

## Innovation Management in Central and Eastern Europe: Technology Perspectives and EU Policy Implications

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### Abstract

The purpose of this study is to investigate empirically the role of innovation activity in Central and Eastern Europe (CEE). We also identified those internal and external factors, which might cause improvements in innovation performance of CEE companies. Our main focus was on technology-based innovations within the healthcare industry. We applied qualitative research methods.

Our findings demonstrate that CEE companies within the healthcare industry have significant contribution to European Union's innovation performance. We found that key success factors of these organizations are based on four elements: knowledge management, access to financial resources, managing formal and informal networks, as well as achieving synergies between technological and non-technological innovations.

**Keywords:** innovation management, R&D, technology, Central and Eastern Europe, healthcare industry, EU policy

### 1. The role of innovations in corporate value creation

In the 21st century successful managers consider innovations and innovation management as key pillars of modern business operations. Numerous definitions could be found in the literature concerning innovation (Shumpeter, 1934; Mintzberg, 1983; Drucker, 2003; Pörzse, 2011). We can identify a common ground among the definitions: they all mention novelty, change and competitiveness. Innovation management is a managerial activity that supervises organizational changes that have a close connection with improvement and development, in order to increase the competitiveness of a company (Fejes, 2013).

Porter (1985, 1990) also argued that several innovation opportunities stem from a comprehensive understanding of the external competitive environment. In Porter's value chain concept technology management/R&D was tagged as a support activity of the firm. Currently, technology related innovation is tending to be the focus for many sectors such as automotive, ITC, medicine and biotechnology.

Nowadays, other economic streams influence the business logic included dynamic capabilities. Dynamic capabilities are the firm's capacities to integrate, build, and reconfigure internal and external resources in order to shape the changing business environment (Teece et al., 1997). Companies are operating in a very competitive business environment (Teece, 2011), which rather calls for soft assets like collective knowledge, emotional intelligence, problem solving abilities, empathy and so on. According to this resource-based view, the success of a company significantly roots in the entrepreneurial skills of a manager.

Technological excellence though does not worth much without prominence in business execution. In order to fulfill the obligations of modern market economy, companies have to turn more attention on innovation which has an outstanding relevance in winning this game. Accordingly, Chikán and Czakó (2009) have pointed out that the correlation between innovation and competitiveness is positive. Therefore, development of innovative products and services has become indispensable for realizing and retaining competitiveness in international markets (Miron et al., 2004).

Companies usually have the following innovation goals (Kiss, 2005):

- keep the market share
- reduce costs
- improve quality

- enlarge product portfolio
- enter new market segments
- increase the flexibility of production

The above-mentioned innovation goals can be reached in three ways (Capan, 2009). Firstly, through the *market pull approach*, where the innovation strategy is based on latent needs of the market. Secondly, through the *technology push approach*, when some kind of scientific solution can be transformed into products and/or services. Lastly, we can mention the *combination* of market pull and technology push attitudes because innovation is unlikely to appear in its pure form, it is more realistic that innovation activity integrates both aspects.

Innovation also requires a correct balance between exploiting (receiving the maximum returns on current resources) and exploring (looking for fresh, novel, and unique opportunities) (Tushman - O'Reilly, 1996; Moss, 2006). This ambiguity needs organizational flexibility and a great amount of attention to relationships and networks inside, as well as outside of the company.

## 2. Innovation chain and the dual nature of innovations

The innovation chain shows the strategic connections between technology and market. Innovations have their own circulation processes. Such a process might begin with an investment in an R&D project, which result in new organizational knowledge. This knowledge goes further and will be converted into marketable products and/or services that generate revenue to the company. With the harvesting of the profit the rotation ends up in creating value for the most important stakeholders. Generally speaking, the innovation chain covers the whole value crating process from the perception of needs to the feedbacks of the consumers in order to highlight every significant milestone that requires managerial interventions.

Figure 1. demonstrates the dual nature of innovation where the process usually starts with engineering work, resulting in managerial tasks. The one is not achievable without the other that is why innovation is based on the effort of both professional teams. In our view, we consider innovation as a result of a technology-business mix, which manifests in an endless, iterative process.

