

---

## Analysis of Enterprises Innovation Processes Hampering Factors in EU Member States

---

Submitted 25/07/23, 1st revision 16/08/23, 2nd revision 11/09/23, accepted 30/09/23

Piotr Szklarz<sup>1</sup>

**Abstract:**

**Purpose:** Innovation process is a set of both formal and unconventional activities which are in general related to the invention, development, and implementation of new idea into practice. Although innovative activities of enterprises remain a subject of extensive empirical examination, less attention has been paid to the hampering factors, whereas these factors can negatively affect the innovation activities in the long run. The purpose of this study is to analyse the structure of the innovation process hampering factors in EU member states, in order to identify the key barriers (highly indicated factors) for European innovative enterprises.

**Methodology/Approach:** The study covered 20 EU member states; Eurostat database concerning the innovation survey was used to perform the analysis. The most current available period was included. Applied methodology involved comparable analyses based on statistical structure parameters of central tendency, variability and asymmetry.

**Findings/value added:** Identified hampering factors with the highest average indication from European innovative enterprises were: high costs, lack of internal finance and lack of qualified employees within enterprise. High costs of innovation process was the factor with both, significantly highest average score and the lowest variability in the whole research group. On the contrary, lack of access to external knowledge and lack of collaboration partners received significantly lower average indication.

**Practical Implications:** The relations between high costs and lack of internal finance combined with relatively good access to external knowledge and collaboration partners revealed potential for innovation processes development, in particular with respect to open model paradigm. Open process models, if properly implemented and based on cooperation linkages and knowledge exchange, should allow to diversify the risk and to reduce the costs of internal processes within the enterprise and facilitate management decisions concerning dedicating capital to innovations.

**Keywords:** Innovation processes, hampering factors, European enterprises.

**JEL codes:** O31, O32.

**Paper type:** Research article.

**Acknowledgment:** The project is financed within the framework of the program of the Minister of Science and Higher Education under the name "Regional Excellence Initiative" in the years 2019 - 2022; project number 001/RID/2018/19; the amount of financing PLN 10,684,000.00.

---

<sup>1</sup>Assistant Prof., University of Szczecin, Institute of Spatial Management and Socio-Economic Geography, [piotr.szklarz@usz.edu.pl](mailto:piotr.szklarz@usz.edu.pl);

## 1. Introduction

Innovation is perceived as essential requirement for enterprises to operate in the competitive and turbulent environment. This is especially important in the current reality of disruptive changes related to new technologies rapid development (Brynjolfsson, 2016, pp. 14-40; Hémous and Morton, 2022, pp. 179-223). The majority of empirical research has proved that although innovation can imply high initial or continuous investments and risks, the benefits generally seem to outweigh the costs (Norris *et al.*, 2010, pp. 3-34, Thalassinou and Berezkinova, 2013).

Although innovation remains a subject of extensive empirical examination, and in this respect is often perceived as an outcome, attention is also directed to the innovation process. It is argued that this process is a set of both formal and unconventional activities that should be properly analysed and managed. It leads from perceiving the need for change to creating or adapting innovation, and includes the sequence of activities necessary to make a specific innovative concept a reality and transform it into a new state of affairs (Penc, 2002, pp. 35).

The knowledge and the empirical studies concerning the hampering factors for innovation activities of enterprises has also been developed, however, it seems that less attention has been to this research area. Additionally, from the perspective of innovation management, it is important to identify the barriers of innovation activities to introduce strategies oriented to overcoming these obstacles. Eurostat collects the data of major hampering factors concerning enterprises operating in EU member states within the initiative of innovation survey. These factors are however not sufficiently reflected in the measurement framework of European Innovation Scoreboard, thus it is generally based on the stimulants of member states innovation systems (European Innovation Scoreboard, 2022, pp. 10-20).

In the described context, the purpose of this paper is to analyse the structure of the innovation process hampering factors in EU member states, in order to identify the key barriers (highly indicated factors) for European innovative enterprises. The study covered 20 EU member states engaged in community innovation survey. Eurostat database was used to perform the analysis. The most current available period was included. Applied methodology involved comparable analyses based on both classical and positional statistical structure parameters.

