INNOVATION AS A FACTOR (DETERMINANT) FOR SUSTAINABLE DEVELOPMENT OF SMES IN THE KNOWLEDGE-BASED ECONOMY

Roman Stryjski[1], Justyna Patalas-Maliszewska[2], Irene Krebs[3]
[1,2] University of Zielona Góra, Poland,Institute of Computer Science and Production Management, Prof. Z. Szafrana 4, 65-516 Zielona Góra,
e-mail: stryjski@post.pl, e-mail: j.patalas@iizp.uz.zgora.pl,
[3] Brandenburg University of Technology Cottbus, Germany, Chair of Industrial Information Systems, Konrad-Wachsmann-Allee 1, 03046 Cottbus,
e-mail: krebs@iit.tu-cottbus.de

Abstract 1 *Innovationen in Unternehmen ermöglichen die Entwicklung des Marktes und damit die Befriedigung der Bedürfnisse der Kunden. Jedoch ist festzustellen, dass der Innovationtransfer und die Innovationsimplementierung in kleinen und mittelständischen Unternehmen extrem abhängig vom Stand der Forschung und der Entwicklung des Finanzkapitals in großen Unternehmen sind. „Innovation ist keine Garantie für Erfolg, das ist die Veränderung für Unternehmen. Sie führt zur Entwicklung und Erhöhung des Unternehmens" [1].*

In diesem Artikel ist die wissensbasierte Wirtschaft beschrieben, und die Determinante für eine nachhaltige Entwicklung von Unternehmen wird spezifiziert. Schlussfolgernd bedeutet das, dass die Innovation als ein Indikator für eine nachhaltige Entwicklung von Unternehmen unter den Bedingungen der wissensbasierten Wirtschaft definiert werden kann. Als Ergebnis unserer Forschungen wird das Modell für nachhaltige Entwicklung von Unternehmen vorgestellt.

Keywords: *eine nachhaltige Entwicklung von kleinen und mittelständischen Unternehmen, Innovationen, die wissensbasierte Wirtschaft*

Abstract 2 *The innovation in a company allows for the extension of its market product or service range and for the adjustment of this offer to the needs of its customers. Nevertheless, the range and speed of innovation in small and medium enterprises is restricted in comparison to large enterprises which typically have their own research and development infrastructure, as well as the financial means to allow for extensive research. "Innovation is not a guarantee of success, it is a chance. …leading companies develop the wallet of innovation, which others can take from in order to sustain their own growth" [1].*

In this article the knowledge-based economy is described and the determinants for sustainable development of SMES are presented. Consequently, the innovation in SMEs as the one of the factor for sustainable development of SMES in the knowledge-based economy is defined. As the result of our research the model of sustainable development of SMES in the knowledge-based economy based on innovation is formulated.

Keywords: *sustainable development of SMES, the innovation, the knowledge-based economy*

1 INTRODUCTION

Small and medium sized enterprises (SMEs) have a decisive role in creating working places and, more generally, they are social stability and economic development factors. However, they often encounter difficulties in getting capital or credit, given the limited guarantees which they can offer, as well as limited access to information, concerning especially new technologies and possible markets.

An one of essential factor in the process of developing and maintaining a competitive edge in the market is innovation. The term is understood in a variety of ways, among others: innovation can be defined as:

- The solution to a basic scientific puzzle or the invention of a new "product" only in a laboratory setting makes no direct economic contribution. Innovation includes not only basic and applied research but also product development, manufacturing, marketing, distribution, servicing, and later product adaptation and upgrading [2],
- A production process [innovation] is the system of process equipment, work force, task specification, material inputs, work and information flows, and so forth that are employed to produce a product or service [3].

The notion of innovation is treated flexibly depending on the field in which it is used. So, the following research problem has been formulated: there is a company in the SME sector with a defined functional area and with set qualification criteria for an innovative company. There are innovation transfer tools in the knowledge-based economy. What is needed is a model of innovation transfer in SMEs, which will allow for sustainable development of SMES in the knowledge-based economy.

In this article the knowledge-based economy is described and the determinants for sustainable development of SMES are presented. Consequently, the innovation in SMEs as the one of the factor for sustainable development of SMES in the knowledge-based economy is defined. As the result of our research the model of sustainable development of SMES in the knowledge-based economy based on innovation is formulated.