This process should be based on continuous development and proactivity (Johne, 1999) to assure productivity and efficiency. To enlarge the probability of entrepreneurial success organizations should involve outsider opinions from external sources because the peripheral environment is a potential platform of novel ideas (Chesbrough, 2003, 2006). The importance of open innovations is getting greater and we can observe the tendency of networking and real time online communication with this purpose.

The ongoing globalization of business activities accelerates innovation processes. To improve and sustain their competitiveness, firms must steadily develop their innovation performance by focusing on new opportunities for commercialization (Inauen - Schenker-Wicki, 2012).

## 3. Innovations and innovation performance in Central and Eastern Europe: regional characteristics

As long as innovations enhance the competitiveness of firms, it means extra profits to the organizations. If companies perform well, that results higher sector performance. Thus, if a sector performance is continually increasing, in a long-term it has deep impact on the national economy and the civil society. As a consequence we can recognize the connection between innovations based corporate value creation and social welfare (Fejes, 2013). If companies prosper they need more workforce, meaning that more employees boost the national budget with taxpaying and induce growth in GDP. Hence, we can set up a theoretical dictum that says innovation exists in a system – subsystem context where if the players of the national economy perform better, it has a positive contribution to the entire economy.

This process is not as obvious as it seems because CEE countries are characterized by inadequate regulatory environment (Pörzse et al., 2012a) what makes innovation more risky.

In the next subchapters we are going to examine the CEE regions' innovation performance from three different aspects.

### 3.1 Innovation performance in terms of company structure

SMEs have minor contribution to the national innovation system as they have a very low innovation activity because the recession affected them seriously (Kiss, 2009). They do not have financial resources to launch and perform many innovative projects. Shortage of cash and the absence of capital accumulation force SMEs to eat up their innovation potentials. As a result, temporarily they have to grow without focusing on innovations, so they rather follow the strategy of surviving. In contrast, in the forefront of innovations we can find those multinational corporations that are able to acquire special knowledge and take possession over complementary resources.

### 3.2 Innovation performance in terms of the company's location

In line with Innovation Union Scoreboard (2011) the CEE region can be divided into four groups (Figure. 2.):

1. Innovation leaders: Germany
2. Innovation followers: Austria, Slovenia
3. Moderate innovators: Hungary, Czech Republic, Poland and Slovakia.
4. Modest innovators: Romania and Bulgaria.

One of the main reasons for the difference in “innovative” countries and “moderate innovators” is education. We can notice a clear tendency: the innovation performance is higher in those countries where more citizens complete tertiary education. Education can be a great opportunity for the emerging economies to get closer to the front-runners. Several CEE countries should put more emphasis on education: combining different kinds of knowledge and expertise has an outstanding contribution to the competitive advantage of the organization (Pörzse et al., 2012b)

### 3.3 Innovation performance in terms of global competition

In global context, the United States of America, Japan and Korea overtakes the EU region. According to Montalvo and Giessen (2012) the US economy recently has specialized in high growth sectors such as ITC, pharmaceuticals, biotechnology, semiconductors and medical engineering, while Europe focuses on machine tools, mechanical and civil engineering, thermal processes and other lower growth sectors. In Asia emerging economies like India and China are catching up in areas of technological specialties of both low and high growth rates.

## 4. Research design

We applied qualitative research methods. We conducted semi-structured, in-depth interviews with CEOs, board members and senior innovation leaders of companies within the CEE healthcare industry. Each interview session typically lasted from 50 to 70 minutes. Afterwards, the data was analyzed, and the outcomes have been further examined through critical discussions within the group of authors as well as industry professionals.

Wherever available, we collected innovation management strategies, business reports and other relevant documentations as a supplementation of the interviews. We used these records to double-check all the collected information and validate the consistency of data obtained via interviews.

The research was conducted among multinational companies that have a fundamental presence in CEE region markets. Nonetheless, they shared their materials and opinions with us but they did not give the permission to disclose their identity.

