension.

Narratives

Narratives mean stories and storytelling is a fundamental human activity. It is a way of thinking, understanding, being a human. We constantly tell, transform and interpret narratives. They function as a way of organizing our perceptions, experiences, thought and feelings. Stories, myths, excuses, reasons for our actions or non-actions are all part of narratives that may sup-

port us in creating visions, insights, overview, meaning and belonging. Both for ourselves and in a wider context.

When we want to create and share knowledge narratives is a possibility and a potential for exchange of huge amounts of data. They are able to handle the exchange of tacit knowing without reducing it to explicit knowing like in the Social Learning Cycle. Therefore the two approaches supplement and complement each other.

When narratives are exchanges among people they both narrate on specific experiences and the context. But the narratives are transformed and interpreted in the communication process, Thereby a sort of co-creation of knowing is established; an ecology of knowledge sharing can be developed.

In organizations that are engaged in networks or base their organizing on informal networks narrative mechanisms will be in focus. These mechanisms cannot be mapped, planned or controlled but have to find their own way of functioning in the design, innovation and entrepreneurship processes. They have to be created and supported based on trust.

Trust functions as the clue that holds the network together. The better they function, the better knowledge sharing may work. This calls for new approaches in collecting and visualizing narratives. Knowledge and Fitness Landscapes are a potential solution.

Value Network Analysis for Regional

Innovation Potentials

Nova Spivack (ongoing) as well as Davis Mills (2008) have been working with the development of WEB 2.0 and WEB 3.0 philosophies (see below). These approaches create new forms of visualization and interpretations of data and communication in networks.

Fig. 5: Comparison Chart of Business Process, Social Network Analysis, and Value Network Analysis (adapted from http://valuenetworks.com/public/blog/207582).

We use these approaches in the form of Value Network Analysis based on www.valuenetworks.com and Knowledge and Fitness Landscapes based on Oliver & Roos (1999).

In www.valuenetworks.com blog from April 13. 2010 a comparison of business processes, social network analysis and value network analysis is made, see fig. 5.

Business process modelling is well known. More recently social network analysis has been used as a methodology for relating business processes with people involved in order to visualize and analyse patterns in the integration of processes and humans. Value Network Analysis is a solution to that need as it combines the two and at the same time show the value produced in the network of humans and processes.

A recent example of Value Network Analysis can be seen at Value Network Analysis of the Skåne Region's Innovation System, (RIS), Dec. 2009. This shows the connections and communications among the 48 central players in the Regional Innovation System. In this particular case the landscape shows that most of the value creation is on knowledge creation (around 67 %) and the creation of infra-structure (around 26 %). While the communication of validation of the knowledge for the market is 7 % and implementing of innovation into the market is almost 0%. Like in the Skåne Region case we use Value Network Analysis to reveal and support good network patterns of value creation and explicate and support diversity, uncertainties, contradictions and complexities.

Knowledge and Fitness Landscapes

Oliver & Roos (1999) uses complexity theory to unfold their concepts of Knowledge and Fitness landscapes. They develop and discuss these concepts using the metaphor of landscape as an ever-changing picture and understanding of knowledge of individuals and organizations. They write:

> *"From the rolling contours of a species' fitness landscape, using the notion of knowledge potential we can develop an analogy of an individual, community, or organization (actor) in its own "knowledge landscape". In its struggle for survival, an actor will attempt to move to higher and higher points on a knowledge landscape. Like the fitness landscape, the knowledge landscape contains peaks and valleys of varying heights, which will be of differing interest for an actor to climb. However, instead of "fitness", the peaks on an actor's landscape represent knowledge, or given our epistemological stance, potential knowledge. Examples of potential knowledge "peaks" could include signals from competitors, suppliers, customers, consultants, experts, academic institutions, research centres, government agencies, employees and journals. "Valleys" could include sources of obsolete data, such as knowledge of "telex" technology for telecommunications manufacturers. Thus, by definition, knowledge landscapes are unique and private to each actor." (1999, p. 284)*

An illustration of this approach can be seen in fig. 6 based on a beta version of Tianamo (www.tianamo.org). It shows the major themes related to the town of Sønderborg based on a web-crawl on Google. The interesting thing here is, that in the fitness landscape the innovation potential in knowledge where 'we don't know what we don't know' can be found in the valleys, while innovation potential in knowledge where we 'know what we know' can be found in the peaks.

