ANALYSIS FOR DEVELOPMENT OF INNOVATIVE SMES IN THE SLOVAK INDUSTRY

Milan Kováč

INTRODUCTION

The economic and social significance of SMEs are generally known and appreciated. SMEs in Slovakia constitute 99.9% of the total number of enterprises in the businesses economy, provide jobs for 71.8% of the active workforce and participate in the creation of added value 55.1%. [1]

Support for SMEs has long been declared in all the strategic programs of the EU and the Slovak Republic. Continuously implements a variety of support programs. Effects of existing support programs for SMEs are significantly differentiated. Statistical results show that the required growth and efficiency of SMEs in Slovakia does not reach. Declared causes such as lack of capital, administrative demands, legislative restrictions and other barriers are only one part causes underdevelopment of SMEs. Most widespread SME (shop, restaurant, service household appliances…) are limited buying power of customers. This is one of the reasons that the development of SMEs in Slovakia does not fulfil expectations. This situation will change only slowly.

Determining factor for the change in the situation, so that SMEs have become an important element in the creation of new jobs, growth performance of the Slovak economy and overall competitiveness of the economy is necessary to change the structure and orientation of SMEs in favour of innovative technology-based SMEs, especially startup and spin-off companies.

1. INNOVATION BUSINESS ORIENTATION

Substantially all of developed countries have elaborated and implemented some form of innovative business strategy.

For example, the Europe 2020 strategy has first mentioned direction “Innovation Union” - improve framework conditions and access to finance for research and innovation to ensure that innovative ideas led to the creation of products and services that provide growth and jobs. With innovation related also other directions of the Europe 2020 Strategy, for example, industrial policy for the globalisation era “- improving the business environment, especially for SMEs and CARS program in 2020” - Action Plan for a competitive and sustainable automotive industry in Europe [9]

In SR innovation orientation can be seen for example in the current document Proposal Economic policies of the Slovak Republic - Slovakia 2020+ [7], and research and innovation strategy for smart specialization Slovak Republic RIS3. [10]

Priority of innovation and its driving forces in today's business environment follows in particular from growth in the scale and frequency of changes:
- globalisation and growing competition from low-cost countries (China, India, etc.),
- easier access to knowledge and accelerate communication,
- high -tech products and technologies, changes in customer requirements.

Other drivers of innovation are: liberalization of markets, reducing long-term costs of transport and communication, the growth in importance and performance of science and technology, the increasing role of services and the increasing importance of environmental factors. An important trend is to shortening preparation time of innovation, TTM - time to market). [4]

In professional publications are views that currently there is a technological break point, which is the largest in the last 50 years. On breakthrough product innovations follow extensive secondary and tertiary waves of innovation processes and services, which are an important opportunity for SMEs. Global trends show the need to integrate the advantages of SMEs and innovation and to develop growth of innovative technology-oriented SMEs. [8]

Drivers of innovation for SMEs:

Compared to large companies, SMEs have several innovative benefits:
- Personal interest small business owners to try new approaches to business success.
- Connect with Customers: direct relationships with customers allows identifying new opportunities.
- Agility and adaptation: Unlike large enterprises, small businesses can quickly adapt to changing market and introduce new business practices.
When owners or managers of SMEs finding a new opportunities they are not afraid of experimentation and improvisation and accept failure as part of the path to success.

- Limited resources: SMEs are active in getting "more value in less resources".
- Information Sharing and Collaboration: SMEs also rely on knowledge and social networks for information sharing and inspiring innovative thinking.
- Enhancing technologies innovative opportunities: SMEs currently use the technology, which in the past were only characteristic of large companies. Technology has become cheaper, more powerful and accessible, start-up costs of the business have been reduced, while the opportunities for innovation in small business increased.
- On-line communities of SMEs and expanding networking opportunities to SMEs sharing knowledge on many levels. There is the opportunity to learn from the best practices in various sectors of industry and regardless of geographic location.
- Innovation policy can stimulate SME businesses to innovate, to research, development and commercialisation of new technologies, products and methods. State support can help SMEs enterprises in their innovation performance.

Specifics of innovative technology-based SMEs

- Customers are largely companies, often multinational corporations to concentrate on their core business and have a network of suppliers of components, technical equipment and professional services. These customers have the resources. Lean manufacturing strategies increase a sales potential subcontractors.
- Innovative SME suppliers are largely applicable to the export market. Supply networks are international, which simplifies the entry of SMEs in foreign markets. A typical example is the automotive industry.
- Novelty products, technologies and services as a result of the innovation process are a general competitive advantage associated with a higher added value.
- Ability to innovative businesses to respond flexibly to changes creates a number of new market opportunities. In case of successful innovation is the potential rapid growth in SME business.
- A specific of innovative businesses is a high level of risk, which is a general feature of innovation.

