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III. The Knowledge Triangle Promoting Innovation and Multidimensional Learning

Abstract

Higher education institutions play a pivotal role in the well-being of their regions by creating and transferring new knowledge to their students and regions, thereby increasing both students "and regions" capacity to absorb latest knowledge and foster innovation. To optimise both educational and RDI impacts, the Knowledge Triangle (KT) is important. It is about creating and strengthening the interaction and synergy between research, education and innovation and paying due attention to the linkages between them. The KT, however, requires changes in the design and delivery of education programmes. It also calls for new mechanisms and interfaces for collaboration among various regional stakeholders. Learning by Developing (LbD) together with the LivingLabs (LL) model exemplify these changes and mechanisms in practice. The article explores LbD and LL as a university case (i.e. Laurea University of Applied Sciences) and an example of the KT.

Keywords: The Knowledge Triangle (KT), Learning by Developing (LbD), LivingLabs (LL), collaborative research, development and innovation (RDI)

1. Introduction

Higher education institutions (HEI) are conducive to the socio-economic development by contributing to human capital and innovation in the world of work and the wider economy. Traditionally, the contribution has materialized through linear processes (from basic research to education and laboratory work, innovation and commercialisation). In the frame of the KT, this article, however, concentrates on the non-linear and collaborative modes of learning and innovation practices in between a HEI and

its region. In the interdependent global context, the challenges have turned severer and subsequently new collaborative tools and mechanisms have been fostered and experimented with.

In the context of a complex, interdependent global economy, corporations in Europe are specialising in services and high value-added production sectors. At the same time, the evolving principle of shared value creation (Porter & Kramer, 2011) calls for creating economic value in a way that also creates value for society (Kulkki, 2011). Similarly, the EU Horizon2020 challenge-based third pillar, that is, better societies, emphasises the need to take the societal problems themselves as a starting point for corporate and university RDI work.

As Kulkki (2011) explains, grand challenges and shared value creation call for convergence[1] of disciplines and collaboration of firms, academia, public agencies, regions and cities with people and citizens. "This collaboration may cover activities from research to market with a new focus on innovation related activities, such as piloting, demonstration, test-beds, living labs and support for public procurement and market uptake." (Kulkki, 2012, 24)

From the viewpoint of HEIs and their contribution to lifelong learning, creative collective action implies that people are seen as an inspiring partner bringing their values and creativity to problem solving. This may, however, require what Nonaka and Takeychi (2011, in Kulkki 2012) describe as distributed leadership, where wisdom is embedded in every individual and collective practice and action.

2. The Learning by Developing model in conjunction with the university driven LivingLabs

In the complex global context that transforms at an accelerating speed, higher education institutions form the core for new collaborative RDI and multidimensional learning mechanisms for the benefit of people, organisations and regions. In Finland, traditional universities and universities of applied sciences (UASs) together constitute the dual higher education system and a continuum of knowledge creation and transformation, in which the UAS sector has three legislative tasks: education, RDI and regional development. Education in a UAS is based on its working-life oriented RDI work complementing the basic research of the traditional universities. Many of the Finnish UASs operate as living laboratories and develop and apply the related methodologies enhancing multidimensional learning and innovation (Kantola & Hirvikoski, 2012; Living Lab ammattikorkeakoulussa, 2012).

2.1 Living Labs and related concepts

Westerlund and Leminen (2012) define "living labs as physical regions or virtual realities, or interaction spaces, in which stakeholders form public-private-people partnerships (4Ps) of companies, public agencies, universities, users, and other stakeholders,

[1] "Convergence as a research design merges distinct methodologies, technologies, tools, processing principles, and other elements of research designs into a unified whole." (Kulkki 2011)

all collaborating for creation, prototyping, validating, and testing of new technologies, services, products, and systems in real-life contexts. They are used for the development of communities for the use of innovation."