Thus we take the Knowledge and Fitness Landscapes to be able to visualize and guide us in finding innovation potentials in a complex knowledge economy. Thereby we have a possibility to handle the insight put forward by Charles Sanders Peirce in 1902: "a percept cannot be represented in words, and consequently, the first part of thinking cannot be represented by any logical form of argument".

ICT for design, innovation and entrepreneurship

Pyka & Scharnhorst defines innovation in this way (2009, p. 10):

> *"In a more abstract systems theoretical approach, innovation can be understood as a critical event which destabilizes the current state of the system, and opens a new process of self-organization leading to a new stable state."*

Thus innovation can be understood as a critical event diffusion processes that follows models of self-organized criticality which trigger single and overlap-
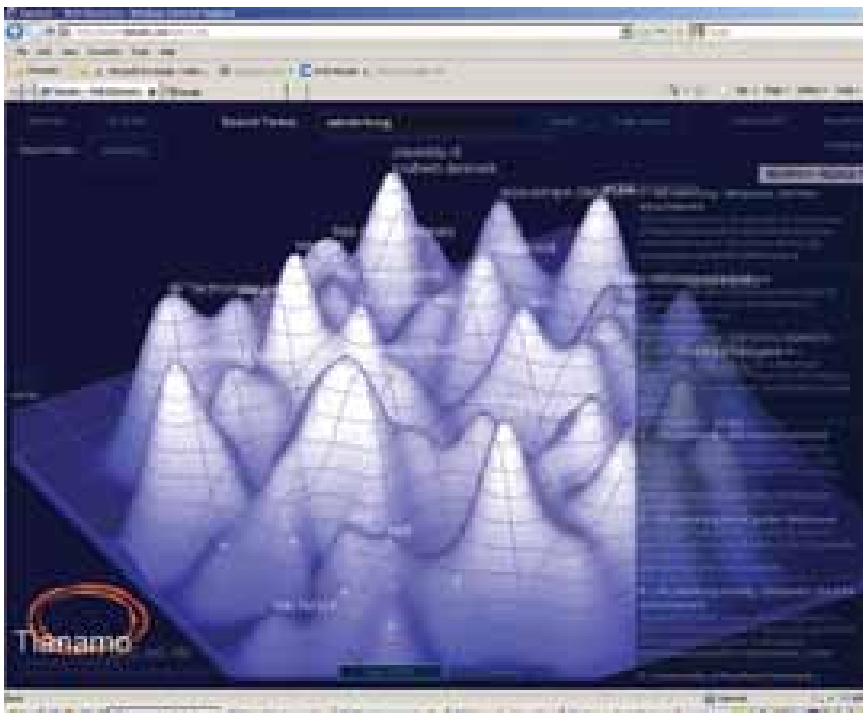
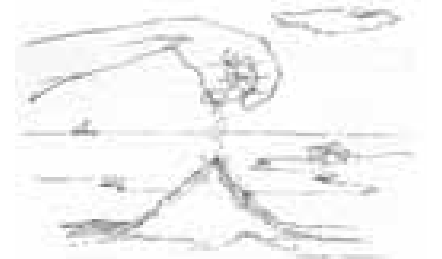*Fig. 6: Fitness Landscape on Sønderborg, based on www.tianamo.org.*

