

# Designing Knowledge Environments: Eleven Streams of Research Leading to Knowledge Anytime Anywhere

An Illustrated journey into a research landscape

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## **Abstract**

Our assumption is that ICT has made all of us Knowledge Workers and that ICT offers a potential to live and work in Knowledge Environments, which, if properly designed, could make us happier and more productive at the same time. We believe that this should be the focus for future research in the area of KM. In this paper some of the fundamental dimensions of Knowledge Environments are explored. Together, they form an exciting possible research landscape in which eleven research streams flow, interact, feed each other and lead to a better understanding of the nature of “Knowledge Anytime Anywhere”.

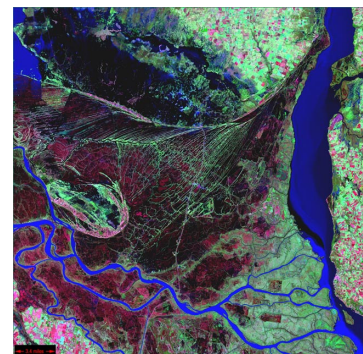
The first research stream is about the principles of **complexity** as the foundation of how things really work – in nature as well as in human environments. Based on this, the emerging notion of **Hi-Tech Hi-Touch** reminds us of the need to put more attention to the human factors and rebalance the human/technology equation. Within this context, we suggest to navigate the research agenda along the following streams: the role and operation of **Networks**, the characteristics of **knowledge leadership**, the critical handling of **Intellectual Capital**; particular cases of knowledge workers such as **Free Agents**, the emerging new role of **Customer Knowledge**, the role of **Knowledge Zones**, the critical need for **Future Orientation** and the contribution of knowledge environments to **Sustainability**. The last stream in this research landscape is the exploration of **Innovation Ecologies** which are based on the principles discovered in this rich research agenda.

## **1. Introduction**

We believe that designing effective knowledge environments should be the focus of future research in the area of IST. There has always been a gap between the potential of technology and the ability to make the best use of it. Future research in IST should focus on closing this gap. Making sense of ICT, its potential to contribute to better performance at work and better quality of life is a big challenge. Creating knowledge environments where people put technology to use for their benefit and do not become slaves to technology – is the goal.

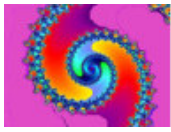
Using the concept of “Ba” which was originally proposed by the Japanese philosopher Kitaro Nishida (1970) and further developed by Nonaka (Nonaka, 1998), a Knowledge Environment is a “ba”, a place which enables knowledge creation and innovation. Ba can be considered as a shared space that serves as a foundation for knowledge creation. “Ba” can be thought of as a shared space for emerging relationships. This space can be physical (eg. office, dispersed business space), virtual (e.g., email, teleconference), mental (eg. shared experiences, ideas, ideals) or any combination of them. Ba provides a platform for advancing individual and/or collective knowledge. (Dvir and Pasher, 2004)

We visualize a possible future research agenda through the metaphor of several research streams which run through a river delta into the sea. In geographical river deltas, it is never one river which makes its way to the sea – there are always many streams, narrow and wide, fast and slow; their paths can change overnight or gradually as a result of natural forces; they split and merge; and they coexist with other elements of a dynamic landscape. Similarly, the landscape of the future research of knowledge environments will be dynamic. Many streams of thought, research and practice will run through it on their way to the sea of “knowledge anywhere anytime”. These streams will not be limited to fixed paths: rather, they will interact, merge to form multidisciplinary exploration, change as a result of social, economical, political, cultural and technological forces.



## 2. A framework for a possible research landscape

The research landscape includes eleven streams which are interlinked:



**Complexity (Stream 1)** and its implications to the dynamics of knowledge environments is the first stream. As the principles of complexity describe better than more linear models how the world (physical, social-economical and human) works, this stream serves as the foundation for the complete knowledge environments research agenda.

Nesbit coined the notion of **Hi-Tech Hi-Touch (S2)** and articulated the problem of the imbalance between the technological and human sides of development. We believe that the Hi-Tech Hi-Touch balance challenge should be a major concern in the Knowledge Environments research.