The outline of this paper is as follows. The first section provides theoretical background by reviewing the literature concerning the development of approach to enterprises innovation processes and innovative activities hampering factors. The second section presents the adopted methodology and the results of the conducted research. The final section presents the most important conclusions related to the conducted analysis, indicates limitations and identifies fields for further research areas. This section also provides some practical implications deriving from the study findings.

## **2. Theoretical Background**

Theoreticians and practitioners agree that innovation process is an integral part of organization reality, so it should not be seen as an isolated phenomenon, but rather as an important element of the current and future activity of the each firm (Niedzielski and Łobacz, 2011, pp. 46). Innovation process is defined differently which mainly derives from inconsistent definition of the innovation itself.

Three main components can be identified: the production of knowledge; the transformation of knowledge into products, systems, processes and services; and the continuous matching of the latter to market needs and demands (Pavitt, 2006, pp. 86-114). The definitions of the innovation process, despite their diversity, are united by noticing the values that are important for the strategic and operational management, which are defined primarily as creating value for the customer through the development and introduction of new products, and other solutions, as well as new relationships with the market (Polinkevych, 2018, pp. 90).

In order to increase the effectiveness of the innovation process, researchers began to focus on modelling the innovation process and identification of its phases, such as for instance: research phase, strategic phase, resource phase, implementation phase, learning and re-innovation phase (Tidd *et al.*, 2001, pp. 52-59). In this context innovation process is also presented as the sequence of certain stages, such as: development (evaluation, modification and improvement) of a new idea; design and application of a new idea in production; introduction of a new product or service to the market; increase in sales; market maturity and emerging of imitators; decreasing demand that forces the need for the implementation of another innovation (Griffin, 1996, pp. 659-661).

It is underlined however, that taking the enterprises perspective into consideration, the primary and the final event in such a process should be the implementation of a new product or solution in practice (Janasz *et al.*, 2001, pp. 194-197).

Along with the evolution innovation understanding, there has been a change in the perception of the innovation process and the model of this process. In the economic literature, the development of innovation process models is subdivided into generations (Berkhout *et al.*, 2006, pp. 390-403), thus the evolution of these models is presented as follows (Karlik, 2014, pp. 29-30; Szopik-Depczyńska, 2012, pp. 111-123):

- the first generation (technology push linear models) developed in the 50s and 60s of the XX century; innovative processes in enterprises were mainly related to the implementation of new technologies in industry and related to the development of science and technology;

- 
- the second generation (market pull linear models) developed in the 60s and 70s of the XX century; mainly sustainable innovations of enterprises based on the market needs;
  - the third generation (coupled models) developed in the 70s and 80s of the XX century; the combination of the first and the second generation, R&D include market research and its interactions;
  - the fourth generation (integrated models) developed in the 80s and 90s of the XX century; enterprises innovations processes based on cooperation and interactions between internal divisions and external cooperants;
  - the fifth generation (networking models) developed in the late 90s of the XX century; enterprises innovations processes supported by IT technologies and based on strategic integration with key cooperants;
  - the sixth generation (spiral process models) developed in the XXI century; enterprises innovations processes based on constant improvement of knowledge development and supported by IT and ICT including artificial intelligence.

There is mainstream consent among economic and management scholars, that relevant knowledge is a common element of any innovation process, as it allows to transform uncertainty in creating innovations into conscious risk, supported by appropriate actions at every stage of this process. As the approach to managing innovative processes evolved, knowledge, which at first was often treated as an area reserved for enterprises, began to change into a widely available resource (Chesbrough and Garman, 2012, pp. 46-54).

Managing disruptive innovations in particularly required searching for new market opportunities and the adoption of innovative business models by enterprises (Chesbrough, 2006, pp.17-20). The fundamental change compared to the previous models was related to creating opportunities for the flow of knowledge outside and inside organization, at every stage of the innovation process, via cooperative relations.

