

## **The co-evolution in local development - From the triple to the quadruple helix model**

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### **Abstract**

*The Nordic welfare states embrace the idea of co-evolution. This phenomenon is less obvious due to the strong role of the state, but yet it is visible in the adoption of technological development and in the efforts that entwine the technological innovations to work environments, social services and everyday life. It is even more conspicuous, when the participatory approach to technology is applied in the city regions and neighbourhoods with the assistance of NGO's and local governance. It is justified to claim, that the shift from the early examples of participatory design to the current technology-assisted local development embraces the ethos of the welfare state. How technology is applied and to whom it is designed for shows the core values of society. The paper addresses the history of technology-assisted development processes in the Nordic countries which implies a mismatch between innovation policies and the local development. The research problem is, whether the co-evolving nature of development is able to mend the mismatch between policy and practice? I argue that the triple helix model of regional development is viable as a concept but it needs updating to a 2.0 version which also includes NGO's, SMS and the local neighbourhoods. The aim of the paper is to present a general view of the technological development processes and their institutional and socio-political background in the Nordic context. Thus, it is an ex-post analysis of the innovation policies and their “fit” with the local development processes.*

### **Introduction**

The local development processes in Finland embrace the idea of co-evolution<sup>1</sup>. The triple helix is a metaphor for a socio-economic model in which the co-evolution provides a justified explanation of the dynamics and motivation for the co-operation between organizations of science, private corporations, public administration and policy-making. The organizations influence their environments, each other, and vice versa (Lewin & Volberda 1999). This dynamics has been obvious in the adoption of technologies and in the practical efforts to embed the technological innovations in industry, work environments and also in health and social services (Gregory 2003; Sotarauta & Srinivas 2006). Recently, it has also been visible, when the participatory approach to technology has been applied in city regions and neighbourhoods. This has not taken place to the policies and development programs themselves. The reason is that the proactive and capable networks of local NGO's and activists have been able to acquire socio-technical<sup>2</sup> resources from the traditional triple helix parties.

Innovation policies in the Nordic countries have traditionally implied a hard neo-liberal ethos<sup>3</sup> and the use of tools associated with the new public management (Pettersson 2007). However, in the era of open innovations and participatory planning, innovation policies should embrace the idea of co-evolution that is supported by appropriate measures and resources. In this paper, I will reflect on the experiences gathered in co-evolving development projects over several decades in the Nordic countries. The outcomes of the recent project, called Ubiquitous Helsinki, disclosed that the triple helix model is a viable concept, but it needs to be updated to a 2.0 version that also includes NGO's, SMS and local neighborhoods.

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<sup>1</sup> Co-evolution is originally a biological term, yet currently adopted widely in other fields of research and technology. Co-evolution occurs when two or more organisms adapt to their environments and evolve together.

<sup>2</sup> Socio-technical capabilities consist of the physical access, personal abilities and skills to use information and communication technology (ICT).

<sup>3</sup> Ethos is a Greek word that denotes the guiding beliefs or ideals that characterize a community, a nation or an ideology.

The paper addresses the history of technology-assisted development processes in the Nordic countries which implies a mismatch between innovation policies and the local development. The research problem is, whether the co-evolving nature of development is able to mend the mismatch between policy and practice? In this paper, I seek to unwrap the dilemma partly by analyzing the development processes and their background with following questions: How have the detached regional development and innovation policies been adopted in local development and urban planning? What kind of development models there are on the case studies? And, should we talk about quadruple helix instead of triple helix, if the development embraces a co-evolving dynamics with multiple stakeholders?

Even today, the co-evolving processes are not encouraged nor acknowledged in the innovation policies. For instance, the actions of the Finnish Funding Agency for Technology and Innovation lie deeply in the triple helix model (UbiCom program 2006). However, the grass root level actors seem to be so skilled and capable that they are able to take advantage of the funding program. Not surprisingly, the role of the university has been crucial. In order to understand the dynamics of the co-evolving technological and social development on the local level, I will present the context of technological advancement and the institutional framework of the Nordic economic development and innovation policies. I will first describe, how the role of technology and socio-political ethos has evolved in the Nordic countries. I will also explain how the technology and socio-political ethos have been entwined in the innovative initiatives for several each decades. Then, I will take a look at the local development process of Ubiquitous Helsinki. The final section comprises a discussion of the role of the welfare state and its shortcomings in the evolvement of knowledge society.