According to the European Network of Living Labs (ENoLL), the Living Labs are citizen-driven open innovation ecosystems in real-life settings in which innovation is fully integrated into the co-creative, co-design processes for new technologies, products, services, and societal infrastructures. First developed by William J. Mitchell at MIT in 2003 to study people and their interaction with new technologies in a living environment, the Living Lab model was introduced to Europe by Nokia and adapted to the needs of ICT research and development. From there, the method spread, gaining a specifically European version as a user-centric development of the Open Innovation paradigm, based on the co-design of innovative ICT applications in local, often rural, communities.

Initially regarded only as micro-level test beds, Living Labs are currently evolving into new regional learning environments and macro-level innovation ecosystems. According to Wessner (2007), innovation ecosystems capture actors like large and small businesses, universities, research institutes and laboratories, intermediating organisations, as well as venture capital firms and financial markets. In the innovation ecosystems, knowledge and innovation are created and brought to market with the help of public policies that strengthen the links within the innovation ecosystem and improve innovation-led growth. Also rules, regulations, and incentives as well as shared social norms and value systems are crucial variables of innovation ecosystems. In Laurea, the Living Lab approach has been developed and implemented from micro level to the most extreme macro-level in parallel to the practice-based LbD action model enhancement.

The integrative LbD model has gradually been evolving since early 2003 in resonance with the KT and such "transdiscursive" (Miettinen, 2002) concepts as the Knowledge Creation Mode 2 (Gibbons et al., 2008), the Triple Helix of Academia, Industry and State (Etzkowitz &Leydesdorff, 1998), the Entrepreneurial University (Etzkowitz, 2004), the Science II (Hollingsworth & Müller, 2008), The Living Laboratories (ENoLL), the National Innovation System (Miettinen, 2002; Lundvall & Borras, 2005), the Regional Innovation System (Kautonen, 2006) and the Innovation Ecosystem (Bahrami &Evans, 1995; Wessner, 2007; Hämäläinen 2005, 2006, 2007) (Hirvikoski 2009).

The axiomatic nature of the innovation system and Triple Helix has been, however, criticized by Miettinen (2002). He argues that these concepts are "loose" and lack scientific preciseness; nevertheless, these "transdiscursive" terms are powerful when used to reorganize and guide discourses within research communities and in policymaking. Their emergence and development is dependent on the interaction between the two.

2.2 LbD Action Model by Laurea UAS

Laurea UAS has a nine-year continuous tenure as a Centre of Excellence as nominated by the National Evaluation Council due to its student-centred LbD action model integrating RDI with learning and regional development. "The LbD action models views

learning as a tool for achieving competence, which in turn is demonstrated as new ways of action. Lbd provides students and lecturers with genuine encounters with the changing requirements of working life and a collaboration model for functioning as innovative partners" (Raij & Niinistö-Sivuranta, 2011, 6).

The LbD model has been collectively developed and applied within Laurea and with its regional and international partners, and its development still continues as an educational, managerial or service innovation, depending on the context and viewpoint of its user. Today, through Laurea's shared leadership practices, the entire university with its almost 8,000 students and staff members and their personal connections with the world of work, is mobilised to the collaborative RDI.

The LbD model, in conjunction with the LivingLab approach is based on innovation co-creation among various stakeholders within the Helsinki Metropolitan area and internationally. Or, as Pirinen (2012) defines it: "the integrative model refers to the student-centred integration of higher education, research and development (R&D) and regional development in the viewpoint of actualizations of study units with funded R&D projects and within regional R&D actors such as regional innovation system and clusters."

Consequently, Laurea became an active participant in the international project field of business, security and eHealth research. Laurea offers a broad range of research related to service business and is already prominent in the international forums of service design, user centricity, and customer focus.

2.3 Lbd Action Model has its roots in Pragmatism

The LbD model has its roots in pragmatism (Dewey, 1929), which is an action-oriented philosophy of science, viewing reality in the state of constant transformation, and man as an active conductor of transformation, either by thought or action. In the frame of Burrell and Morgan's (1979 in Taatila & Raij, 2011) interpretative and functional paradigms of social sciences, the LbD model was perceived to fall into the category of interpretative paradigm, which "sees the social world as an ever changing place", where "students should learn the process of discovery and self-sufficiency as much as the facts that are discovered" (Taatila & Raij, 2011, 832).