Simultaneously, it was argued that the efficiency of innovation processes is a result of enterprises creativity, thus, the special role of organizational culture and social factors was underlined. Concepts related to creativity of management, teamwork and employees approach were developed (Trompenaars, 2000, pp. 12-20; Anthony, 2015, pp. 123-133). Treating creativity as a driving force of enterprises development became an attempt to change the paradigm of economy based on knowledge towards a creative economy (Janasz, 2012, pp. 41-50).

The general overview of economic and management literature concerning the innovation processes shows, that the majority of theoretical and empirical studies was dedicated to identify the supportive factors and activities. It seems, that much less attention have been paid to the hampering factors, whereas, the these factors, if not properly analysed and managed, can negatively affect the innovation activities of enterprises (Sipos *et al.*, 2014, pp. 415-424). This concerns both external and

internal organisation perspectives, therefore, the factors can generally be aligned with market, technology human resources and enterprises relationships (potential for cooperation on different stages of innovation process).

Additionally, some empirical studies distinguish hampering factors as revealed and deterring barriers (D'Este *et al.*, 2012, pp. 482-488). In the described context, the research gap could be recognized, both concerning the analysis of the hampering factors in general, as well as related to identification of the major barriers for innovation activities of European enterprises.

### **3. Methods and Results**

The analysis of enterprises innovation hampering factors was designed on the basis of the annual data from 20 EU member states (Bulgaria, Czechia, Denmark, Estonia, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Austria, Poland, Portugal, Romania, Slovakia and Sweden) involved in the innovation survey performed by Eurostat and referring to 2020 (lastly updated in 07.2023).

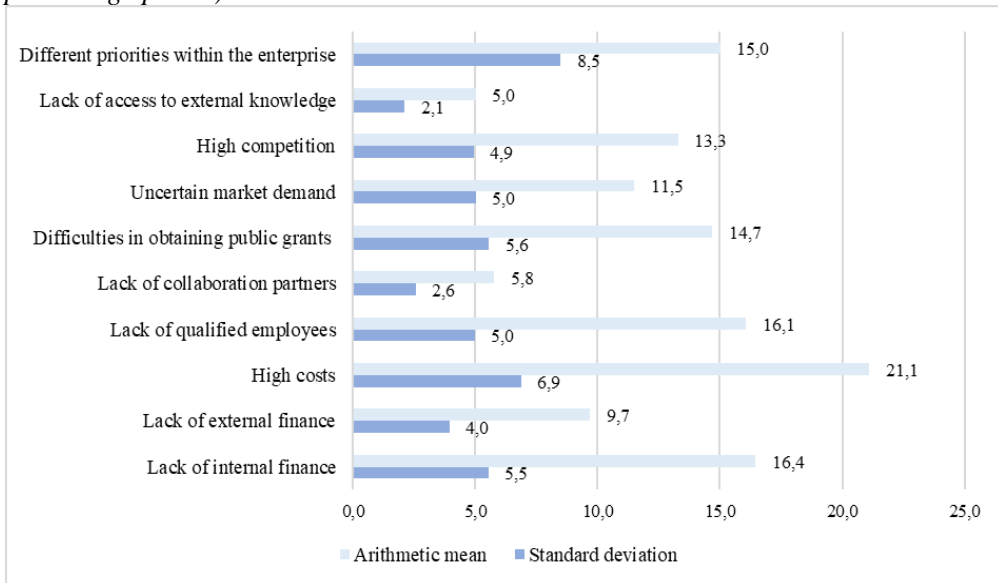
The study covered 10 major hampering factors indicated by innovative enterprises, which were: (1) lack of internal finance, (2) lack of external finance - credit or private equity, (3) high costs, (4) lack of qualified employees within enterprise, (5) lack of collaboration partners, (6) difficulties in obtaining public grants or subsidies, (7) uncertain market demand, (8) high competition, (9) lack of access to external knowledge and (10) different priorities within the enterprise. For the comparability reasons the hampering factors were included only in relative values.

Applied methodology involved comparable analyses based on statistical structure parameters of central tendency, variability and asymmetry, which were in particular: mean, median, quartiles, standard and quarter deviation, classic and positional coefficient of variation and asymmetry measures.