2 DETERMINANTS FOR SUSTAINABLE DEVELOPMENT OF SMES IN THE KNOWLEDGE-BASED ECONOMY

Knowledge, based on information and supported by cultural and spiritual values, has become an independent force and the most decisive factor of social, economic, technological and cultural transformation. Added value for SME can be determine as knowledge, employees' skills and abilities, social relation, know-how, and particularly effective investing in innovation transfer. The enterprises which invest in knowledge and innovation and systems of work are achieved competitive advantage because of their workers' readiness to learning and qualifying themselves and also thanks to effective information and communication transfers.

The knowledge-based economy has allowed a quick integration of the enormous intellectual resources of economies in transition into the European intellectual pool, stimulating the development of the former countries. Every country can benefit from developing a knowledge-based economy to become a more equal participant in the global development process. The four pillars in the knowledge-based economy are defined:

- An economic and industrial regime,
- An educated and skilled population,
- A dynamic information infrastructure,
- An effective innovation system.

Enterprises SMES to be competitive in the knowledge-based economy need to based their activities on a cooperation with R&D Centers, Universities, networks of firms. Highlights the trends in the organizational structures of enterprises, based on a defined the networked economy, the following organizational solution are defined [4]:

- Local, international and global network,
- Clusters,
- Technological and Science Park and similar organizational forms,
- Innovation firm network,
- Virtual organization,
- Process organization,
- Fractal organization.

The defined organizational structures are the meeting place for representatives of science, modern industry and all aspects of entrepreneurship. The main purpose of the structures is bringing research results (and research scientists), innovation solution closer to the social and economic practice in all of the enterprises. The activities are aimed at developing new technologies and upgrading those that are already existing as well as finding solutions to synthetic, technological and analytical problems encountered by various active companies. Consequently it can be observed that the main sources of innovation transfer in SME are:

- Innovation's project database – websites,
- New technologies databases,
- Patents bases,
- Specialists' training database [5].

Nevertheless, the range and speed of innovation in small and medium enterprises is restricted in comparison to large enterprises which typically have their own research and development infrastructure, as well as the financial means to allow for extensive research. "Innovation is not a guarantee of success, it is a chance. …leading companies develop the wallet of innovation, which others can take from in order to sustain their own growth" [1].

3 INNOVATION IN SMES

Actions leading to the development of businesses, their knowledge integration and innovation are a significant factor in their competitive edge. An innovation-oriented company:

- conducts large-scale research and development (or purchases new technologies),
- has the ability to obtain and generate innovation,
- is flexible towards the changing market
- systematically implements new solutions,
- has a wide share of new products within its whole product range,
- constantly introduces innovation into the market [6,7].

Innovation capability refers to the ability to make major improvements and modifications to existing technologies, and to create new technologies [8, 9,10].These studies take into account various aspects of an innovation as a factor for sustainable development of SMES.

To built a model of sustainable development of SMES in the knowledge-based economy based on innovation, on the basis of an analysis of the literature on the subject [11,12,13,14] and through observing economic reality, the following determinants of firm growth through the innovation transfer are formulated:

- National and regional innovation system: firms network, science and technology, supportive institutions,
- Education and training system,
- Sector and market factors,
- Macro economical factors.

In the aforementioned context, an attempt has been made to build a model of sustainable development of SMES in the knowledge-based economy based on innovation.

4 MODEL OF SUSTAINABLE DEVELOPMENT OF SMES IN THE KNOWLEDGE-BASED ECONOMY BASED ON INNOVATION.

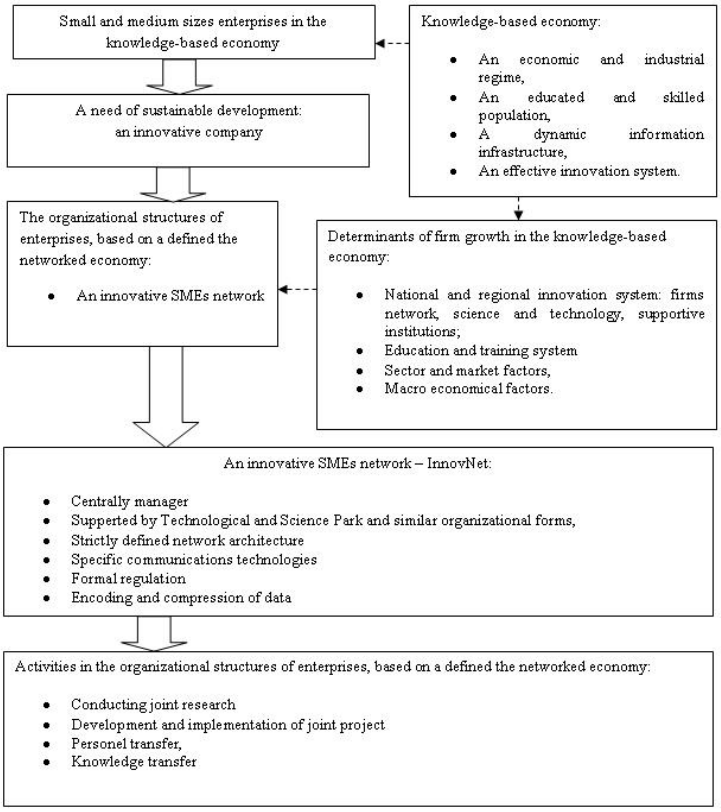
In order to solve the research problem, a model has been designed for sustainable development of SMES in the knowledge-based economy. The proposed model consists of elements (see Fig. 1):