### **Technological development and the Nordic societies**

Industrialization took place in a different pace in the Nordic countries, due to several social, spatial and economic differences. On a global scale, however, the Nordic countries seem to have a common cultural background, similar political and social institutions as well as a strong emphasis on technological advancement. These characteristics are considered the main essence and reason for both the global competitiveness and the high living standard (WEF 2008, UNDP 2008).

In political economy, researchers have looked for the answer by analysing different macroeconomic indicators and comparing the performance of certain organizations, industries or regions. However, the innate character of the economic and social development lies deeper. The development policies and initiatives are the offspring of a normative socio-political ethos. The technological advancement enjoys a major role in the economic performance and policy-making of the Nordic countries. For instance Castells and Himanen (2001) have drawn a straight equation between these two, and named it as “comprehensive and distributive knowledge social policy”, a welfare information society. Generally, technology and welfare policies are considered merely the outcome of current performance and the basis for the future competitiveness (Porter 1998, Örjan & al. 1991). The complementary nature of these two is more often disputed than empirically proven (Jauhainen 2008, Pettersson 2007). For the tree is known by fruit, some interesting outcomes can be found in the debate, when the nature of the development itself is analysed.

In social science, technology and the way it has been applied in practice reflect the exercised power and politics in society, which also shapes the experience of citizenship. Technology is a political and social vehicle – both in implicit and explicit ways (Joerges 1999, Latour 1988, Winner 1980). Technological artefacts are political and social consequences in practice. They support and steer to a certain kind of political and social progress. Technologies and artefacts also become symbols of the political or social endeavour (Woolgar 1991). In the 2000's, the Nokia mobile phone has been the national pride and the artefact of the national hegemony in Finland, like the tractor was in the Soviet Union in the 1950's. The expansion of ICT-technology and attempts to overcome the ever growing digital divide provide an interesting case study on the normative power of the welfare state ethos, in which the first is embedded. The marriage of the technological progress and social consciousness has been going on in the Nordic countries, since 1960's. The latest technological achievements of the export-oriented industry and the welfare state ameliorations have evolved hand in hand.

Technology has advanced in giant steps, in the blink of an eye, and in every field of industry. In ICT, this has led to the emergence of ubiquitous computing and communication in everyday life. The world has witnessed a rapid expansion of mobile technology both in the networks from 3G to 4G- local area networks, as well as i-phones that are packed with new software and hardware solutions with services. The ever enlarging World Wide Web with the new logic of web 2.0 tools and software have provided people almost boundless possibilities to consume digital services of communication, shopping, security and amusement. Many of these services are still in the early stage, meaning that they are high-end products for “specified” user groups. They are targeted at people who are affluent and capable, not only willing to use such services. The number of users with high broadband access, valid gadgets and high level of education, the relative

amount of such users is higher in the Nordic countries than anywhere else in the world<sup>4</sup>. The latest "it" in the ICT-system development are the flexible services and mash-ups of several user interfaces that are produced by the users themselves. This open innovation model is based on the co-production and participatory design of peer-to-peer networks (Mitchell 2007, Leadbeater 2004).

However, technology is not about gadgets anymore – in fact it never was. People are merely trapped to think so. Cities and living environments are more embedded with technology and its' affordances than ever before. The time, ways and place of work, the family and recreation undergo a rapid change. According to William Mitchell (2000):

*"The new settlement patterns of the twenty-first century will be characterized by live/work dwellings, 24-hour pedestrian-scale neighborhoods rich in social relationships, and vigorous local community life, complemented by far-flung configurations of electronic meeting places and decentralized production, marketing, and distribution systems."*

In practice, there has been a massive effort throughout the developed world to produce a variety of wireless communities. They have been self-organized, government-oriented or market-led. It is not only about Facebook or Second Life, it is about the wlan-supported campus portal or on-line e-banking, e-employing or e-shopping in the living room. The technology-driven urge to financial profit has turned into vast socio-political processes in everyday life.