Laurea's strategic choice to integrate regional development, education and RDI led to renewals in designing its educational, research and managerial activities. As a consequence, a new competence-based curriculum (Kallioinen, 2007) and the LbD action model were developed and implemented in practice at the Laurea Living Labs Network (including e.g. SID BarLaurea, Redlab, SID lab networks, SID lab security and, Active Life Village, CIDE, Medical and Care Simulation Centre, Laurea Business Centre, P2P).

As the mission of UASs is praxis–oriented, the curriculum defines competence as the integration of knowing, understanding, acting and situation management, including knowledge written in theories and models, or embedded in skills and abilities, as well as moral knowledge and experiential knowledge (Raij & Niinistö-Sivuranta, 2011).

Through the joint international RDI projects, the domestic and international students benefit from an interesting and competitive learning environment that boosts

their professional and academic career progress. The LbD model focuses on learning outcomes for the highly skilled, creative, enterprising and flexible workforce with critical thinking capabilities. Prominently, according to the national statistics, the LbD has provided Laurea graduates with great employment and start-up opportunities.

2.4 The collaborative LbD as a living laboratory or an "orchestration table"

Based on Laurea's experiences, it is evident that a HEI can play a crucial role in formulating and implementing regional innovation strategies in partnership with the local authorities, businesses and citizens.

Metaphorically, the collaborative LbD projects operate as regional learning living laboratories, which can be associated with an orchestration table (Figure 1), around which the different players, such as public, corporate and third-sector actors, as well as universities together with end-users gather in order to swarm around the common phenomena and problems. Apart from the actual RDI work, the integrative process consists of social interaction, knowledge sharing, collective intelligence, learning and problem solving, and the build-up of related sheared meanings. In the Living Labs, the co-creation of innovation and innovative activities bring the concepts of science close to citizens and the users' real-life expertise close to researchers, designers and politicians. Also, the stakeholders' roles as designers, researchers, enablers, or users can vary depending on the project type.

Throughout the feedback loops between the collaboration stages of interlinked university and UAS-driven RDI projects, commercialisation and innovation policy, additional, systemic learning and changes may follow both in the wider society or industrial clusters.

In all this, the students are equal partners, developing and creating new professional knowledge and skills whilst growing towards their own fullest potential as human beings. As there is a constant demand for self-organising actions, the model fosters creativity, entrepreneurial competences and critical thinking. Consequently, together they form the bases for learning regional Living labs and people-driven dynamic societies that do not shy away from the challenges but rather organise themselves around them. (Kantola & Hirvikoski, 2012)

Through its internationally funded projects and by operating as an orchestration table, Laurea can offer its best co-operation capability also to the international partners and consequently an access to one of the world's most competitive and advanced metropolitan areas. As a result of these principles and in accordance with the regional Smart Specialisation strategy, HEIs in various countries can foster the enriching and mutual cooperation between their regions and their regional learning Living Labs.

Laurea aspires, together with its regional and international partners, to construct better RDI results and improve their commercialisation and usage in organisations and within society. The RDI results, co-created within the frame of LdD, may be turned into innovative marketable products and services by the corporate sector, whereas the public sector may utilise them in their strategies and operations.