## 5. Technology innovations and technology management

From the aspect of technology management we can still cite the technology categories of Littler (1981). Firstly, there are *base technologies*, which are available for every company in the sector. They serve as a barrier to entry to the market. Secondly, there are *key technologies*, based on them companies can reach temporary competitive advantage. Finally, there are *racing technologies* that are break-through initiatives reshaping the whole business environment. These types of technologies can be identified across most industries, regionally or globally.

We were able to identify these technologies and observed a very close relationship to each other. They can develop in-line with each other by using each other's knowledge base and trying to combine or implement it into their own field. These convergent technologies have been analyzed within the below mentioned market

segments:

- Healthcare technologies
  - Biotechnology
  - Pharmaceuticals
  - Medical equipment
- Nanotechnology

### *5.1 The strategy of boosting technology innovation*

We analyzed the strategic behaviors regarding innovations of CEE companies. Our data showed, that CEE companies do not really develop their own abilities to compete in global markets alone, they more likely to buy technologies from cutting-edge global organizations. Reflecting to the technology categories, we can note that CEE companies that focus on technology innovation do not finance racing technologies alone. They have a well-structured concept, which is aiming to establish stable key technologies but they stay within their capabilities and do not set up platforms for racing technologies on their own.

### *5.2 Trends in technology push innovation in CEE*

Based on our research data, we identified some factors that significantly influence technology innovations.

#### 1. Globalization of markets and knowledge platforms

Companies are seeking to grow quickly; therefore they need massive international markets. However, growing alone is often not a viable option for CEE companies. Consequently, they are intensively looking for regional or global partners, doing some mergers or acquisition, or trying to increase their links to international networks. As a result, the partner organizations deal together with knowledge and innovation and use them as opportunities for sustainable growth and profitability (Bower et al, 2011).

We found that knowledge management technologies in CEE are reasonably underdeveloped compared to knowledge organizations in more developed economies. Several interviewed executives explained this though with the high confidentiality of innovation-related information within local firms. This makes knowledge codification and its practical usage to increase innovation performance more difficult.

#### 2. Access to financial resources

Allocating resources to finance innovative technologies is a sensitive issue. The biggest problem roots in the unpredictable balance of risk and yield. Furthermore, managers are not able to accurately plan the whole innovation process; therefore the return period is often unseen for the shareholders. To reduce this uncertainty companies, especially SMEs, usually involve capital from external sources like EU grants, venture capitals, private equity firms, governmental subventions or business angels.

#### 3. Managing formal and informal networks

Networking has an indisputable contribution to successful innovations. We found an increasing trend in regional and global networking ambitions of CEE companies. There was a clear intent of multinational firms to foster open innovations and strategic cooperation.

Maier and his coauthors (2011) have defined the emergence of a new model of network, called value creation networks (VCNs). This model, which we also identified in CEE, stands for to respond effectively to changes in the business environment and customer demands. The VCN model is based on the refusal of a centralized mindset by setting up a flatter hierarchy and emphasizing teamwork. Innovative technologies are considered the core enablers of this new way of rapidly creating, executing, sharing and developing knowledge along with relationships across organizations, causing low costs. In the VCN perspective, the usage of innovative technologies allows to take advantage of the resources of allies to create distinctive value for its stakeholders.

#### 4. Synergies between technological and non-technological innovations

We have also identified strong interdependencies among technological and non-technological innovations. If the organization renews its product portfolio, it should be followed by a comprehensive process renewal and strategic renewal. Synergies between technological and non-technological innovations mean that companies can reach higher performance in innovations, if they implement new managerial and working concepts and practices besides technological excellence. In this respect, an effective utilization of new technologies frequently requires harmonizing changes in ICT and new business tools. As a consequence, these two kinds of innovation should not be considered in isolation because they function as complementary forces to enlarge innovation capacity through synergy.