Risks for innovative SMEs

Surveys successful innovation shows that in practically all-industrial sectors is the percentage 45-60% (15% technical risks, 45% of the commercial risk). For a very important innovation (new generation products) percentage is even lower, about 10% of the projects. The data on the risks of industrial innovation synthesized author from works consultancy firms KPMG and BCG. [4]

The main sources of risk are:

- Change in demand (changes in consumer preferences, input of substitute products and services from new competition, reducing the purchasing power of customers).
- Changes in costs of materials, energy, wages, capital equipment, etc.
- Changes in technology (materials, construction, processing technology).
- Macro economic and political environment (taxes, laws, inflation, and other legislative restrictions).

Other sources of risk analysis show the typical causes of failure of innovation.

- Deficiencies innovation causing poor quality product or service, putting a good product, but at the wrong time.
- Incorrect estimates of response competition in the new product.
- Small market that does not have the prerequisites for development, lack of marketing support
- Lack of potential for further improving the product, respectively services, errors in project management, innovative cost overrun.

Risk factor requires system support for innovative SMEs: SMEs training in a risk-management, the existence of risk capital resources and systems for the distribution and transfer of risk.

Often the promotion of an innovative SME business concentrated on the issue of financing. This is justified because the cost of development and introduction of innovative products and services are higher than in the standard business. Support is also important in knowledge and managerial areas.

Develop support for innovative SMEs throughout the innovation cycle is:

- Motivating the focus on innovation, entrepreneurship, establishing new SMEs and reorientation of existing low performance of SMEs.
- Education and access to knowledge and technology for the development of innovative ideas.
- Consulting experts to test innovative ideas and evaluating the feasibility and potential of innovative ideas.
- SMEs’ access to new technology for product development respectively services.
• Services for the realization of prototypes and pilot solutions and testing them.
• Support for start-up of production, marketing, sales support, and business management.

Directions in which the greatest need and potential for innovation are identified in reputable rule sectorial focus in studies, such as: automotive, intelligent manufacturing, sustainable mobility. However, they are known to the relevant range of specialists in large enterprises and in scientific circles. Starting entrepreneurs have not the information they need to identify innovative opportunities and finding innovative ideas.

2. PRIORITY DIRECTION FOR INNOVATE SMEs

Selection from the direction of global innovation

Expert panel KPMG Industrial Manufacturing 2014 [3] identifies and analyses 10 mega trends of strategic innovation in the industry:
1. Factory of the Future
2. Talent Challenge
3. Near-shoring
4. Nanotechnology / Nanomanufacturing
5. Demand Shift to the East
6. Service Driven Business Models
7. Cluster Manufacturing
8. Sourcing Governance
9. Resource Efficiency
10. Additive Manufacturing / 3D Printing

Direction for innovative SMEs from the analysis can highlight the mega trends:
• Requirements for automation, which in many areas is more effective than relocation of production to low-cost countries.
• Requirements for professional services in engineering, design and manufacturing tools and products and programming of NC machines and robots.
• Potential applications of nanotechnology in products.
• Increasing share of innovations from suppliers 2 and grade 3.
• Products based on additive technologies / 3D printing and other.
• Innovation for energy saving, recycling.

Selection from the direction of industrial innovation - High-Performance Processing

The main innovation of high-performance production under publications [2], [6]:
Flexible, adaptive production equipment and systems ready for rapid reconfiguration and optimal use of energy:

• New systems adaptively machinery construction based on mechatronic modules, multi-layer control and highly efficient measurement.
• New equipment and machines that require less workshop space, by reducing peripheral devices, optimisation cycles and planning processes.
• Components based on smart materials.
• New production systems for manufacturing, assembly and disassembly, based on robotics and automation technology for optimization tasks between humans and robots for the needs of SMEs. Adaptive equipment for optimal energy consumption.

High-precision micro manufacturing machines and systems:

• Miniaturization of products and production equipment and integrated compact design systems
• Production of 3D micro components using a wide range of materials (metal alloys, composites, polymers, ceramics). The new process chain integration of various manufacturing technologies.
• Micro manufacturing systems. Easily configurable assembly lines located in a small space for installation and testing of small parts of equipment, sensors, actuators, etc.)