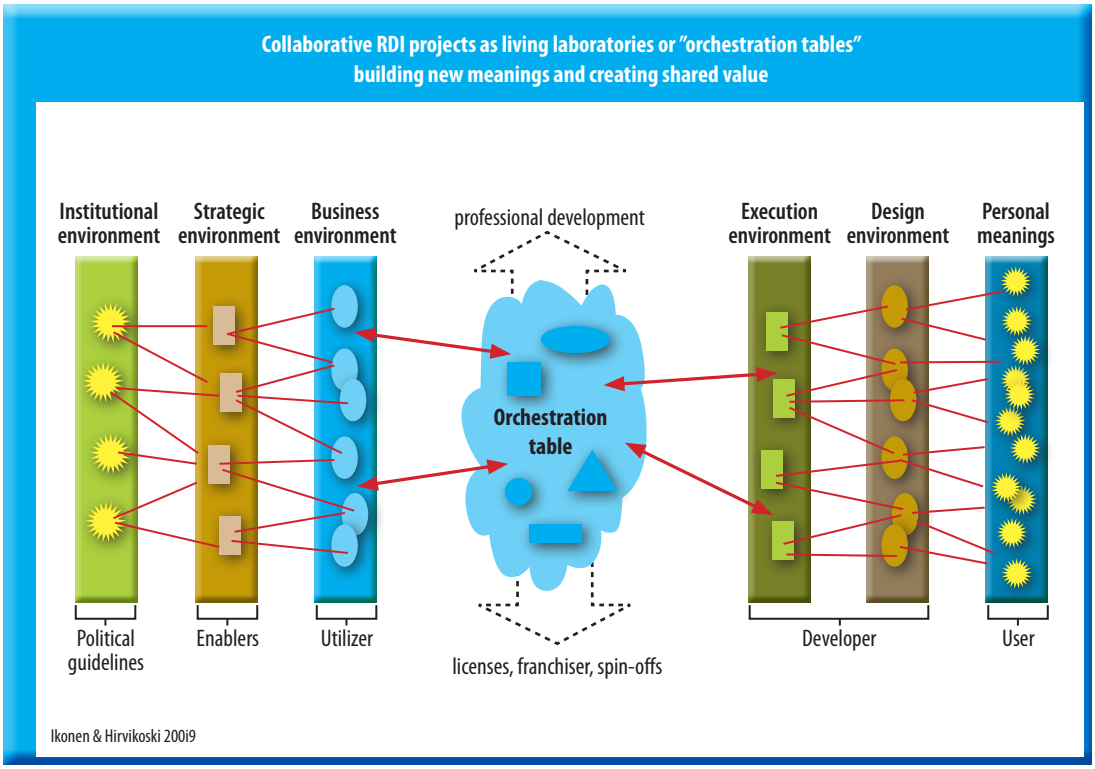

Figure 1. Collaborative RDI projects as living laboratories or "orchestration tables" building new meanings and creating shared value.

2.5 The stages of the LbD wheel

From the point of view of learning, the development projects, rooted in the world of work, reflect the ever-changing reality where learning takes place when participants create, cultivate and test new ways of action and new habits. The stages of the LbD are enabled by the new learning possibilities that are created as the RDI project progresses. The needed knowledge, skills and methodological tools are obtained, experimented and developed through diverse workshops and laboratory environments. The action model comprises the several complementary stages, as illustrated in Figure 2. (Raij & Niinistö-Sivuranta, 2011)

In partnership with the students, developers and researchers, the teachers prepare, organise, facilitate, implement and develop the LbD stages. As evaluators, teachers focus on competence evaluation and the project evaluation.

2.6 The collaborative development projects

The LbD assignments may originate from the Laurea RDI portfolio, with externally funded projects mobilising a wide range of local and international actors for joint problem-solving, and research and development work. These projects carry a sub-