The results of arithmetic mean and standard deviation values of analyzed innovation hampering factors for the research group of EU member states are presented in Figure 1. The hampering factors with an average highest indication (app. 15% and above) from European innovative enterprises were as follows: high costs of innovation process (21,1%), lack of internal finance (16,4%), lack of qualified employees within enterprise (16,1%), different priorities within the enterprise (15,0%) and further difficulties in obtaining public grants or subsidies (14,7%).

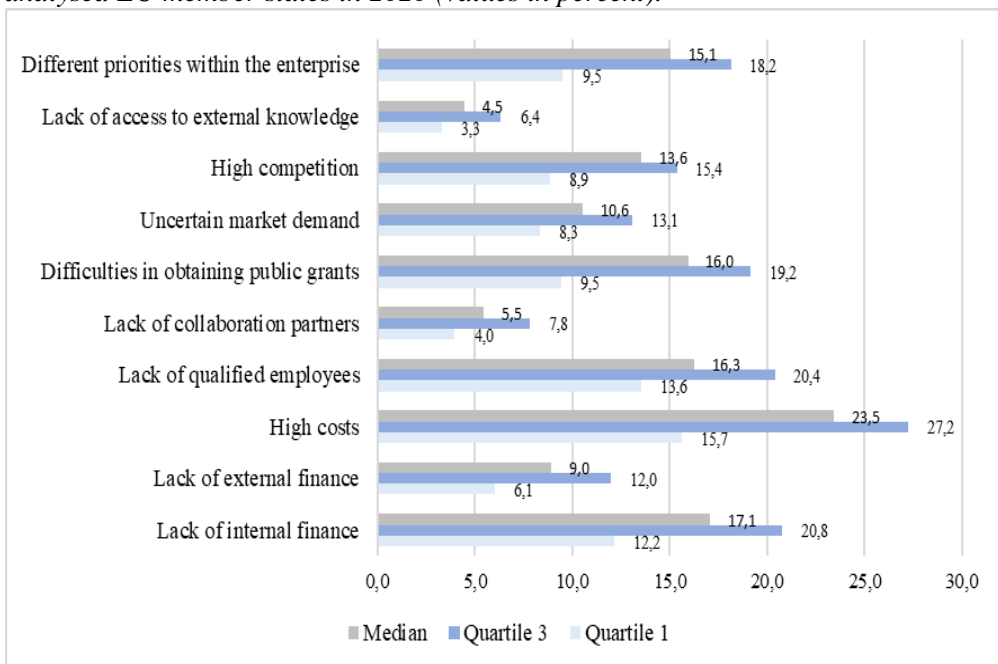
Furthermore, the top three mentioned factors had the lowest level of differentiation. The results of median and quartiles values of analyzed innovation hampering factors for the research group of EU member states are presented in Figure 2, whereas the values of positional measure of asymmetry are presented in Figure 3.

**Figure 1.** The values of arithmetic mean and standard deviation of the innovation hampering factors in analysed EU member states in 2020 (values in percent and percentage points).