## 6. Innovation ecosystem

We highlighted earlier that innovation ecosystem in CEE region is a key success factor. We argued that collaborative work with universities and the influence of administration (EU, national government) have a cardinal impact on the competitive sectors' innovation performance. Besides this, we should also mention the relevance of venture capitals and private equity firms that bring financial as well as non-financial support to the innovation ecosystem of CEE region. EU should stimulate private sector investment to increase European venture capital investments, which are currently a quarter of the level in the US (Innovation Union, 2013).

### 6.1. European Union implications

The European Union has set five ambitious objectives - on employment, innovation, education, social inclusion and climate/energy - to be reached by 2020. Each member state has adopted its own national targets in each of these areas. In the field of modernization Innovation Union try to underpin the Europe 2020 strategy by improving access to finance for research and innovation, to ensure that innovative ideas can be translated into marketable products and services.

This increased performance will be able to boost the national economies by creating jobs and growth. As a result, EU labeled this Europe 2020 Strategy as the decade of "smart, sustainable and inclusive growth" (SOIU, 2011). This strategy should help the European economy to get back on track and cope with societal and economic challenges. Additional programs have been also launched to support innovation: FP7 and Horizon 2020.

Key initiatives of Innovation Union (Innovation Union, 2013):

1. Strengthening Europe's knowledge base
2. Getting good ideas to market
3. Maximizing regional and social benefits (social innovation)
4. Pooling efforts for breakthroughs
5. Collaborating internationally

### 6.2. Innovation potential that makes organizations more competitive

Increasing the overall performance of the company might strongly depend on innovation. But how could innovation leaders translate their technological excellence into a positive economic performance?

- value added (efficiency and productivity is increasing, costs are decreasing)
- serve globally/locally new market segments (domestically, export)
- ambitious growth strategy (employment issues, GDP)

Let us point out, that in CEE region the importance of non-technological forms of innovation is a bit more emphasized compared to technological innovation. The reason is that non-technological forms of innovation and their contribution to productivity and business performance are in focus, especially in those countries, where industrial specialization and structure limit the scope for technology based R&D activities (Rogers, 1998).

Our research data showed, that CEE companies also do not turn enough attention to organizational innovations because they do not trust the positive outcomes of these innovations. CEE companies frequently take advantage of marketing innovations, as we mentioned above.

## 7. Conclusion

The primary goal of the research was to identify those internal and external factors, which might cause improvements in innovation performance of CEE companies within the healthcare industry. As a summary of our research outcomes, please find below our main findings:

- Increase in innovation performance of organizations can lead to economic growth at the macro level, as well as it can decreasing the impact of economic downturn within CEE
- CEE companies tend to get closer to substantial innovative technologies and specialized knowledge via mergers and acquisitions, business-academia collaborations, cross-border cooperation and other kind of network connections
- CEE companies have a clear strategy of internationalization of their R&D activities
- Due to intensive formal and informal networking activity and workforce transfers the difference in innovative behavior of CEE companies versus companies operating in other, more developed countries decreases
- CEE companies should pay more attention on exploiting their hidden potential in non-technological innovation and find the right balance in their innovation portfolio
- Development of competitive research infrastructure, innovation management skills, as well as innovation technology development incentives should get a high priority within European Union's policy making in order to enable a faster economic recovery.

Innovation plays a crucial role to shape a better future by reducing poverty, reaching social cohesion, balancing the economic performance and coping with environmental damages. CEE region has the opportunity and the potential to contribute to these solutions. The CEE contribution might be more efficient if the European Union would provide the more incentives for that.