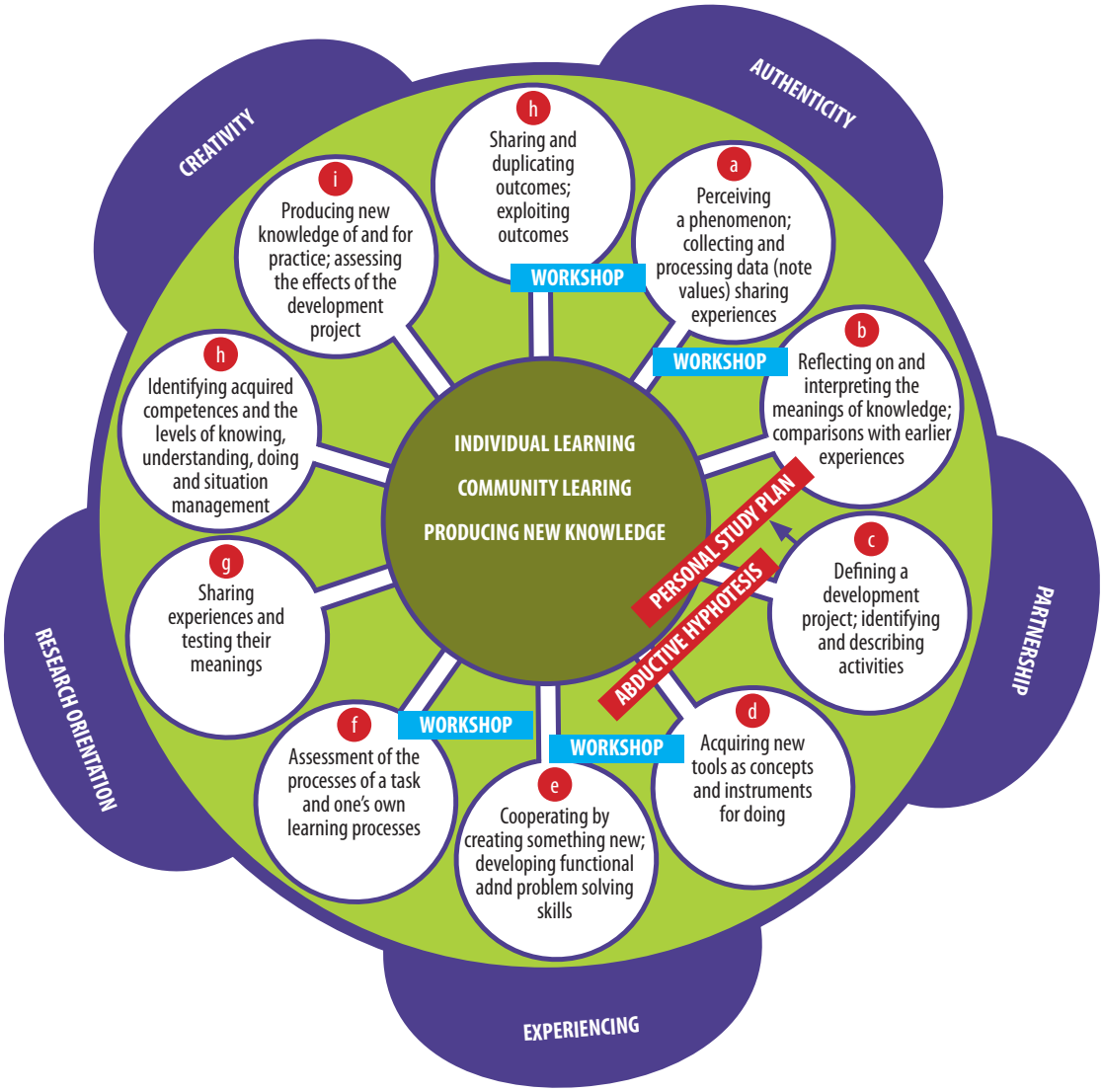

Figure 2. The stages in the LbD wheel (Raij et Niinistö-Sivuranta, 2011)

stantial amount of leveraging power for developing e.g. new service innovations (such as the Caring TV® or the People Value Canvas presented by the Express2Connect are examples of the Local Digital Agenda) or boosting socio-economic progress in Helsinki Metropolitan area's sub-regions (e.g. Koulii and Symbio Living Lab). The externally funded RDI projects also operate as a long-term learning environment and bases for the regional competence development continuum.

The LbD projects may also serve as minor knowledge-producing commission and joint-learning activities, originating usually from one firm, public organisation or third-sector player. If successful, these commissions often lead to a productive partnership between Laurea and its client organisation. This has been the case e.g. when conducting LbD pedagogy in the clinical contexts together with the Helsinki University Central Hospital (HUCH) (Aholaakko, 2011).

