



**PhD
Programme
in Sociology**

RÉSUMÉ OF THESES

Csizmadia Péter

**Patterns of organisational innovation and knowledge use in the Hungarian
economy**

PhD dissertation

Supervisor:

Dr. Makó Csaba DSc

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Institute of Sociology and Social Policy

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1. Overview of previous research and the relevance of the issue investigated

Despite the original believes, in the last two decades after the fall of state-socialism Hungary was not able to accede the position of the advanced countries in terms of economic wealth and performance. The preserves of the FDI-based modernisation process of the 1990s exhausted, the economic performance of the country has been stagnating since the beginning of the 2000s. In the attempts to overcome the current, unfavourable situation one possible model could be the creation of new development paths based on innovation and the increase of the share of high value-added economic activities. This scenario is, however, far from being unproblematic, especially because of the weak innovation performance of the Hungarian economy. According to data of the Union Innovation Scoreboard¹ (IUS), Hungary's performance in almost each innovation indicators remains under the EU-average and even lags behind the Czech Republic, Estonia and Slovenia among the post-socialist countries. The performance of the country is especially weak in intellectual assets and in the innovation activities of enterprises. The weak relative position seems to be an observable trend in the last two decades. The basic question is what are the reasons that explain this tendency?

A country's performance in innovation is determined by the efforts economic actors make in order to find new and innovative solutions. In accordance with this statement, in the dissertation I intended to investigate some important factors influencing the innovation performance of the Hungarian enterprises. In doing so I applied a theoretical framework that was elaborated most detailed by the professionals of the European Centre for Development of Vocational Training. (Cedefop 2012) This theoretical approach provides a new perspective for the innovation research in Hungary, as well.

The central argument of the theory is that the innovative ability of organisations depends on their absorptive capacity. The term 'absorptive capacity' refers to the organisations' general ability to use internal and external knowledge. (Cohen-Levinthal 1990) Absorptive capacity depends on the level of knowledge, skills and competences (KSC) possessed by organisation members but is not equal to their mechanic summation. On the contrary, it is determined by such structural factors that make organisations capable to combine external knowledge with

¹ Earlier *European Innovation Scoreboard* – EIS

their KSC efficiently. The Cedefop research report referred earlier calls attention to the fact that the KSC level of an organisation incorporates its learning potential. (Cedefop 2012)

Absorptive capacity depends on the stock of intellectual capital organisations possess. Intellectual capital is equal to the knowledge asset accumulated by the organisation. It is not restricted to the actual KBC level of the organisational actors, but it also contains the organisation's internal and external structural relations. (Edvinsson – Malone 1997) It consists of three elements: human capital, structural capital and relational capital. (Cedefop 2012)

OECD defines *human capital* as “the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being”. (Keeley 2007: 18) In the theoretical model elaborated by Cedefop human capital consists of such elements that are connected either to the already accumulated human capital (e.g. actual level of KBC in organisations) or to the changes in human capital (e.g. knowledge development). It is about such factors, like KBC of the employees, their willingness and ability to learn, trainings and further trainings and the various forms knowledge development at the workplace.

In capital accumulating, preserving and sharing of knowledge asset learning processes play a decisive role. Relating to this issue, two dominant theoretical paradigm of learning can be identified. The first stream interprets learning as ‘acquisition’, while the second stream describes learning as ‘participation’. The ‘acquisition paradigm’ emphasises the cognitive, rational elements of learning that can be linked to formal frameworks (e.g. education system, company trainings and further trainings, etc.). To the contrary, ‘participation paradigm’ stresses that learning is spontaneous social process that is bounded to specific contexts, concrete and practical situations and experiences, and is built on cooperation of various actors. In that case learning is far from being a cognitive process, it is rather a kind of socialisation. There is, however, a third, emerging approach, that calls attention to the situations when knowledge is not preliminary defined but are constructed during the learning process. This kind of ‘constructive’ learning is of utmost importance in activities related to innovation. (Sfard 1998, Eraut 2000, Bessant et al. 2003, Billett 2004, Fenwick 2008)