## References

1. Bower, L. J. - Leonard H. B. - Paine S. L. (2011): Global Capitalism at Risk, *Harvard Business Review* 104-112
2. Chesbrough, H.W. (2003) Open Innovation: The New Imperative for Creating and Profiting from Technology, Harvard Business School Press, Boston, MA.
3. Chesbrough, H.W. (2006) Open innovation: a new paradigm for understanding industrial innovation, in: Chesbrough, H.W., Vanhanverbeke, W. and West, J. (Eds), *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford, pp. 1-12.
4. Chikán, A. – Czakó, E. (2009) Versenyben a világgal: Vállalatok versenyképessége az új évezred küszöbén, Budapest, Akadémia
5. Drucker, P, F. (2003) Innovation opportunities, *Harvard Business Manager*, May - June, 28-34 o. Budapest
6. Fejes, J. (2013) Innovációvezérelt vállalatirányítás: stratégiai megközelítés, Working paper, Budapest University of Corvinus, Budapest
7. Inauen, M. - Schenker-Wicki, A. (2012) Fostering radical innovations with open innovation, *European Journal of Innovation Management*, Vol. 15 Iss: 2 pp. 212 - 231
8. Innovation Union Scoreboard (2011) Research and Innovation Union scoreboard, European Commission, Belgium
9. Innovation Union, (2013) [http://ec.europa.eu/research/innovation-union/index\\_en.cfm?pg=key](http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=key)
10. Johne, A. (1999) Successful market innovation, *European Journal of Innovation Management*, Vol. 2 Iss:1 pp. 6 - 11
11. Kiss, J. (2009): A magyarországi vállalatok K+F és innovációs teljesítménye 112. sz. Working paper. pp. 1-9. Budapest University of Corvinus, Budapest
12. Littler, D. (1981) The Strategic Management of Technology in: Pataki (2005) A technológia menedzselése, Typotex, Budapest
13. Maier, R. – Passiante, G. – Zhang, S. (2011) Creating Value in Networks, *International Journal of*

14. Mintzberg, H. (1983) *Structures in Fives: Designing Effectiove Organisations*, London, Prentice-Hall
15. Miron, E. - Erez, M. - Naveh, E. (2004) Do personal characteristics and cultural values that promote innovation, quality, and efficiency compete or complement each other?, *Journal of Organizational Behavior*, Vol. 25, pp. 175-99.
16. Montalvo, C. - Giessen, A. (2012) *Sectoral Innovation Watch 2008-2011: Synthesis Report*, European Commission
17. Moss K. R. (2006) Innovation: The Classic Traps, *Harvard Business Review*, November, pp. 73-83
18. Porter, M. E. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*, New York, The free Predd
19. Porter, M. E. (1990) *The Competitive Advantage of Nations*, New York, Free Press
20. Pörzse, G. (2011): *Kutatásszervezés és innovációmenedzsmnt az egészség- és élettudományok területén*, Semmelweis Kiadó, Budapest
21. Pörzse, G. - Takács, S. - Csedő, Z. - Berta, Z. - Sára, Z. - Fejes, J. (2012b) The impact of creative organizational climate on the innovation activity of medical devices manufacturing firms in Hungary, *European Journal of Business and Management*, Vol 4, No.13, 2012
22. Pörzse, G. - Takács, S. - Fejes, J. - Csedő, Z. - Sára, Z. (2012a) Knowledge and innovation as value drivers in professional services firms: an empirical research in Central and Eastern Europe, *European Journal of Business and Management*, Vol 4, No.8,
23. Rogers, M. (1998): *The definition and measurement of innovation*, Melbourne Institute Working Paper No. 10/98
24. Shumpeter, J. A. (1934) *The Theory of Economic Development*, Oxford University Press, London
25. SOIU (2011) *State of Innovation Union*, European Commission, Brussels
26. Teece, D. J. - Pisano, G. - Schuen, A. (1997) Dynamic capabilities and strategic management, *Strategic Management Journal*, Vol. 18, pp. 509-33.
27. Teece, J. D. (2011) *Dynamic Capabilities: A guide for managers*, *Ivey Business Journal*, March/April
28. Tushman, M. L. - O'Reilly, C. (1996) *Ambidextrous Organizations: managing evolutionary and revolutionary change*, *California Management Review*, Summer 96, Volt. 38 Issue 4, p 8-30