It is in accordance with the LbD principles that successful projects also originate with students and citizens. In the security and ICT project, SATERISK, the idea and foundation were elaborated by Laurea students and further led to a long-term international RDI collaboration with European firms and authorities. Today, SATERISK is merely one project in a wide range of externally-funded project ecosystems (see more in detail Pirinen 2012).

As partner organisations are pivotal for LbD, Laurea Business Lab has initiated a partnership programme to manage its local partners. As a consequence, the business students successfully deepen the partnerships on behalf of the university, whilst the programme syllabus supports student's' experiential learning. Moreover, "the Lab represents a hybrid model of partnership management", a model which enables centrally managed relationship programme coexisting 'with dispersed, private partnerships'". (Ylikoski & Kortelainen, 2012, 355)

2.7 Open and user-driven innovation

Many Laurea LbD projects fall into the category of open innovation (Chesbrough, 2006) or demand- and user-driven innovations (von Hippel, 2005), where firms and public organisations develop, experiment and pilot with customers for new products, services and businesses and citizens improve their living conditions (e.g. Loppukiri in Helsinki). In the open and user-driven RDI, LbD applies e.g. action research, ethnographical methods, service design, participatory observation, interviews and focus group methods. Laurea researchers have also widely contributed to theoretical and methodological development in this field.

As a consequence of open and user-driven innovation processes, each and every individual can also learn to innovate. This is important because in the era of innovation democratisation calling for a variety of complementary innovations, there is no monopoly but many innovations have seen daylight thanks to everyday laymen actions. This argument is supported by the Innovation Europe survey (2004), according to which only some 4% of innovations are based on academic research whilst the most significant sources of innovation are customer contacts, company networks and the like. Moreover, an on-going survey by Von Hippel (2010, in Kulkki 2012) indicates that 70% of innovations come from the markets and customers.

Based on Rogers' (2003) innovation adopter categorization, this paper suggests that learning to innovate may also be vital for generating new markets and behavioural patterns in the civic society, as those who learned to innovate, may either become the "leader-users" that create new ways of consuming and solving problems, or they may join the "early majority" adopting novelties. In the long term, models like LbD might help the HEIs not only to produce a high level of education but also improve citizens' innovation competences, i.e. grasping the essence of a problem, exploring the problem at hand in wider contexts, drawing conclusions from observations, visualising the possible solutions so that others can follow, and acting on them.

With the help of distributed leadership, people equipped with these competences and a strong intent, form the core of the people-centred, self-renewal societies and

working organisations, where individuals contribute to the sustainable and all-inclusive growth and development for a better world.

3. Conclusions

This paper advocates that the LL and the LbD models together epitomise the KT-related transformation in designing education, research and management in UASs. Moreover, together they operate collaborative RDI and joint value creation mechanisms or "orchestration tables" in their regions.

Based on the case university's (Laurea UAS) experiences since early 2000 and the related evaluation results, it is argued that collaborative RDI projects can be successfully orchestrated in a multi-stakeholder context. Most importantly, the student-centred model provides an attractive multi-dimensional learning environment for individuals, working organisations, regions and the wider society. The model has provided Laurea graduates with great employment and start-up opportunities.

This paper suggests that throughout models such as LbD and LL, higher education can contribute to open and user-driven innovation and the development of people-centred self-renewal societies and working organisations.

References

Aholaakko, T-K.: Learning in clinical development projects. Interdisciplinary Studies Journal, 2011, 1(2)59–63.

Hirvikoski, T.: A System Theoretical Approach to the Characteristics of a Successful Future Innovation Ecosystem. University of Aveiro, 2009.

Innovation Europe – Results for the third Community Innovation Survey for the EU, Norway and Iceland, 2004. ftp://ftp.cordis.europa.eu/pub/innovationsmes/docs/resultsfrom_cis3_for_eu_iceland_norway.pdf. Acquired 22.10.2007.