The second element of intellectual capital is *structural capital*. It refers to those elements of the organisational infrastructure that support learning and innovation (e.g. organisational culture, knowledge management, info-communicational technologies and organisational innovations). Structural capital consists of three further elements. By organisational capital

such institutionalised factors are meant, which influence the behaviour and performance of organisational actors (e.g. organisational culture and philosophy, communication, infrastructure supporting knowledge accumulation and share). (Roos et al 1998) Process capital refers to organisational processes supporting the creation and marketing of new products and services. Innovation capital is the intellectual asset possessed by the organisation. (Maddocks – Beaney 2002) Organisational innovations are very important elements of structural capital. There are several different approaches to be identified to define the term ‘organisational innovation’, which is a very complex phenomenon. (Lam 2004, Schienstock 2004) In the dissertation ‘organisational innovation’ is defined as those intentional changes in organisational structure, organisational processes, organisational (collective) knowledge and in cognitive frameworks and/or behaviour of the organisational members that aim at improving the performance, learning capability and adaptability of the organisation. In the dissertation special attention was devoted to the analysis of the Hungarian enterprises’ performance related to organisational innovations. It is important to stress that organisational capital is not equal to organisational innovation, which is a more process-oriented concept and represents an important part of the innovation and learning potential of organisations incorporated by intellectual capital.

Third element of the intellectual capital is *relational capital*, which is defined as the organisation’s relations to external actors, like customers, suppliers, competitors, social partners, etc. It is an important indicator of the organisations’ ability to acquire external knowledge. (Cedefop 2012) Capello and Faggian (2005) defines relational capital as all relationships between firms, institutions and people. It includes market connections, power relations and cooperation of actors, as well. Its value is depending on the organisation’s ability to maintain and preserve its reputation.

The next table provides a brief overview about the various elements of intellectual capital.

Table 1. Human, structural and relational capital as determinants of innovative ability

Intellectual capital		
Human capital	Structural capital	Relational capital
Domain-related KSC	Organisational culture	Relations to customers
Practical experience	Cooperation and communication within the organisation	Relations to investors/shareholders
Social skills and competences	Equipment relating to information technology, software and other technological systems	Relations to suppliers
Motivation	Knowledge transfer and storage	External cooperation with educational institutions
Leadership skills	R&D infrastructure for product innovation	External knowledge acquisition
Personal skills and competences	R&D infrastructure for process innovation	Social engagement/corporate social responsibility (CVTS)
CVT	Organisational structure	Image of company/brand
IVET	Organisational processes	Engagements in associations and public relations
Continuing HE	Use of modern information and communications technologies (ICT)	
School and HE	Learning-intensive forms of organisation	

Source: Cedefop 2012:23

The three components of intellectual capital determine the organisations' absorptive capacity, e.g. their innovative and learning capabilities. The main strand of the innovation literature emphasises the importance of technology, R&D and some aspects of human capital, while neglecting the structural and relational capital. In addition, the investigation of the relation between the different types of capitals seems to be completely missing in both empirical and theoretical studies.

2. Research questions and methodology

In accordance with the considerations presented above, in the dissertation I focused on some critical factors influencing the innovation performance of the Hungarian companies. I intended to investigate the various aspects of intellectual capital possessed by the Hungarian enterprises, which is also an indicator of their innovation potential. The emphasis was put on the investigation of certain aspects of human and structural (organisational) capital and the relations between the two. Besides its crucial role in the absorption of external knowledge, I decided not to investigate relational capital. The reason of my decision lies in the lack of available data that does not allowed me to analyse the issues as detailed as in the case of the other two forms of intellectual capital.

My research consisted of three different parts. I dealt with human capital, especially focused on the changes in capital stock. Regarding the issue the following research questions were formulated:

1. How can Hungarian companies' training and further training activities be characterised compared to the other European states?
2. What is the proportion of employees receiving training?
3. What are the chances of the various employee groups in access to various forms of workplace learning?

The second issue I investigated was the dynamic change of organisational capital. The relevant theories and empirical research works call attention to the fact, that organisational structure, and especially those work organisation practices that support organisational learning processes, can be directly linked to the absorptive capacity of organisations. Therefore my research questions were directed toward organisational innovations and learning organisations. The following questions were formulated:

1. What is the position of the Hungarian companies with regard for organisational innovations in an international comparison?
2. What motifs are to be identified behind the introduction of organisational innovations?
3. What is the prevalence of organisational forms supporting learning?
4. What changes can be detected in the prevalence of organisational forms supporting learning between 2005 and 2010?