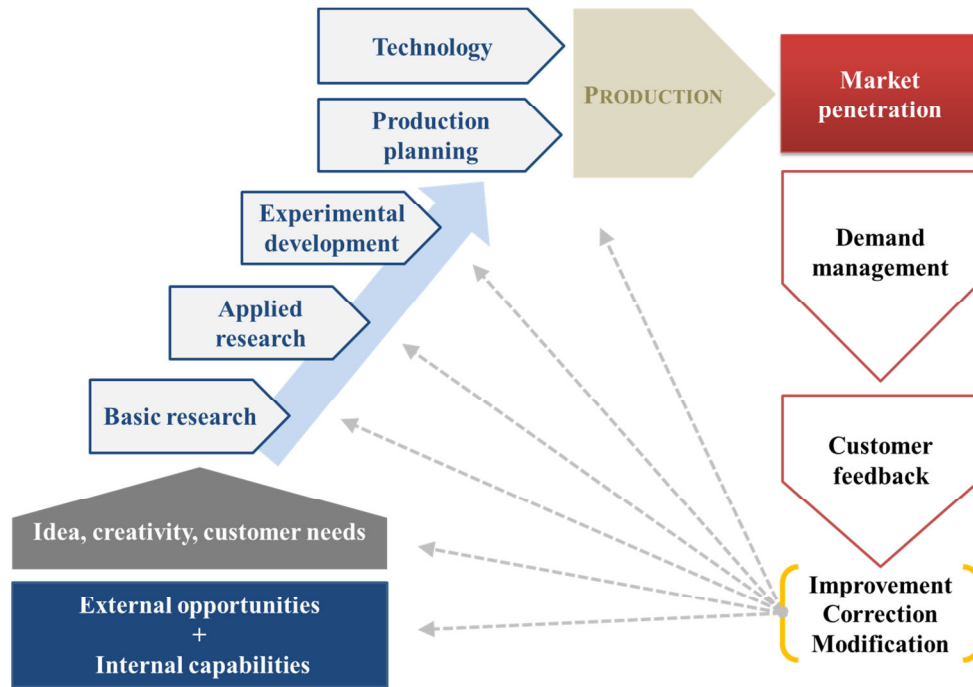


Figure 1. The innovation chain within the context of the technology-business mix

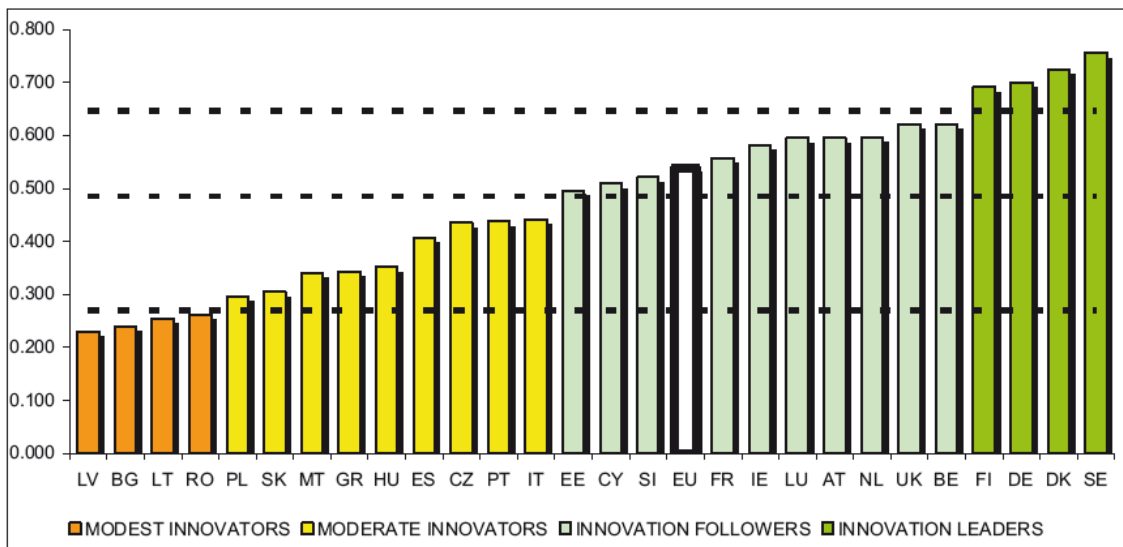


Figure 2. EU member States' Innovation Performance

Source: Innovation Union Scoreboard, 2011



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