In a complex knowledge economy, old forms of organization are not suitable any more. Formal and informal **Networks and Networked Organizations (S3)** become major players in the knowledge economy. However, the understanding of how they work, what makes them fail and succeed only starts to emerge. In this context, how can we create effective knowledge environments within and around them, while maintaining the Hi-Tech Hi-Touch balance?

One of the less explored questions is the issue of **Knowledge Leadership (S4)** in networks. What are the characteristics of a leader in a network in which the old linear, mechanical and hierarchical principles do not apply any more?



How can knowledge environments support the players in networks, such as the growing (in number and importance) class of **Free Agents (S5)** – highly skilled individuals who thrive in the knowledge economy through smart networking. How could technology better support connectivity and “contactivity”?

Another critical group of players in the knowledge economy – the customers - deserve better research. They are knowledge workers too! How can **Customers` Knowledge (S6)** be leveraged through a smart and balanced knowledge environment? How can they become active partners in the innovation process?



Another important issue in knowledge environments is **Intellectual Property (S7)**. It



remains a major blocker (or catalyst, if managed wisely) to value creation in networks. For example, the ownership of ideas is a complex issue in knowledge intensive networks. We think that the handling of intellectual property in complex knowledge environments should be a critical element of the future research landscape.

We maintain that most organizations and networks need to manage their future more seriously. How can **Future Orientation (S8)** be nourished in knowledge environments and then exploited? What might be the role of technology? How can we learn to deal better with what we don't know that we don't know?



Future orientation leads to another key issue: **Sustainability (S9)**. One interesting research thread leads to the possible contribution of effective knowledge environments to the sustainability of organizations. We live and work in organizations and they become less and less sustainable. Even families suffer from this phenomenon and we all pay a high price for that. How should we design knowledge environments where people and organizations and even the planet can

be saved?

Sustainable development of human settlements – be it villages, neighborhoods, cities and regions – is another non-trivial and timely challenge. The transformation of them into **Knowledge Zones (S10)** is perhaps a key success factor. This calls for research on how to create urban (or regional) effective knowledge environments.





The last research stream is about the creation of eco-systems and organisational climates which enable and catalyze innovation. Without innovation there is no renewal, and renewal is a must for people and organizations in a rapidly changing environment. The design of an **Innovation Ecology (S11)** draws from the principles explored in all other research streams. We hypothesize that: good networking is a critical aspect; so is committed knowledge leadership; and effective handling of intellectual property; and a true sense of future orientation; and operation based on the principles of complexity rather than on linear models; and a good balance between the technology and the human scale.

### Why did we choose to highlight these specific eleven streams?

First, we believe they are critical for the creation of Knowledge Anytime Anywhere or what we call - Knowledge Environments. This is what we have learnt in more than a decade of exploring the landscape of Knowledge Management.

Second, although the rhetoric around some of these streams may be quite developed the actual research, and even more so, the real world application of them, is still embryonic. For each of these fundamental challenges, only the tip of the iceberg was already explored. In this sense, the suggested streams do not represent a revolution in the focus of the research and application of “knowledge environments”. Rather, they suggest a natural evolution based on the advancements in thinking not only in the specific domain of knowledge management but also in many adjacent social, economical, technological and business disciplines.

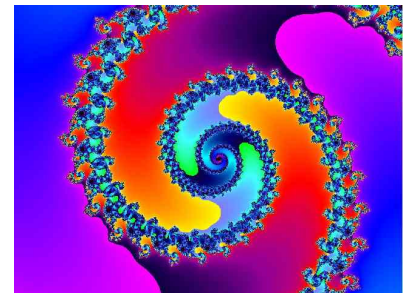
Last, those streams are close to our hearts, as researchers, promoters and practitioners of Knowledge Management.

## The eleven research streams

In this section each of the proposed research stream is briefly described.

### Research Stream 1: Complexity

How can we use the principles of complexity (such as self-organization, emergence, connectivity, co-evolution) in order to better understand the dynamics of knowledge development and better design knowledge environments? There is a growing interest in this area, yet there is still a long way to go. The potential for interdisciplinary research for better understanding of Knowledge Environments is still at its early stage. There are already some pioneering groups but most of the academic world itself operates as typical industrial age business organizations. Universities are often themselves “stupid” organizations with islands of knowledge that never create an intelligent organization even though they have lots of brilliant people inside them.



