

Summary

The past decades have been characterized by large-scale educational innovations aimed to supply the society with knowledge workers, who are able to answer the demands of the knowledge economy. Educational innovations were common across Europe and beyond, but acceptance and success differed strongly, usually for unknown reasons. Research on influencing factors offered insufficient answers, which made empirical research welcome.

This dissertation is a result of new empirical studies, aiming at large-scale innovation processes between the educational sector and businesses. Its intention is to collect relevant empirical knowledge, helpful for such complex innovations. As earlier research in several domains indicated that 'Social Capital' is an enhancing factor for innovation, this research addresses the relation between large-scale innovation processes and Social Capital in so-called Industry-School-Partnerships.

The research is geared towards three objectives:

1. To provide new and deeper insights in the concept of Social Capital;
2. To explore the possible contribution of the concept of Social Capital in understanding the dynamics of large-scale educational innovations;
3. To design an instrument for practitioners in order to improve educational innovations.

The main concepts that are evaluated in this thesis involve 'innovation', 'Social Capital', 'knowledge productivity' and 'co-creation'. Four studies have been carried out to meet the objectives: a literature review on the relation between Social Capital and innovation, two case-studies of large-scale innovation projects between education and business sectors, and a validation study on the instrument we developed targeting innovating practitioners, the 'Co-Creation-Wheel'.

The key chapters of this thesis have been built on four articles, published in and submitted to international journals, and presented at international conferences. These chapters can be read separately. Inevitably, there is some overlap between the chapters.

One Hundred Years of 'Social Capital': Historical Development and Contribution to Collective Knowledge Creation in Organizational Innovation

Chapter 2 presents a literature review about Social Capital and innovation in order to increase insight in the theory of Social Capital in relation to innovation. It also develops a research framework for the empirical studies of this thesis.

The literature review focused on the domain of professional education, non-profit organizations, and knowledge organizations and reports on peer-reviewed, mostly empirical research about Social Capital and innovation during the period 1916 until 2014. The search terms included 'Social Capital', 'Social Capital and innovation', 'innovation', 'education and innovation' and 'educational innovation'.

We found strong evidence of the influence of the concept of Social Capital on innovation in a broad range of social sectors and socio-economic sciences. Social Capital refers to relationships, to active connections and/or social networks that result in increased value or productivity and involve mechanisms through which knowledge can be transferred from one to another. It is based on a set of social interaction assets, such as shared norms and values, trust, mutual understanding and collaboration that enable people to benefit from each other (Anderson, 2008; Bourdieu, 1986; Coleman, 1990; Paldam, 2000).

We also presented an extended historical retrospect of the evolution of Social Capital theory, including its origin, applications and meanings in various periods with a view to a better understanding of the roots and meaning of the concept of Social Capital (see chapter 2, Table 1). Surprisingly, the retrospect showed that even though the roots of Social Capital lay in the educational domain, the concept only regained attention from educational innovators in the last twenty-five years. Currently, it is an intensively researched and highly valued concept, especially in management, economics and social sciences.

A model from Nahapiet and Ghoshal (1998) proved to present a valuable framework about Social Capital in relation to innovation. Their model illustrates how the process of creating new collective knowledge occurs through the influence of three dimensions of Social Capital and through collective actions.

In order to understand what the Social Capital theory adds to existing theories and models on innovation, we compared the concept of Social Capital with four prevailing theories on innovation in the educational sector: in particular the Concerns Based Adoption Model, Organizational Development Theory, Cultural Historical

Activity Theory, and Social Network Theory. The Social Capital perspective appears to better reveal and describe intangible social interaction processes between innovators, the multi-disciplinary aspects, and dynamics that drive sustainable innovation. As a result, it offers an interesting framework for the study of collective innovation. Capitalising on these findings, we decided to use the model of Nahapiet and Ghoshal to build the conceptual framework for the empirical study of inter-organizational innovation projects between professional education and industry.