There is relatively little systematic information about the characteristics of the relations between the various elements of intellectual capital. The theoretical relevance of the issue lies in the fact that it may help us to conceive how the factors determining organisations' absorptive and learning capabilities are operating. The question has some practical relevance, too. Through the investigation of the nature of relations between the different forms of intellectual capital one can understand what combinations of these factors may help companies in improving their innovation performance. The following questions have been set:

1. Are there any relationship between the organisations' absorptive capacity and their technological adaptability?
2. Are there any relationships between the various elements of human and organisational capital? I focused especially on the question what factors should be combined in order to support organisations' absorption and learning effectively? The following factors were investigated in details: the relationship between the organisational characteristics and individual creativity, employee participation and employee motivation.

Data sources and methods of analysis

In order to find answers to the research questions presented above I used the results of more international data surveys. I was not primarily interested in the Hungarian situation as such, but I wanted to carry out an international comparison and to reflect on time perspective, as well. The results of the following three datasets have been re-analysed:

1. Community Innovation Survey (CIS) – the innovation survey of the European Union. A representative sample of company leaders are surveyed about the innovation activities of companies.

2. Continuing Vocational Training Survey (CVTS) – a company survey initiated by the European Union among European firms employing more than 10 people. Company leaders are surveyed about the training and further training activities of companies. The CVTS was carried out in 1999, 2005 and 2010 that makes possible a comparison in both geographic and longitudinal perspective.

3. European Working Conditions Survey (EWCS) – The survey has been initiated by the European Foundation for the Improvement of Living and Working Conditions (Eurofound). EWCS has been carried out in five different waves from 1990/91 till 2010. Data was collected among the employees and self-employed older than 15 in the EU, the acceding and the partner

countries. The EWCS investigates such issues like the quality of work, the physical and psycho-social working conditions, working time, wage, work organisation, workplace health and safety and work-life balance.

For answering the research questions both descriptive and multivariable analyses have been carried out. In investigating the issues related to structural capital I replicated a French-Hungarian joint research project that aimed at identifying the different work organisation models operating in the European economy by analysing the data of the EWCS 2005. (Valeyre et al 2009) For identifying the various work organisation models I applied non-hierarchical (k-means) cluster analysis on the EWCS 2010 dataset. For the investigation of relationships between human and structural capital logistic regression was used in order to measure the complex and multiple effects of independent variables on the dependent ones.

3. Most important findings

The most important results of the dissertation are presented below following the thematic issues investigated.

3.1 Human capital

The proportion of the companies providing training possibilities to their employees is low in a European comparison. The share of employees receiving training within training provider companies in Hungary is the lowest in the EU. Especially the micro, small- and medium-sized companies lag behind. The share of those working in workplace environments that support collective learning processes is relatively low. The access to workplace learning possibilities is unequal within the different social groups.

In the dissertation I primarily analysed the changes of human capital stock, especially focused on workplace learning. Taking into account both the internal and external formal company trainings and the other, informal learning opportunities (on-the-job trainings, job rotation, learning circles, attending conferences, etc.), as well, one may say that share of companies providing training to their employees has been increased between 1999 and 2010, albeit the extent of increase is among the worst in Europe. The share of those received any forms of training within the training provider companies is the lowest in the EU. Despite the similar historical and institutional heritage there are significant differences among the post-socialist countries with respect both to prevalence of company training and the share of employees having access to learning possibilities. The Czech Republic, Estonia, Slovakia and Slovenia are far above both the European and regional average.

I also investigated effect of company size on training activities. In case of the Mediterranean and Balkan countries, along with Hungary and Poland people employed in micro firms (employing 0-9 people) receive little training and it also observable in case of small- and medium-sized companies (SMEs) in Bulgaria, Romania, Greece, Poland and Hungary. Taking into consideration that vast majority of economically active population are employed in such companies, these countries seems to be in a disadvantaged position compared to the rest of the EU.

There are significant differences among countries in respect to the chances of different social groups in access to learning opportunities at the workplace. I also investigated the relationship

of educational level and the employees' age with the prevalence of participation in workplace learning. With the exception of Nordic countries, there are differences between the participation rates of the social groups with different educational level. (In case of the post-socialist countries these differences are present even in those countries, where the ratio of low-educated people is below the regional average, e.g. the Czech Republic, Slovakia and Slovenia). In Hungary the participation rate of employees with primary education is far below the one of those with secondary and especially with tertiary education.