### Research Stream 2: Hi-Tech Hi-Touch

“High-Tech Hi-Touch” is an approach suggested by John Naisbitt (1999). From past experience we know that introduction of new technologies ultimately leads to social change. For example, the development of the Internet related technologies plays an increasingly important role in our day-to-day life, by incorporating new means of communication between people, such as emails, chats, video conferencing, forums and also creating new types of

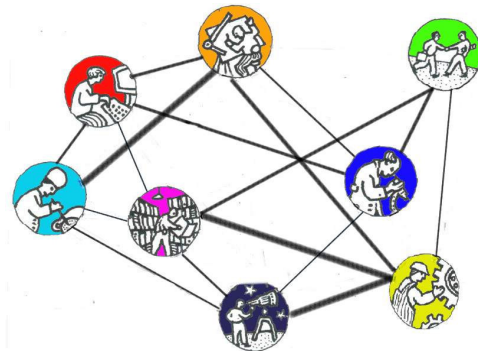
communities and groups. The problem today is that while technology has accelerated rapidly, social change hasn't kept the pace. High Tech is about digital communication, real time, automation, computerization, virtual reality etc. On the other hand, High Touch is about relationships, human interaction, behaviors, aesthetics, education and personal growth. Naisbitt claims that like the Yin and Yang, technology and social change should be in balance. However in our time this equilibrium has been violated and we constantly seek to regain it.

Technology for example, has enabled people to do things from their home, such as working from home, shopping through the internet, watching movies in a "home theatre". On the other hand, people are seeking more than ever the company of other people, in movies, rock concerts, shopping malls, restaurants etc. In addition, the advancement of technology has raised new questions that are relevant to the human side that are yet to be addressed. These questions range from values (is it right to clone an animal or a person?) to organizational questions (what is the role of leadership in a highly technological world?).

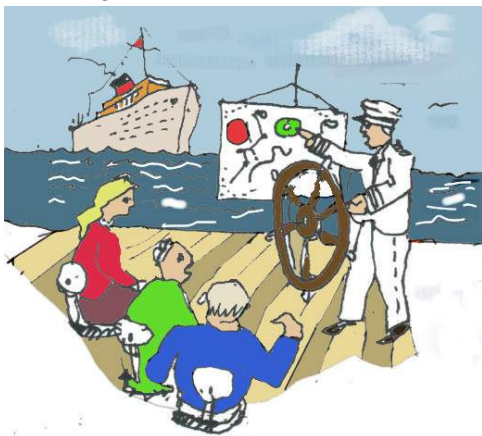
While technology is already on its way to achieve the "knowledge anywhere anytime" approach, understanding the human factors and the impact on the individual, society and culture is still very vague. Within the IST program it could be possible to investigate the impact of these changes and to create the knowledge and the tools that are required to cope with this change.

**Research Stream 3: Networks and networked organizations –**

The old rigid organisational forms are not suitable anymore to complex business and social situations. Therefore, we need to research the growing importance of Networks and how knowledge environments are facilitating value-creation in them: how can we help formal and informal networks to maximize their intellectual capital, and turn the knowledge and talents of their members into value.



Unfortunately it seems that terrorism is making better use of ICT than the Western liberal society. ICT makes it possible to work together beyond time and space, to collaborate to compete, to grow with little risk, to work alone and together at the same time, to speed up new product development, to cut on time to market, to learn from each other and thus truly be life long learners. Yet the challenge for networking inside organizations and between organizations is high. Issues of trust creation, tolerance for ambiguity, conflict management – are some of them. Understanding networks, designing knowledge environments in which they flourish is a research challenge.



**Research Stream 4: Knowledge leadership**

Arguably, navigating a knowledge-based organisation or network is very different than leading a traditional organisation. Amidon and Macnamara (2004) identified this need and highlighted several implications: "Because of the multiplier effect of knowledge – the more it is shared, the more it grows – we are now evolving a view of executive development demanding a new style of leadership behavior". They suggest that knowledge leadership is a matter of 7 C's: Context, Competence, Culture, Communities, Conversations and Common Language, Communications and Coaching.

This Knowledge Leadership stream calls for a long list of research questions. What do leaders in knowledge organizations look like? How do leaders “manage” in complex socio-economical systems characterized by self-organization, emergence, and co-evolution? What do they do differently? How are networks and networked organizations managed? Which new skills do their leaders need to develop? How do knowledge environments support knowledge leaders – and what do they contribute to such environments? Does information technology help traditional managers transform into knowledge leaders and if so, how?