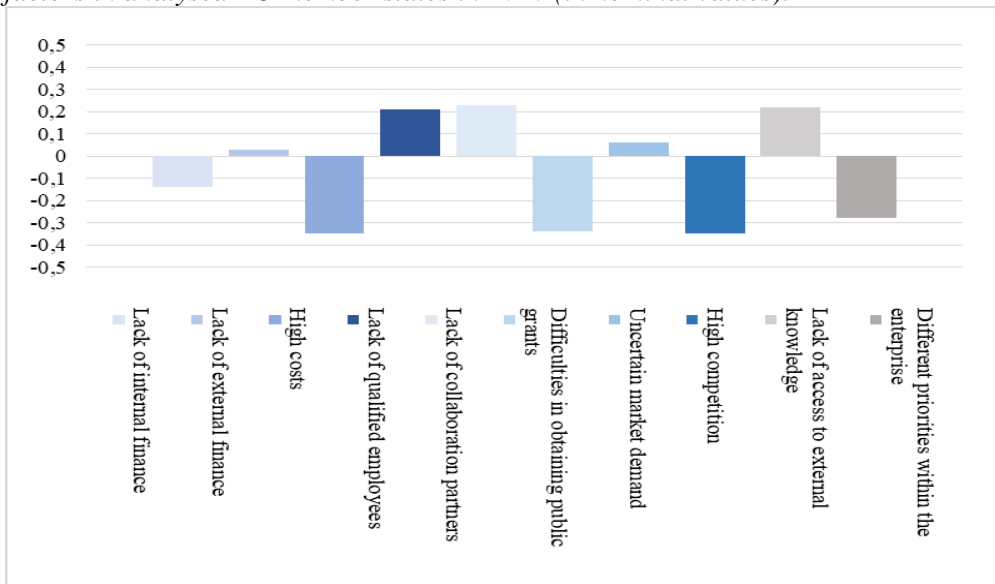
Source: Own calculations based on Eurostat database.

**Figure 2.** The values of median and quartiles of the innovation hampering factors in analysed EU member states in 2020 (values in percent).



Source: Own calculations based on Eurostat database.

**Figure 3.** The values of positional asymmetry measures of the innovation hampering factors in analysed EU member states in 2020 (in nominal values).



*Source:* Own calculations based on Eurostat database.

The results of further measures confirm the findings: high costs, lack of internal finance, lack of qualified employees, difficulties in obtaining grants and different priorities, were confirmed as the top hampering factors of innovation. Furthermore, in 25% of analysed member states high costs, lack of finance and lack of qualified employees were identified as the major barriers of innovation for more than 20% of innovative enterprises. Moreover, in the narrowed area of variation EU member states revealed the score for high costs of innovation process above an average value, whereas, this distribution for the lack of internal finance is close to symmetric and for the lack of qualified employees is adverse.

#### 4. Conclusions

This study was directed to analyse the structure of innovation process hampering factors in EU member states, in order to identify the key barriers indicated by European innovative enterprises. The considerations supported by the empirical study results led to several conclusions. The identified hampering factors with the highest average indication were: (1) high costs, (2) lack of internal finance and (3) lack of qualified employees within enterprise.

It seems, that the first two identified hampering factors are internally related, in particular with respect to the management decision process within enterprises. The third one is rather linked to low mobility of qualified employment or limited access to highly qualified human resources on local European markets.

It is also worth to mention further hampering factors, which were: different priorities within the enterprise and difficulties in obtaining public grants or subsidies for innovation. It should be underlined, that high costs of innovation process was the factor with both: significantly highest average score and lowest variability in the whole research group.

Furthermore, the majority of EU member states innovative enterprises revealed high costs above an average level. On the contrary, lack of access to external knowledge and lack of collaboration partners received significantly lower average indication among European enterprises. It therefore seems, that these were in general the strongest factors supporting innovation processes, however, the highest variability among the member states should also be noticed.

The relations between high costs and lack of internal finance combined with relatively good access to external knowledge and collaboration partners reveals potential for innovation processes development, in particular with respect to described open model paradigm. Open process models, if properly implemented and based on cooperation linkages and knowledge exchange, should allow to diversify the risk and to reduce the costs of internal processes within the enterprise and facilitate management decisions concerning dedicating capital to innovations. This research area should therefore be the field for further empirical studies.

Ultimately, limitations of the conducted research should be recognized, mainly deriving from limited data concerning the member states, as well as the research period published by Eurostat within innovation survey. Despite its limitations, this study makes general contribution with respect to the identification of key barriers for European enterprises innovation processes and suggests wider implementation of open models, as more appropriate with respect to individual hampering factors assessment.