Kallioinen, O.: The competence-based curriculum at Laurea. Vantaa: Laurea Publications, 2007.

Chesbrough, H.: Open Business Models. How to Thrive in the New Innovation Landscape. Boston MA: Harvard business school press, 2006.

Kantola, T. & Hirvikoski, T.: Living lab monitasoisena oppimisympäristönä. In Kotila, H. & Mäki, K.: Ammattikorkeakoulupedagogiikka 2. Edita Publishing Oy, Helsinki, Suomi, 2012,35–52.

Kulkki, S.: Convergence of Disciplines: Universities in innovation-driven Europe. Public Service Review: European Union, 2011, Issue 2.

Kulkki, S.: Towards a European socioeconomic model: Firm-society collaboration for shared value creation. Public Service Review: Europe, 2012, issue 24.

Living Lab ammattikorkeakoulussa, Ammattikorkeakoulujen neloskierre –hanke / HAAGA-HELIA ammattikorkeakoulu, Vantaa: Multiprint, 2006.

Pirinen, R.: Collaborative Regional Development and Research in Higher Education: In the Perspective of Quality in a University of Applied Sciences. Creative Education 2012. Vol.3, Special Issue, 1150-1157 Published Online October 2012 in SciRes (http://www.SciRP.org/journal/ce) DOI:10.4236/ce.2012.326171

Raij, K. & Niinistö-Sivuranta, S. (Eds.): Learning by Developing LbD Guide, Laurea Publications, Vantaa, 2011. http://www.laurea.fi/fi/tutkimus_ja_kehitys/julkaisut/Erilliset_julkaisut/Documents/LbD_Guide_04102011_ENG_lowres.pdf Acquired 01.01.2013.

Lundval, B-Å. & Borras, S.: Science technology and innovation Policy. In Fagerberg et al. (Eds). The Oxford Handbook of Innovation. Oxford NY. Oxford University Press, 2005, Pages 599–631.

Miettinen, R.: National Innovation System. Scientific Concept or Political Rhetoric. Helsinki: Edita, 2002.

Porter, M.E. & Kramer, M.R.: Creating shared Value: How to reinvent capitalism – and unleash a wave of innovation and growth', Harvard Business Review, January-February 2011, Reprint R1101C

Rogers, E.M.: Diffusion for Innovation. New York: Free press, 2003.

Taatila, V. & Raij, K.: Philosophical Review of Pragmatism as a Basis for Learning by Developing Pedagogy. Education Philosophy and Theory, 44(8), 2012, 832-844.

Ylikoski, T. & Kortelainen, M.J.: A new approach for managing university-workplace partnership, Industrial and Commercial Training. 44(6), 2012, 349–356.

Westerlund, M. & Leminen, S.: Editorial: Living Labs, Technology Management Review. Dec, 2012, 4. http://timreview.ca/issue/2012/september Acquired 26.12.2012.

Wessner, C.W.: Committee on Comparative Innovation Policy, Best Practice for the 21st Century (CB). Innovation Policies for the 21st Century: Report of a Symposium. Washington, DC, USA: National Academies Press, 2007.

von Hippel, E.: Democratizing Innovation, The MIT Press, Cambridge Massachusetts, London, England, 2005.

About the author

Tuija Hirvikoski has earned a PhD in Industrial Management (Innovation and Innovation Ecosystems), an MSc in Education and an MSc in Administration. Her research interests center on the Finnish education and innovation ecosystems as well as creativity and innovation. As a director at Laurea University of Applied Sciences, she is responsible for export and the internationalisation of Laurea's research and development operations. Since the early 1990s, Hirvikoski has played a vital role in enriching the Helsinki metropolitan area's joint value co-creation among universities, companies and the public sector. She has promoted cross-border co-operation related to user-centred and knowledge-intensive innovation ecosystems through, for example, Finnish technology centres, European Network of Living Labs, Sendai-Finland Wellbeing Centre, Helsinki Information Technology Association and the talent cultivation program for Smart Living Industry in Taiwan.