For the small and medium sizes enterprises can gain a competitive advantage thanks to the participation in the network must meet the following conditions: be competent, be able to cooperate with others, have modern communication and information technologies.

An innovative SMEs network – InnovNet designing, you should find answers to your questions:

- What will be the added value for users?
- What form should adopt a network?
- What communication technologies should offer the network?
- What entities should be co-regulated contracts?
- What is the co-operators should be based on mutual trust rather than formal cooperation?
- What organizational structure will have a network management unit?
- What role should have Technological and Science Park and similar organizational forms?
- What are the financial arrangements of cooperation through a network?
- How will the form, structure and content of data sets in the network?
- What will form the structure and content of the database results from the participation?

Fig. 1 Model of sustainable development of SMES in the knowledge-based economy



A solution of the formulated problems the authors will explain their work to others. The proposed model of sustainable development of SMES in the knowledge-based economy is based on building a network of innovative companies supported by Technological and Science Park and similar organizational forms. It fully correspond to the objectives of knowledge-based economy and guarantees the sustainable development of each SMES in the innovative SMEs network – InnovNet.

5 CONCLUDING REMARKS

How innovations are labeled is important if researchers want to increase their understanding of the development process of different types of innovations. The goal for future researchers should be to help practitioners identify the determinants of firm growth in the knowledge-based economy.

In accordance with the defined innovation were creating the decision model allowing sustainable development of SMEs in the knowledge-based economy, which contain the proposal of creating an innovative SMEs network – InnovNet.

The results of this study offer important implications for researchers and practitioners of firms. The results suggest that future research investigating the cooperation of SMEs will allow the company to build a sustainable competitive advantage based on innovation.

References

[1] Davila T., Epstein and Shelton R.: Making innovation work: How to Manage It, Measure It and Profit From It. Wharton Scholl Publishing, 2005.

[2] Smith B.L.R., Barfield C.E.: Technology, R&D, and the economy. The Brookings Institution, Washington, 1996, DC.

[3] Utterback J.M., Abernathy W.J.: A dynamic model of process, and product innovation, Omega, 1975, Volume: 33, pp. 639-656.

[4] Stabryła A.: Improving the organizational structure of enterprises in the knowledge-based economy, Beck, 2009, Warsaw, Poland.

[5] Stryjski R., Krebs I, Kłos S.: Innovation management in small and medium-sized enterprises: development of innovation - experiences in Poland, 2008, Berlin: Trafo.

[6] Jasiński A.H.: An innovative company on the market, Warsaw, 1992,Poland.

[7] Sosnowska A., Łobejko S., Kłopotek A.: Management of the innovative company, Difin, 2000, Warsaw, Poland

[8] Furman J.L., Porter M.E., Stern S.: The determinants of national innovative capacity, Research Policy, 2002, Volume: 31, pp. 899—933.

[9] Romjin H., Albaladejo M.: Determinants of innovation capability in small UK firms: an empirical analysis, Working Paper No. 40, University of Oxford, Queen Elizabeth House, 2000.

[10] INSEAD. : Global Innovation Index: More on Methodology. INSEAD Global Innovation Index, 2007.

[11] Chabbel R.,: Characteristic of innovation: Policies, Namely for SMEs, Science, Technology, Industry, 1996, no 16.

[12] Hippel von E.: The Sources of Innovation, Oxford University Press, New York-Oxford, IMD World Competitive Year Book 2008, 1995.

[13] Show B.: Developing technological innovation within network, Entrepreneurial&Research Development, 1991, no 3.

[14] Technology, productivity and Job Creation. 1998. Analytical Report. The OECD job strategy. Paris.