Unravelling the Social Dynamics of an Industry-School Partnership: Social Capital as Perspective for Co-creation

Chapter three presents an explorative study of an inter-organizational three-year innovation project, with features of an Industry-School Partnership. We had the great opportunity to participate in this inter-organizational project from beginning to end, as researcher and consultant. The goal was to observe, gather and analyze the innovation activities of the participants at different levels, in order to measure the output and to discover ways to sustain the innovating professionals. The setting of the project is Limburg Leisure Academy (LLA), an innovation project between eight leisure businesses and eight Educational institutions, aimed to improve vocational and higher education for the leisure sector.

The Social Capital model of Nahapiet and Ghoshal (1998) was applied to design the research framework for this multi-case study. Building on the literature review, we added a fourth dimension, the 'action dimension', to the three original dimensions (structural, relational, cognitive) of their model.

Three research questions were formulated:

1. Which Social Capital dimensions stimulate the innovation process?
2. What is the output of the innovation process for participating organizations and professionals?
3. How can the innovating professionals be supported from a Social Capital perspective?

Previous research had shown that in-depth and multi-faceted research is necessary to grasp the dynamics and intangible aspects of interaction in innovation practices. This was the reason why a mix of mostly qualitative methods and instruments was used: document analysis, participative observation, telephone interviews, interventions and reflection, face-to-face interviews, and a questionnaire at the end of the project. Data collection and data analysis consisted of on-going, alternating processes during the whole project period, partially pre-designed and partly developed with

the participants as action research. The abundance of data has been analyzed according to a schedule of the dimensions, project-years and project-teams.

The following answers to the three questions were found.

The research framework with the four dimensions of Social Capital – structure, relation, cognition, action – uncovered detailed characteristics of this complex innovation project. It showed the dynamics of the innovation process and of the Social Capital during the five phases of the project, from preparation until dissemination, and demonstrated not only the multifaceted character of innovation processes, but also how this differed and evolved per project phase. In Figure 4 of Chapter 3, 16 characteristics that played a paramount role in the innovation process, have been ordered according to the four dimensions of Social Capital: structural, relational, cognitive, action. In addition, seven different kinds of innovation output are presented.

All dimensions appeared to be important but each played a different role during the various project phases. The structural dimension seemed to be most important in the first and second phase, the relational played an important role in all phases, the cognitive in the middle phases, and the action dimension was mostly visible at the end of the project.

We found and specified the planned results, in particular the new products, processes and services, and also discovered unplanned and incidental results for the organizations and for the individual innovators. Together the outcomes demonstrate the learning effect of innovation activities for the professionals, and its sustainable benefits for the organizations involved.

Data showed stimulating external conditions for the project, such as funding, motivated partners, a stimulating management, shared values and goals, and urgency of the problem.

Also, we found how the innovating professionals could be supported: by the management, and by the chair and the members of the innovation teams, and the ‘user organization’. Support means that the atmosphere in the organization has to be open and acceptable for innovation, management has to provide enough time and money, the chair of the innovation team has to be able to create a positive relational and emotional working climate, team members need to have enough expertise, innovation capability and communication skills, and finally the innovators need to be able to collaborate, deliberate, negotiate, present and implement. Human resource development (HRD) should consider it as their task to take care for this support, not

only by looking for the right individual competences, but in facilitating the innovators.

Knowledge productivity for sustainable innovation: Social Capital as HRD target

Because hardly any other studies of this kind exist, we wanted to enhance the validity of these findings in a second study, with a different context and participants. We also wanted to develop a stronger focus on the action dimension. A second large-scale innovation project provided the opportunity for some replication of the previous study. This case, the Care Academy Parkstad project, concerned the subsidized Health Care sector, which experienced a high urgency to innovate. A university, a university of applied sciences, institutions of vocational education and the regional government were actively involved in the project.

The action dimension – the knowledge activities of the teams – presented the basis for the creation of products, processes and services. We applied the concept of ‘knowledge productivity’ (Kessels, 1995, 2001, 2004) in order to describe these activities, because this concept emphasized the process of productivity, as well as the outcomes for the organization and for the innovators. Knowledge productivity refers to the competence of individuals and groups to gradually improve and radically innovate procedures, products and services. This concept enabled us to design a more specified research model, with the following main elements: conditions, Social Capital dimensions, process of knowledge productivity, products of knowledge productivity (see Figure 1, Chapter 4).