**Research Stream 5: Knowledge workers, Free agents and Micro Enterprises.**

"Knowledge worker" is a term coined by Peter Drucker in the late 60s to describe an employee's expertise and specialization as the new and emerging "means of productions" over expensive and sophisticated machineries characteristics of the manufacturing era. "The most important, and indeed the truly unique, contribution of management in the 20th century was the fifty-fold increase in the productivity of the manual worker in manufacturing. The most important contribution management needs make in the 21st century is similarly to increase the productivity of knowledge work and the knowledge worker."(Drucker, 1994).

The massive portion of research in the domains of Information Technology and Knowledge Management was focused on the needs of large organizations, and recently also the challenges of small and medium enterprise and their employees. However, a new class of knowledge workers is becoming increasingly more important in the knowledge Economy and value creation game. These are the Free Agents which act in “Me Inc.” and companies-of- one, micro enterprises, loose networks of independent solicits and other emerging constellations (Pink, 2001).



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How do we create a free market of free agents? How do we create knowledge environments for this particular type of knowledge workers? How the social sense and human connectivity is maintained when people work from home?



**Research Stream 6: Customers Knowledge** - In most organizations this is an underutilized capital. ICT makes it possible to capture it for the benefit of suppliers and customers alike. Some companies are doing it. For example: Nokia makes customers full partners in the design of future products. Microsoft lets customers do a lot of the debugging (!) Yet, most companies do not even know what their customers think, feel, expect or consider added value for which they are willing to pay. There is so much waste because of it! Customer satisfaction surveys are providing statistical input but do not capture true customers` knowledge. Here is another challenge for research:

What knowledge environments should we design where customers` knowledge flows freely?

### Research Stream 7: The future of intellectual property

Intellectual Property (IP) is a general term for intangible property rights which are a result of intellectual effort. Patents, trademarks, designs and copyright are the main intellectual property rights (Patent, 2004). In knowledge environments IP is a key issue. Knowledge can flow with no limit with ICT but IP is an obstacle. We have to explore the following dilemma: On the one hand – we invest in knowledge creation and we would like to see return of investment. On the other hand – what about medical knowledge, for example, which is very expensive to produce and at the same time could often save lives, if not for IP rights? Only further research of this issue with new models development could solve such ethical issues.



### Research Stream 8: Future Orientation



In a turbulent environment, there is continuous tension between the day-to-day challenges, tasks and problems and the need to focus on the future. In organisations that excel in innovation, the top priority issue is the future. In other companies, most management and employee attention is directed to fire fighting and short-term objectives. There are exceptions: *“The future is 14 second away”* argued Leif Edvinsson (2003), and created Skandia future Center, with the explicit objective of *“turning the future into an asset”*; Ericsson established the Foresight team, whose vision is serving as *“the corporate futures group, a long-term futures centre with a 10 year outlook. The group will identify emerging trends, invite creative ideas, create scenarios*

*and develop strategic options in a wide range of area”*. (Ericsson, 2003). Pasig (2003) identified four phases of evolution in the history of Future Orientation, each characterized by a particular strategy to approach the future:

- ❖ Predictions based on modeling and trend analysis (developed at the 40’s and 50’s of the 20<sup>th</sup> century)
- ❖ Identification of realistic Scenarios (late 60’s)
- ❖ Wild Cards - identification of improbable scenarios and planning of appropriate response procedures (70’s)
- ❖ The approach of the “Future Design” - the role of future professionals is to help leaders and the other players in a system to design images and visions of the future which emerge from their collective intelligence (since the middle 80’s).

We think that none of these approaches became obsolete. Rather, they complement each other and provide together a good platform for future orientation

This stream will focus on questions such as: can we leverage the knowledge of all players in an organisation in order to handle the future in a more intelligent way and “turn it into an asset”? How can it be done considering the complexity characteristics of the eco-social system in which we operate? How do better knowledge environments contribute to the process of envisioning, co-creation and co-realisation of future visions, images and individual and shared dreams?