The picture is differentiated in case of the various age groups, as well. In the Nordic countries senior employees participate in workplace learning above average. Similar pattern can be identified in case of Estonia, the Czech Republic, Slovakia and Slovenia, and in some Continental countries, like Germany.

In the case of Hungary it is worth calling attention to the changes within the period observed. Between 2005 and 2010 the participation rates of the young and middle-aged people increased, while in the case of the senior employees it remained low. As a conclusion one may say that in Hungary there are social inequalities in the participation at workplace learning.

I also investigated those aspects of the learning environments at the workplaces that are connected to the so-called implicit learning. The two most important characteristics of implicit learning are the lack of learning intention of the learner and the momentum that the actors involved do not interpret the process as 'learning'. (Eraut 2000) I surveyed those cognitive aspects of work organisation practices that are connected to the everyday work situation and support the change of behaviour routines and play a crucial role in situations, where the actors have to create new knowledge, mainly in an unstable environment. (E.g. complexity of work tasks, learning and problem solving activities in everyday work, individual responsibility in quality control and the possibility to apply own ideas.) The cognitive index calculated on the basis of the variables mentioned above reaches the highest value in the Nordic countries (Sweden, Denmark, Finland and the Netherlands). One post-socialist country, namely Estonia is also among the performers in this respect. Hungary's position is, however, quite unfavourable, which means that the vast majority of the Hungarian employees work in a disadvantageous workplace environment in terms of cognitive aspects of implicit learning.

Learning is, however, not a merely cognitive process. In most cases, especially in case of tacit knowledge and skills, knowledge transfer is a socially bounded. In workplace learning collective learning processes embedded in practical situations play a crucial role, especially when it comes to the transfer of behavioural patterns and/or norms and values. I investigated the work organisation practices that support social learning situations (e.g. teamwork, workplace social support, relations with external actors). The post-socialist countries represent diversified patterns in terms of individual learning performances, but in respect to collective (social/organisational) learning they are far behind the rest of the EU. It should be stressed here that creating work organisation practices that support collective learning do not require radical organisational changes. With other words these practices allow to organisations to use their resources more effectively via relatively low investments.

3.2 Structural capital

10% of the Hungarian companies introduced any form of organisational innovation in 2010. This data is far below both EU and regional averages. Almost half of the Hungarian 'market sector' establishments employing more than 10 people represent a work organisational model with low learning capabilities.

Organisational innovations are important elements of structural capital and, besides, this they can be important sources of competitiveness in themselves.

10% of the Hungarian companies introduced any form of organisational innovation in 2010. This data is far below both EU and regional averages. The ratio of SMEs implementing organisational innovation is especially low. Introduction of organisational innovations is a rather complex and time-consuming process, but does not require too much direct investments; therefore they can be important sources of creating new development paths in a small economy lacking available resources.

In the dissertation I reproduced a French-Hungarian joint research of the EWCS 2005 dataset. The multi-dimensional analysis of 20 work organisation variables was carried out in 2007 and aimed at identifying the work organisation models operating in the European economy. Using the EWCS dataset I was able to reproduce the work organisational models identified in 2007. The four models can be characterised by different knowledge use and learning practices. The *learning organisation* can be described by high complexity of work tasks, accompanied by autonomy in work and high level of learning and problem solving capabilities. Its knowledge

use practices are based on individual skills and performance, while collective knowledge sharing is underdeveloped. *Lean organisations* are based on the intensive use of knowledge, skills and competences of their employees. In this type of work organisation workplace learning and the need for creative problem solving are of crucial importance. Collective learning processes play a decisive role because of the dominance of teamwork and the restricted autonomy in work. The *Taylorist/Fordist* work organisation model is described by the rigid internal division of labour, specialised work tasks, strong hierarchical control and restricted use of their employees' knowledge and problems solving skills. It is a very rigid organisational model with a low-level of adaptive and innovative potential; therefore it is mainly applicable in executing routine tasks. *Traditional* work organisation are characterised by underdeveloped internal division of labour, inefficient knowledge use and strongly restricted adaptability.

Learning and lean organisations efficiently adjust to the changes of the external environment, representing a reflective organisational model capable to exceed and institutionalised paths organisational routines. Taylorist and traditional organisations possess weak learning and adaptation capabilities and have difficulties in both satisfying differentiated, fast changing client needs and mobilizing internal resources required for creation of new products and services. Almost half of the Hungarian 'market sector' establishments employing more than 10 people represent these two types of work organisational models, which reflects the deficiencies of the Hungarian economy's adaptability and innovative potential.