There are two multidisciplinary research approaches to study this new field, namely Participatory Design (DP) and Community Informatics (CI). According to Carroll and Ronsson (2007), PD means the direct involvement of end-users and other stakeholders in design, where as CI addresses the impacts and utilization of information technology in the facilitation of community life and further development of participatory design. Thus, the differences between these approaches are difficult to define. They both examine the same field, how ICT can effectively support the community's socio-economic, socio-political or socio-cultural objectives. They integrate the participatory design of information technology resources, popular education, and asset-based development in order to enhance citizen empowerment and quality of life (Stoecker 2005). They "entail collaborative partnerships and the co-construction of knowledge in the analysis and co-construction of changes in social practices" (Gregory 2007). Similar issues have been addressed in political economy and in the regional studies of co-evolutionary development and innovation diffusion (Sotarauta & Srinivas 2006). The difference is that PD and CI have a key interest in micro-level development processes, where as political economy seeks to explain regional and national level processes.

### **The history of Nordic development projects**

Nordic countries have developed a panoply of encompassing civic and economic organizations: from industrial workers to knowledge society. The corporatist tradition of welfare state has fostered a direct role in policy design, bargaining, and implementation. The name of the Nordic Utopia projects referred to the *Utopia* of Thomas More from 1516, which depicted the future ideal society, "the best of all worlds". At the same time Utopia was the land of nowhere, a "world which does not yet exist".

In practice, the Nordic Utopia begun already in the first half of the 20th century which is associated with youth and progress, with a strong protestant ethos to view and understand the changing world and modernity. In Sweden, this resulted in innovations, such as new architecture (Vällingby Center and the skyscrapers at Hötorget), and Gunnar and Alva Myrdal's ideas of social welfare politics. From the 1960's until the first half of the 1980's, the Nordic countries witnessed a period of strong trade unions and attempts to realize the goals of economic and industrial democracy. After the economic depression in the 1990's, a number of new actors and institutions, such as universities and Associations of R&D Funding with affinities to the labour movement, came on stage and quickly gained strength through a number of governmental decisions. The formation of a state-supported network of strong labour interests has dispersed in many ways, but at the same time gained new strength to fight for the creation of the knowledge society. The latter is not only fuelling economic competitiveness but it is also a solid societal structure that produce wellbeing and social inclusion.

The Social Democratic leaders Ernst Wigforss and Per Albin Hansson created the idea of "the people's home" (*folkhemmet*) in 1930's. At the beginning the idea was close to the geopolitics of Rodolf Kjellén that originated in the organic state theory of Friedrich Ratzel (Kjellén 1916). Their and Myrdal's legacy, redefined by Olf Palme, was not just

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<sup>4</sup> For example, in Finland, the high broadband access ratio was 30,7 in 2007 (average in OECD 20,0). The total amount of mobile phones exceeded the number of population in 2005. 65 % of population has second level education or higher (Statistics Finland 2009 a & b).

about social engineering, but about the nationalization of private enterprises, abandonment of the class-struggle and an open invitation to immigrants to build the nation. There was a strong belief in competition between nations that could be won by ever lasting progress through hard work, common values and the nation state. The high income taxation, subsidies for both lower and middle class especially in educational and health services followed the universalist principle, which kept people monolithic. Technological advancement became the main goal in the industrialized and rapidly urbanized country. The state was the main nurturer and maintainer of the civil society. Everybody was included as long as they were willing to improve themselves and profit the community (Kiander & Lönnqvist 2002).

The Swedish model was adopted in other Nordic countries too. Even today, the welfare model is embraced in consensus by both the right and left wing political parties in the Nordic countries. The welfare model has received a lot of critic and strong neo-liberalism has spread the Nordic countries in many ways. However, the modernist ethos and the protestant belief in progress through technology still exist. The selection and implementation of technological development projects in the Nordic countries have been surprisingly convergent during several decades. The following development projects have been chosen for comparison on purpose. They all stand for the latest progress in technology, and they are implemented with the most special methods and participants of their time. They provide together a perspective to the Nordic experiences of co-evolutionary knowledge creation from 1960's to 2000's.

### **From the development of working environments to the development of local neighbourhoods**

The "UTOPIA Project" was the first Scandinavian research project established in the Nordic countries between 1981 and 1986. The results of social studies showed that monotonous repetitive work contributes to apathy and alienation from political participation (Gregory 2003). It was a trade union-based development project which provided training in both computer technology and work organizations. Utopia was carried out in the graphic industries. It was a part of the Scandinavian co-operation taking place both in Sweden, Denmark and Norway. UTOPIA laid the foundation to the so called Scandinavian School of System Development (*Den skandinaviska skolan*), in which user participation in system development became the key element. Labour unions were not just part of the labour itself, but also formulating technological endeavours of the industry and co-developing both work and produced artefacts. The role of the labour movement in technological change was highlighted. It was underlined that there are different incentives to technological change. Corporations that developed technology usually pursued increased efficiency in production. The labour movement and UTOPIA aimed at other goals, such as job skills, work quality, and the quality of products in the new computer hardware and software of graphic industries.