## Research Stream 9: Sustainability

Business organizations have been the major vehicle for enhancing the sustainability of the world population with goods and services which enabled the well being of civilized life. In the years ahead, as developing countries expand their standards of living, commercial organizations will be needed more than ever.



But, in light of their great potential, most organizations end up as a dramatic failure; they exist at a primitive stage of their evolution, while developing and exploiting only a fraction of their capability. For proof, the average life expectancy of all firms investigated, regardless of size, in most of Europe and Japan, was found to be only 12.5 years. Taking a look at the companies listed in the 1970 Fortune 500, reveals that a full one third of the companies listed had vanished by 1983. Human beings have learned to survive, on average, for 75 years or more, but very few companies are that old and flourishing.

The high “mortality rate” of organizations has a high social price. People loose their jobs, are pushed into unemployment, the economy looses its stability and communities of people bound up with the organization are torn apart and devastated. The effects on the individual employees are also tremendous; they loose their trust with the organizations, become fearful for their future and become less efficient.

Along with their low life expectancy, European organizations are confronted in the 21st century with increased turbulence within their ecosystems. They need to cope with frequent changes and new challenges, through shorter lifecycles, global markets and the reduction of access barriers to key resources.

Therefore, the IST should assist in finding ways to assist European organizations to better leverage and exploit their information, knowledge and technology in order to prolong their life expectancy, master their sustainable renewal within turbulent environments, while promoting the social, ecological and economic (the triple bottom line) responsibility.

## Research Stream 10: Knowledge Zones

The notion of “Knowledge Zone” was defined by Amidon and Davis as a “geographic region, product/service/industry segment or community of practice in which knowledge flows from the point of origin to the point of need or opportunity. Knowledge zones are emerging rapidly as the next step in the quest for sustainable growth and economic development for cities, regions, countries, and even corporations and global virtual organizations” (Amidon, 2003). One example is the Knowledge Cities which is a city “purposefully designed to encourage the nurturing of knowledge” (Edvinsson, 2003). The concept applies to villages, regions, nations and cities determined to turn the knowledge created by their citizens into their main competitive advantage. Their purpose is to optimize the local human capital, intellectual capital, social capital, relationship capital and intangible values. As proposed by Davis and Amidon (2004) “Knowledge based urban development is the perfect new medium in which to grow more liveable, stimulating, cleaner, intelligent, enlightened tolerant and meaningful communities world wide” (Davis and Amidon 2004). Multiple cities such as Barcelona, Delft, Melbourne and Calgary already develop strategic plans for realizing this concept (Dvir, 2003). In a research agenda dedicated to Knowledge Environments and the realisation of the “Knowledge Anytime Anywhere” vision, this stream of thought and research is essential, as it applies to the local context in which we all work and live.





## Research Stream 11: The Ecology of Innovation

Great leaders create conditions that bring out people's ability to produce extraordinary results. Central to that task is the creation of a climate for innovation, which is a force field that guides managers and entrepreneurs towards innovation – or against it (Pinchot & Pellman, 1999). Innovation Ecology is the work

environment, a setting that can enable, encourage, foster, and catalyse the generation of ideas and creation of value out of them (Hale 1996). It supports individuals, teams, and the whole organisation in the journey towards sustainable growth and success that are based on on-going innovation. How do we architect such an eco-system which enables and encourages its players to use their creative talents to turn ideas into reality.

The proposed research stream will explore how the principles of the other 10 streams are applied to Innovation Ecology. What is the role of the knowledge leader in such an ecology? Of networks? Of the customers? Of free agents? How is intellectual property dealt in it? How is the Hi-Tech Hi-Touch balance fostered? How is Future Orientation embedded in it? What does an urban innovation ecology look like?

## Conclusions

The notion of “Ba”, one of the early manifestations of the concept of Knowledge Environments was coined 34 years ago. Since then, some work was done to investigate it. However, we believe that the related aspects are very much an unexplored research domain which still needs extensive scientific research. In this paper we proposed eleven research streams. The first two provide the foundations for this agenda: the understanding of complexity characteristics of the socio-economic knowledge world, and the critical need to return to a better Hi-Tech Hi-Touch balance. We focused the paper on one particular zone, namely “Knowledge Environments”./ However, there are many other zones and streams that need to be explored. Together, they can lead to the realisation of the vision of “Knowledge Anytime Anywhere”.

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