The specific research questions included:

1. Which knowledge-productive activities lead to improvement or innovation for the organization?
2. Which knowledge-productive activities lead to new capabilities among the professionals?
3. Which dimensions of Social Capital stimulate these knowledge-productive processes?
4. Which external conditions stimulate Social Capital and knowledge-productivity?

A mix of 20 participants – members and leaders of the innovation teams of the Care Academy Parkstad project – were interviewed, extended with document-analysis of minutes from the steering committee meetings and a plenary meeting.

The following findings provided answers on the four questions.

We were able to compose a model of ‘eight steps to sustainable knowledge productivity’, (table 4, chapter 4) that would lead to improvement or innovation of the organization. The model can be used as guideline of design principles for HRD-professionals, or as a self-directed HRD-tool by an innovation group (Poell, 2012). The model is an extension of the three steps of knowledge productivity, described by Kessels (2001), and emphasizes the *collective* knowledge productivity.

Furthermore, we showed that different sets of activities have an impact on the development of specific abilities of the innovators. One example involves the activity ‘to organically design a task path with the group members to create the new products, processes or services’ (step 4), resulted in new cognitive abilities of the innovators. This effect occurred, when innovators saw evidence of new knowledge, skills, and attitudes from each other (Boshuizen & Van de Wiel, 2014). Also, several steps contributed to the development of relational attitudes, such as an open mind, creativity and courage. The participants in this project were delighted to learn and stated that they learned most from experiences in the project if these were connected with their daily work.

Equally, we found that all four dimensions of Social Capital contributed to knowledge productivity. These dimensions are interdependent and play a necessary role in different phases of the process. The relational and cognitive dimensions seemed to be key qualitative conditions for innovation, although only suitable actions transformed this condition into productivity. Relational and cognitive quality depended on the composition of the group.

Every dimension needs to have sufficient quality, which in practice involves:

1. Creating a facilitating environment with autonomy and authority for the innovators and support at all levels;
2. Relationships based on motivation and commitment to a common goal, on trust and on pleasure;
3. A good understanding of each other’s language and knowledge, suitable subject-matter expertise and innovation ability;
4. The courage and capability to act: team development, networking, communicating with all levels involved, and tactfully co-creating.

Four external conditions proved to be stimulating: an urgent problem (also found by De Jong, 2010), a smart task formulation, managerial support and autonomy for the innovators.

The insights in these collective knowledge productive actions of innovation teams, combined with the findings of the first two studies, enabled us to design a model of the main mechanisms for successful innovation. This model can be used as a design-and/or reflection instrument by professionals involved in innovation.

The Co-Creation Wheel: twelve mechanisms to enhance collaborative innovation and to engage professionals

The translation of the findings of the first three studies into an instrument for innovators was the goal of the last study. For this reason, we designed a model of success factors for co-creation in teams, broadening our theoretical framework with the concept of 'co-creation'. This concept aptly expresses the core of collaborative innovation, combining collectivity and creativity. The following definition of co-creation was used: 'a participative process in which people or/and organizations in equivalent dialogue together generate and develop new valuable products, processes or services'.

This study developed and validated the instrument 'Co-Creation-Wheel' (see Figure 1, Chapter 5), a systematic graphical representation of the main mechanisms for successful innovation.

The Wheel exists of three circles and four quadrants, that together form the word *CREA*, the capitals of the dimensions of Social Capital: Construction-Relation-Expertise-Action.

This colored anagram makes the instrument transparent and easy to use in practice. Fourteen experts, scholars and practitioners in areas of educational innovation, organizational change, collaborative learning, and industrial co-creation, validated the model. Two instruments were used, a semi-structured interview and a questionnaire, which served as a quantitative check on the qualitative interview data, which were analyzed using a qualitative content analysis (Miles and Huberman, 1994).

The following four research questions were leading:

1. Which mechanisms and dimensions of the 'Co-Creation-Wheel' do experts discern as important?
2. Which interdependency between the mechanisms and dimensions can be discerned?
3. Which actors and activities are important in co-creation processes?
4. What is the value of the 'Co-Creation-Wheel' for practice and future research?