The prevalence of the different work organisational models has changed between 2005 and 2010. This tendency can be described by the increase of organisational control and the decrease of employee autonomy. The changes, however, affected the European countries unequally. In the Nordic countries the decrease in share of learning organisations was accompanied by the diffusion of the lean organisational model, which means the increasing control is not coupled with the restriction of the organisations' learning capabilities. In the former socialist countries, including Hungary, the penetration of Taylorist/Fordist organisations with low learning capabilities increased within the period investigated. There are, however, differences between the post-socialist countries in this respect, which refers to the emerging structural differences between these countries that opens different development paths to them.

3.3 Relations between human and structural capital

3.3.1 Organisational models and technological adaptation

Organisational structure and technology absorption are interconnected. Organisational forms with high learning capability are in better position with respect to the absorption of new technologies and ICTs than traditional organisations. It means that the creation of a realistic development path in Hungary that is based on incremental innovation and adaptation to new technologies requires more intensive investments in organisational innovations.

Organisational and technological innovations are interconnected. This connection is especially strong in the case of post-socialist countries: technological innovators introduce organisational innovations more often than non-innovators, which means that after the fall of the state-socialism the countries in the region have had to face with a double challenge of technological and organisational modernisation.

The analysis of the EWCS 2010 data also suggests that there is a strong connection between the characteristics of the organisational structure and the relative frequency of technological factors. Lean organisations are in the better position in terms of technology absorption, followed by learning and Taylorist models, while traditional organisations show the weakest performance in the adaptation to new technological challenges. In Hungary, besides the non-innovators, technology modifier and adopter companies are most prevalent; therefore these results seem to be of crucial importance. Taking into account the real possibilities of the country, incremental innovators may serve as a basis for a balanced development path but it requires the diffusion of adequate organisational structures, as well. This argument is also supported by the finding that learning and lean organisation are in remarkably better position regarding the use of ICTs and internet-related technologies, than Taylorist/Fordist and traditional organisations that are widely prevalent in Hungary.

3.3.2 Organisational models and motivation

Members of learning and lean organisation are better motivated than those working in Taylorist and traditional organisations, and they identify themselves with the organisational norms and values much deeper, as well. In case of the former two work organisation models the management can count on the employees' creativity, initiatives and active participation in problem solving.

Motivation factors are important parts of learning environment, they play an important role in the creation of atmosphere supporting workplace learning and they encourage organisation members to participate in problem solving and to discovering new pathways. This was the reason why I intended to investigate the relationship of organisational capital to such elements of human capital, like creativity, participation and motivation.

Learning and lean organisations leave more space to the individual initiatives and employee participation than Taylorist and traditional organisations do. On that basis they provide better organisational framework for the improvement of communication and cooperation, and create opportunities to the combination of various knowledge and skills in solving complex and difficult problems. I also investigated the relation between organisational models and various aspects of motivation. Both extrinsic (efforts related to the acquisition of resources and organisational status, like wage, carrier opportunities, etc.) and intrinsic (efforts related to internal rewards, like identification with the organisational values and norms, satisfaction with work, etc.) motivation factors have been involved into the analysis. Employees working in learning and lean organisations are more satisfied with the material aspects of motivation and the perspectives provided by the organisation and, maybe related to that, their commitment to and identification with the organisational norms are more intensive than in case of their counterparts working in Taylorist and traditional organisations. In case of the former two work organisation models the management can count on the employees' creativity, initiatives and active participation in problem solving.

In learning and lean organisations, however, the share of those unsatisfied with their actual skill level compared to the job requirements is higher than in the other two organisational models. Two possible interpretations emerge: in organisations with developed learning culture employees may assess the quality of their skills and competences more realistically than those working in less organic organisations. It is, however, also possible that the continuous pressure on employees to learn may weaken their feeling of being competent.

Conclusions

Drawing the most important conclusions it has to be stressed that positive effects organisational innovations exert on the stock of companies' intellectual capital takes place not merely through the adoption of certain well-defined work organisation practices, but as a result of special combination of work organisation, technological factors and human resource and knowledge use practices. The national differences in the factors mentioned above partly

explain the variability of the development paths. According to our results the majority of the Hungarian companies represent such organisational models that are not capable to renew and they preserve behavioural, cognitive, problem solving and learning patters that seem to be inadequate in the context of global economy.

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