## References:

- Anthony, S.D. 2015. Nowa era innowacji. Harvard Business Review Polska, Warszawa.
- Berkhout, A.J., Hartmann, D., Van Der Duin, P., Ortt, R. 2006. Innovating the innovation process. *International Journal of Technology Management*, Vol. 34, No. 3-4. Retrieved from: <https://www.inderscienceonline.com/journal/ijtm>.
- Brynjolfsson, E., McAfee, A. 2014. *The Second Machine Age, Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company, New York.
- Chesbrough, H.W. 2006. *Open Business Models: How to Thrive in The New Innovation Landscape*. Harvard Business School Press, Boston.
- Chesbrough, H.W., Garman, A.R. 2012. *Otwarta innowacyjność: recepta na trudne czasy*. Harvard Business Review Press, Boston.
- D'Este, P., Immarino, S., Savona, M., Tunzelmann, N. 2012. What hampers innovation? Revealed barriers versus deterring barriers. *Research Policy Elsevier*, Vol. 41, Issue 2.



- European Innovation Scoreboard. 2022. Luxembourg: Publications Office of the European Union.
- Griffin, R.W. 1996. Podstawy zarządzania organizacjami. Wydawnictwo naukowe PWN, Warszawa.
- Hémous, D., Morton, O. 2022. The Rise of the Machines: Automation, Horizontal Innovation and Income Inequality. *American Economic Journal: Macroeconomics*.
- Janasz, W. 2012. Kreatywność i innowacyjność w organizacji. In: Wiśniewska, J., Janasz, K., *Innowacyjność organizacji w strategii inteligentnego i zrównoważonego rozwoju*. Difin SA, Warszawa.
- Janasz, W., Janasz, K., Prozorowicz, M., Świadek, A., Wiśniewska, J. 2002. *Determinanty innowacyjności przedsiębiorstw*. Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin.
- Janasz, W., Janasz, K., Świadek, A., Wiśniewska J. 2001. *Strategie innowacyjne przedsiębiorstw*. Wydawnictwo naukowe Uniwersytetu Szczecińskiego, Szczecin.
- Karlik, M. 2014. *Zarządzanie innowacjami w przedsiębiorstwie. Poszukiwanie i realizacja nowatorskich projektów*. Poltext Sp. z o.o., Warszawa.
- Niedzielski, P., Łobacz, K. 2011. Istota współczesnych innowacji – specyfika, kierunki, trendy. In: Perenc, J., Hołub-Iwan, J. (ed.). *Innowacje w rozwijaniu konkurencyjności firm*. Wydawnictwo C.H. Beck, Warszawa.
- Norris, E.D., Kersting E., Verdier, G. 2010. *Firm Productivity, Innovation and Financial Development*. International Monetary Fund Working Papers, 10/49.
- Pavitt, K. 2006. *Innovation Processes*. In: Fagerberg, J., Mowery, D. (ed.) *The Oxford Handbook of Innovation*. Oxford University Press, Oxford.
- Penc, J. 2002. *Przedsiębiorstwo w burzliwym otoczeniu. Proces adaptacji i współpracy, cz. 2*. Biblioteka Menedżera i Służby Pracowniczej, Bydgoszcz.
- Polinkevych, O. 2018. *Ewolucja procesu innowacyjnego i zarządzanie innowacjami*. In: Kamiński, R. *Innowacje gospodarcze*. Wydawnictwo Naukowe UAM, Poznań.
- Sipos, G., Bizoi, G., Ionescucu, A. 2014. *The Impact of Hampering Innovation Factors on Innovation Performance - European Countries Case*. Elsevier, *Procedia - Social and Behavioral Sciences* 124.
- Szopik-Depczyńska, K. 2012. *Strefa badawczo-rozwojowa w przedsiębiorstwach*. In: Wiśniewska, J., Janasz, K. *Innowacyjność organizacji w strategii inteligentnego i zrównoważonego rozwoju*. Difin SA, Warszawa.
- Tidd, J., Bessant, J., Pavitt, K. 2001. *Managing Innovation*. Wiley, New York.
- Thalassinos, E., Berezkinova, L. 2013. *Innovation Management and Controlling in SMEs*. *European Research Studies Journal*, 16(4), 57-70.
- Trompenaars, F. 2000. *Kultura innowacji, kreatywność pracowników wewnątrz organizacji*. Wydawnictwo Naukowe PWN, Warszawa.