Fig. 7: Innovations as avalanches of data (adapted from Bak, 1995)

ping avalanches. It can be illustrated as avalanches in a sand pile, where the corns of sand are data. Per Bak (1997) has made fig. 7 to illustrate the process. Using this line of thought, design, innovation and entrepreneurship can be taken to be the ability to create the heroic mood in the entrepreneur in such a way that he/she may handle the essential problem in entrepreneurship: having more ambitions than resources available. A help in this process can be to be part of creating, collecting and diffusing knowledge in cross- and trans-disciplinary networks. In a complex global knowledge economy this cannot be done without an enabling ICT. This enabling can take the form of two processes:

- Identification of design-, innovation- and entrepreneurship processes[2]
- Monitorering of design-, innovation- og entrepreneuship processes[3]

Through these two processes a comprehensive theoretical framework can be created for the ICT support of design, innovation and entrepreneurship. This is done by aiming at connecting verbalizing and visualizing of perceptions.

We are used to verbalize data, information and knowledge, but the amount of data that have to be verbalized surmounts our capacities. We need a supplement of 'perceptual zing' and 'visualizing' in order to support informational connectivity and social connectivity.

Novo Spivack (ongoing) and Davis Mills (2008)[4] have used the combination of network thinking and ICT to document tendencies and potentials for a knowledge based economy, where informational and social connectivity (cohesion) walk hand in hand. This can be shown as in fig. 8.

The WEB 2.0-teknologies have created the social interaction possibilities. The movement from WEB 2.0 to WEB 3.0 calls for a semantic web, which is in its infancy. But as the figure shows the movement is happening while we write and speak. We 'just' need to create experiments that may support a joint effort between theory and practice.

Strategy as Guiding Principles for Action

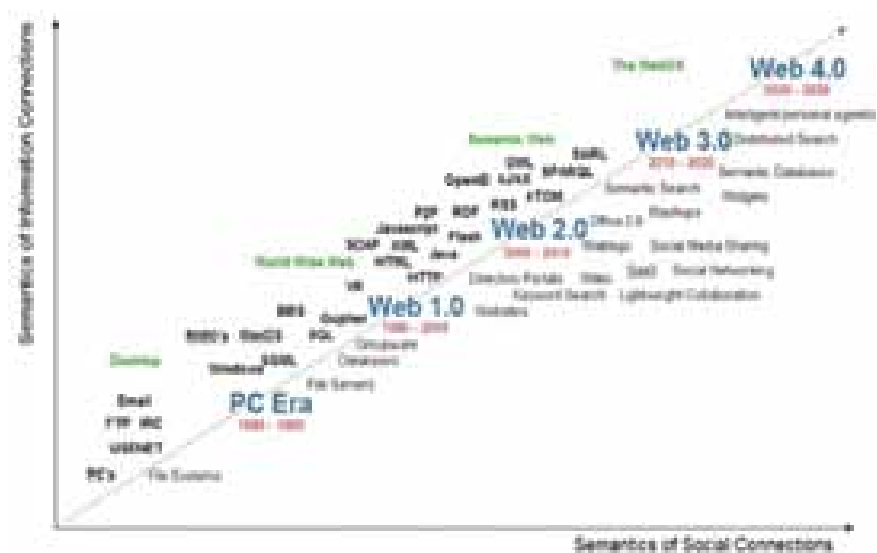So, action is essential, as experience presupposes experiment as Cowan

Fig. 8: Developments in WEB technologies

(1959) states. Such experiments turn us back to the PentaHelix Model in order to create local and regional knowledge based communities of practice that can transform university knowledge into concrete practices in design, innovation and entrepreneurship. Efforts in Denmark like knowledge pilots, innovation agents, innovation consortia, innovation clusters etc. all points in that direction as well as user driven innovation, democratizing innovation, open innovation, employee driven innovation etc.