The Project continued over a decade and it established a new institution, the Center for User-Centered Information Technologies Design (CID) in 1996. The Utopia experience demonstrated that it was possible to develop technology according to the workers demand and not only for the management. The UTOPIA-project can be seen as an attempt to establish an innovation system in which the desires of both parties could be fulfilled. The innovation system built up in the UTOPIA was surprisingly mature. It consisted of the representatives of industry, research institutes, trade unions, and universities. It was characterized by strong labour interests (Lundin 2005)

From the mid seventies to the mid eighties, three big research projects dealt with the trade unions and the development of technology and organization: DEMOS (1975—1980), UTOPIA (1981—1986), and FRONT (Table 1.). The research was not supposed to consist of traditional reflective, analytic social science. Instead, it was "action research" in which the research and development evolved simultaneously with the support of the researchers. The contribution of researchers as well as their reporting were highly dependent on the actions of other members. In other words: it was about commissioned research.

Table 1. Examples of Nordic experiences of co-evolutionary knowledge creation from the 1960's to the 2000's.

<b>Knowledge creation</b>	<b>in work environments</b>	<b>in neighbourhoods and everyday life</b>
Projects	The early experience in 60's Norway DEMOS 1975—1980, Denmark UTOPIA 1981—1986, Sweden, Denmark FRONT 1987->	ARJA 2004-2006 Ubiquitous Helsinki 2007-2009
Nature	Grand research projects with trade unions on the development of both technology and organization	Dispersed R&D projects providing services through the latest web- and mobile applications for inhabitants, and supporting local participatory structures
The role of technology	A new tool for employment	A new tool for social inclusion and the management of everyday life
Participants	Labour unions, big enterprises universities	ICT-enterprises and SME service enterprises, local actor networks, universities
Outcomes	Steady training programs, the concept of participatory design in technological applications	Participatory structures, public-private-people models in technology and local community projects

The same kind of co-evolving approach was applied in the UBIQUITOUS HELSINKI project, funded by the Finnish Funding Agency for Technology and Innovation (2007-2009). It was preceded by a two-year long ARJA project which prepared and mobilized a local network for the living lab. The consortium comprised a private, public, people-partnerships with several companies, the Helsinki Neighbourhoods Association, the University of Technology and the Technical Research Centre of Finland. The project aimed at the development of ubiquitous services of everyday life and events in the centre and two neighbourhoods of Helsinki.

The implementation of the project meant constant iteration between the developers and users in the co-piloting of some digital services to be delivered through the social media. The Helsinki Neighbourhoods Association (Helka) coordinated a service pilot which enhanced the collective capacity and social capital of its 56 neighborhoods by developing their local web-sites. It provided the neighbourhoods mobile and semantic web tools that were produced together with the research group and ICT-enterprises. Helka steered not only the objectives of the ICT-tool development but also defined the production and maintenance requirements.

The traditional innovation process was turned around completely. The users were not outside the development process, nor were they passive objects of the development as they often are in so called user-centered production. Instead, users were brought into the same operative level with the enterprises and the research unit, which were called enablers. This approach demanded a new kind of development methodology. The learning-based network approach (Lena) is a method and a set of tools to analyse, plan, implement, monitor and evaluate development processes in an iterative way. It was originally developed within participatory projects with young people and women, and later on applied in the context of time policy and time planning (Horelli 2003; 2006b; Horelli & Wallin 2006). Its methodology is based on communicative and post structural planning theories (Booher & Innes 2002; Hillier 2008), as well as the theory of *complex coevolving systems* (Mitleton-Kelly 2003).

The application of the framework and methodology enabled not only to continue the strengthening of the infrastructure of everyday life of the neighbourhoods but also to encourage the three Ps, public, private and people into a partnership in which the web-based mobile services were co-configured and co-produced. The co-production of web tools in the context of the development of services has gradually begun to transform the pilot neighborhoods into collective digital urban space.