The findings demonstrated that all four dimensions played a role in effective co-creation processes. However, respondents considered the 'action' dimension most important, followed by the 'relation-emotion' dimension, the 'construction' dimension and finally the 'expertise' dimension. In spite of the fact that the exact appearance of the dimensions of co-creation and their function highly depend on the specific context of the innovation practice and the actors involved, it is obvious that all dimensions influence each other and have to present a minimum quality.

All twelve mechanisms of the 'Co-Creation-Wheel' proved to be important for successful co-creation. The mechanisms of internal and external communication, multi-level collaboration and courage to act were found to be the most influential. Trust, a positive spirit and a pleasant atmosphere in a diverse team were found necessary mechanisms for a safe and stimulating team environment to be creative, while autonomy to act, managerial support and enough facilities formed the organizational backing. These conditions stimulate capable team members to find shared goals, add new knowledge to the existing expertise and to co-create new solutions.

The systemic dynamics between the outer and inner context have to be considered as influencing. A motivating urgency, - a personal passion or an organizational necessity- always set the wheel in motion.

The social construction of activities by all actors in the co-creation setting, including the future users of the new products, processes or services, colors the process and stipulates its quality. To become successful and sustainable, actors at all levels have to be involved and play their complementary roles.

Interventions to stimulate the co-creation process are not the exclusive responsibility of the management and collaboration of all actors is favorable. Of all actors, the team leaders are by far the most important players, provided they perform 'positive' leadership. This includes to accept and motivate team members, to stimulate openness and trust, to create a pleasant and safe learning atmosphere, and to channel constructive conflicts. In a good team, these activities can be performed by team members in the form of shared leadership. Sparrow (2013), Isaksen and Ekvall (2010), Von Stamm (2014) and Kessels (2012) also reported these elements.

In a guideline of the Wheel for practitioners, this could be specified as follows: The management, chair and members of the innovation group, and the 'user' organization have to be supportive. 'Support' means that the atmosphere in the organization has to be open and accepting for innovation; management has to create 'space', which means enough time and money. The chair of the innovation team has

to be able to create a positive relational, emotional working climate; team members have to have enough expertise, mainly innovation capability and communication skills to be able to collaborate, deliberate, negotiate, present and implement. Thus, support is necessary on micro, meso and macro level.

The experts that validated the Wheel assessed the model as a very relevant instrument for practice and a valuable contribution to science. Only a minor revision was suggested, a specification of the items collaboration and communication, addition of the item 'diversity' in the construction quadrant, and items of external conditions in the outer circle, to highlight the environmental context that influences the co-creation process. With these additions, the final version of the Wheel demonstrates a dynamic representation of co-creation processes.

The main result of this study is the revised 'Co-Creation-Wheel', as a holistic and systemic presentation of interactive mechanisms in co-creation processes (see Figure 2, Chapter 5), and suitable as intervention instrument for HRD and professionals in innovation practices.

The deduced 'Co-Creation-Wheel' presents an interactional model, grounded in previous empirical studies. It provides a framework for the integration of individual, group and organizational characteristics and behaviors, and demonstrates the convergence of multiple factors as mechanisms for co-creation.

This 'Co-Creation-Wheel' should be seen as the final conclusion of these four studies. It demonstrates the value of the four-dimensional model of Social Capital for understanding, influencing and improving large-scale inter-organizational innovations.

To make the 'Co-Creation-Wheel' spin, it is to the collectivity to:

- C - onstruct an environment where innovation thrives
- R - ealize positive relations and emotions within the team
- E - nable expertise and creative knowledge production
- A - ctivate collaboration and communication between all levels.

Closing the circle

Chapter 6 summarizes the four studies and presents the main findings and implications for science and practice. It closes the circle of this research project: Social Capital proves to be the driving force in complex collective inter-organizational innovation. Co-creation remains a creative process, with changing dynamics, depending on context and value-creating relations that deserve time, respect and especially trust in the creativity of professionals.

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