Design-, innovation- and entrepreneurship processes can support local, regional, national and international priorities for growth and co-operative advantages. However, in order to bring our methodologies together in practice we need strategy as guiding principles for action. Such guiding principles can be developed from narratives, emotional content and heuristic reasoning as suggested by Oliver & Roos, 2005).

As we take this to be evident from our own practice we suggest the following eight guiding principles based on Stacey (1992) and Aasen (2009):

- Developing a new understanding of control and management
- Designing appropriate uses of power
- Establishing self-organizing learning teams
- Developing multiple cultures
- Taking risks
- Improving group learning skills
- Creating resource slack
- Create permanent dialogue on private and public identity formation, meaning of life and work, power rela-

tions in cooperation and good leadership.

REFLECTION

First of all: Imagine. Imagine that the words of Kant on enlightenment in 1784 may come true: Sapere Aude! "Dare to be wise" or " Have courage to use your own reason." The vision that it is possible to combine economic growth, cooperative advantage, social cohesion and sustainable development can come true. It is our contention that this can best be achieved through the self-organized mobilization of local and regional knowledge in close connection with research and education at all levels. For that we need philosophy, systems thinking, and methodologies for participatory innovation in complex adaptive systems. It is possible to use diversity, uncertainty, contradictions and complexities for design, innovation and entrepreneurship.

We have suggested eight methodologies for that vision in order to do just that: handle innovation in spaces where we don't know what we don't know. The
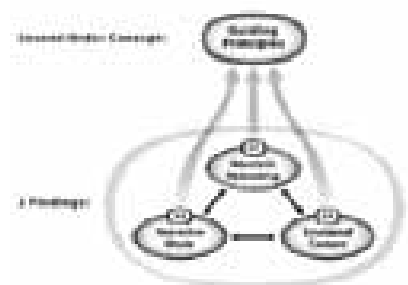

Fig. 9: Theoretical Underpinnings of Guiding Principles (adapted from Oliver & Roos, 2009)

process starts by the initiative of dedicated citizens, who engage companies, public institutions, universities, NGO's, citizens in the local or regional area according to the PentaHelix model. Together they form communities of practice in order to create knowledge for innovation on themes of their choice. Then they create knowledge as a combination of their own practical knowledge and universal knowledge from universities. The knowledge created is both on social networks and the subject matter according to themes chosen. Both types of knowledge are visualized in order to handle the complexity involved and in order to support the creation of innovation potentials. In order to support the over all process and the implementation ICT is used throughout as a way of balancing resources put into handling information and handling social connections. Finally the innovation potentials are put into practice – or stopped – depending upon to the local and regional strategies for development. These strategies are expressed in guiding principles, which – coming back to the PentaHelix model – are developed by the local and regional interests.

We have presented the theories we propose for participatory design, innovation and entrepreneurship. However, we recognize that we do not succeed fully with a theoretical integration. Our next step is practice – applying the methodologies in collaborative projects. This will allow us to unfold the next steps in a coherent theoretical frame.

NOTES

[1] We use this approach in our education in Design, Innovation and Entrepreneurship at Copenhagen Business School (around 200 students attending each year at the B.Sc. level); in MARV – Mobilizing Regional Knowing, supported by the four local counties in Sønderjylland, Denmark: Aabenraa, Haderslev, Sønderborg and Tønder.; in an Öresund project on 'Local Growth – Global Connection' in Landskrona, Sweden supported by Tillväxtverket and Landskrona County; in EULASUR - Understanding Innovation in Nano-technologies, supported by EU 7.th. Framework Programme Project between Europe and Latin America, involving universities, public authorities and companies in Southern Europe and Latin-America).

[2] See experiences of 15 years of experiments in the KUBUS innovation and entrepreneurship education at Copenhagen Business School (CIE, 2009).

[3] See the methodologies developed at Magdeburg Universitet by Kühnle & Wagenhaus (2008).

[4] Based on Nova Spivack: www.radarnetworks.com and Davis Mills: WEB 3.0 Technologies and Markets, 2008

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