### **The participants and outcomes of the co-evolving development projects**

For almost three decades, the main goal of the welfare state policies has been the enhancement of national competitiveness through technology and higher education. The analyse indicates that the development policies in welfare state have mostly been technology-driven. However, the user-sensitive participatory methods empower the local stakeholders and create mediating networks of partnerships. Thus, they engage not only the private and public sector, but also people. Lena is a suitable approach to R&D projects, whose objective is to enhance innovation and their use.

Universities and research centres, alongside enterprises have had an important role in the initiation, implementation and evaluation of process, but also in the networking, mobilizing and educating the stakeholders. In addition to the

knowledge distribution, the research endeavour provides an intermediary level. The project management would have been less competent and the policies and programmes would have had less steering power without the local input participants. Together with the state and regional government, the research and industry have formed seminal axes of the triple helix. However, it should be noticed that the stakeholders, local employees and inhabitants have had an important role in the implementation of the development measures in everyday life. Without their performance and their active role, the implementation of the high status policy projects might have failed and certainly not gained the outcomes. Therefore, their role should be acknowledged and they should be disclosed as the fourth helix of the development.

The participatory approach seems to have the potential to enhance the development and diffusion of innovations in the quadruple helix by connecting the local networks to the co-production of services and training (Table 1). Participatory design is the essence of co-evolution. Partnerships and local networks could find their position in the co-evolving process through testing and iteration in the living lab environment, as defined in the cases. The approach provides the necessary affordances (platforms, tools and channels), which assist the visionary and operational objectives and provide multi-layer monitoring and assessment of the conditions, structure and content of desirable digital services. Thus, the connections between the operational, strategic and policy decision-making level and the necessary feed-back loops get shorter. Open innovations require rapid feed-back loops. This proliferate a shorter path between policy making and day to day activities. Eventually, the double devolution may take place as power is transferred from the town hall to the neighbourhoods, and from the centre of organisations to the front desk.

A great demand for new kind of public-private-people partnerships has emerged. The blooming neo-liberalist ethos and the Lisbon-Gothenburg agreement have sifted the emphasis on the users, or people and their potential to take action in their everyday life. The Learning-based network approach that emphasises the collaboration of different stakeholders has proven to be a viable solution not only to the social and environmental development initiatives, but also to the application of ICT-technology. Residential associations, other NGO's, as well as SMEs will then have a more transparent role from the beginning of the planning process to the final assessment of outcomes.

## **Conclusions**

According to the analysis of the context and the evolution of local development projects, the Nordic welfare states embrace the idea of co-evolution. This character is less obvious due to the strong role of the state. However, it is visible in the adoption of technological development and in the practical efforts to integrate the technological innovations in work environments, social services and everyday life. The Nordic countries have integrated technological development in the participatory design and co-evolutionary institutions. They both provide the core of the much celebrated concept of the knowledge economy. The reason and supportive context for this kind of technological development is the traditions of welfare state in working life, unionisation, relative homogeneity and small size of populations, established relationships between designers, university researchers, workers, unions and companies (Gregory 2003). Thus it is justified to claim that the shift from early examples of participatory design to the current user-sensitive service design reflects the ethos of the Nordic welfare states. How technology is applied and to whom it is designed for, shows the main values of the society.

The modernist ethos and the protestant belief in progress through technology still exist and they are visible in the national discussion. Nevertheless, this innate co-evolutionary nature of the Nordic knowledge economies is less visible at the policy level and programs. Due to the solid background of the welfare state, the development initiatives have been able to mend this shortcoming of policy making and administration. However, it is necessary that in the era of open innovations and participatory planning, innovation policies embrace the co-evolution and provide better measures and resources. It means that the triple helix –model is a viable as a concept but it needs to be updated into a 2.0 version which includes also NGO's , SMS and the local neighbourhoods.

According to the experiences described in the paper, the co-evolving approach seems to have the potential to enhance the adaptation of technological and social advancements at the local level by connecting the four Ps to the co-production of services. Thus, it is possible to transform the traditional triple helix policy model to the quadruple helix one with surprisingly small efforts. The latter might give impetus to new stakeholders, who so far have not been involved, nor recognised except in the so called “living lab”-conditions (Mitchell 2008). The local development initiatives already contain the basic structure and methodology for joint efforts. The living labs and other empowering joint efforts on the local level may provide the desired middle path to a regional development that simultaneously promotes the objectives from several policies without losing sight for local realities.

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