Tools for production planning and simulation of adaptive production systems:

• New high-performance processes, machines and production systems will require new methods and tools for construction machinery and monitor their operation.
• New ways to manage system configuration during operation and anticipating the behaviour of processes based on knowledge tools for planning processes.
Selection from the direction of innovation: knowledge-intensive services

Business services are of great importance for SMEs to develop their potential contribution to innovation and growth. Have a special status - Knowledge Intensive Business Services (KIBS) and Technological Knowledge Intensive Business Services (T KIBS). [5KIBS are defined as business services, where value added activities are in the collection, production and dissemination of knowledge to the development of services or products to meet the needs for client. T KIBS feature is the application of high technology in the development and implementation services. [5]

Important are especially those services whose business are the development of new technologies and their subsequent implementation for specific customers. Drivers of growth in demand for services such as KIBS are: growth in customer demand, growth in complexity of products and technological processes, accelerating the rate innovation, flexibility and variability of the technical, economic and social spheres. KIBS services have potential for growth in all phases of innovation-cycle.

Overview of the most frequent KIBS with the highest technological level:
- Services for the digital factory.
- Experimental development of products and technologies.
- Special testing and testing of prototypes and products, material engineering, rapid prototyping.
- Digitisation of design and manufacturing information, simulation, animation, virtual engineering.
- Design processes, departments, logistics etc.

Economic development potential is determined by KIBS volume of production services themselves. Indicators are favourable rate of value added, application of high workers' skills, know-how and technologies.

3. STRATEGIC DIRECTION FOR INNOVATE SMEs IN SLOVAKIA

The following thesis are formulated based on the author's current research for the project Regional Implementation Plan now being developed by KPMG Slovakia.

In generally are not restrictions for the Slovak innovative SMEs and startup, specifically provided in the direction of managing the necessary connections to partners. For some directions but Slovakia has excellent conditions resulting from the connection of innovative SMEs and startups to foreign corporations operating in Slovakia (contracts from large companies to startups) - solving specific problems and also the connection startups through a large network of contacts to companies abroad.

Industrial production is among the most important sectors of the Slovak economy and growth potential of Slovakia in the first place depends on this sector. Largest accelerator Slovak economy continues to remain mechanical engineering industry especially automobile manufacture. In this sector are powered mainly subcontractors mechanical engineering and electrical industry.

Further specification of direction for innovative SMEs in Slovakia identifies research and innovation strategy for smart specialization SR:
- Basic areas of specialization (automotive and mechanical engineering, electronics and electrical engineering, ICT, production and processing of iron and steel).
- Prospective areas of specialization (automation, robotics, digital technology, light metals and alloys, plastics and chemical substances, creative industries and the domestic resource base).
- Specialization fields of science and research materials and nanotechnology, ICT, biotechnology and bio-medicine, agriculture and environment and energy.

Some of the priority directions for innovative SMEs:
- Information Communication Technology (multi sectorial approach, which is already well developed).
- Components for the automotive industry (development, testing, production, logistics network).
- Tools, fixtures, logistics equipment, measuring and testing components for flexibility changes in production and engineering sector.
- Automation and robotics for the electrical sector.
- Knowledge-intensive services (design, introducing advanced methods such as Kaizen, Lean manufacturing, Total quality control).
- Applications and lightweight composite materials to improve the performance of new products.
- The products and technological solutions to reduce energy intensity of production, reducing evaporation halides, recycling and other components for sustainability.

In terms of innovative SMEs will be necessary to change the structure of the priority directions in which stimulates the development will be connected to large enterprises, universities and government support. Orientation will be required to elaborate-not review the priority directions for initiating
innovative SMEs of all forms (startup, spin off, change existing enterprise) where are the best conditions for success and apply the SME business support system priority defined directions.

Building an integrated support system and its management
In the area of support to SMEs and innovation is active large number of organizations and projects in various forms: training, consultancy, research grants, financial funds, competition and so on. For those interested in a new business is a complex and little clear set of information which is difficult to identify the orientation and the choice of appropriate support options. These activities have their topical application, but their effectiveness will multiply when they are coordinated.

Situation improves create a central information system supporting projects for innovative SMEs and the adoption of measures to reduce unwarranted duplication and fill gaps and deficits in support programs. The solution is the creation of open network with the coordination centre and it’s clustering by sector and support methodologies.

Driving force for network support and cooperation of innovative SMEs are still greater difficulty in maintaining the status quo in technology and product development. New models of innovation must have lower fixed costs, flexibility to respond quickly to changing customer requirements and changes in socio economical environment. Development of new models, tools and techniques for the support and cooperation of innovative SMEs will require of development of knowledge integration across organizations. Important is the platform partnerships and team structures for innovation, the development of skills and practices for innovation networks.

CONCLUSION
Development of innovative technology based SMEs in Slovakia has sufficiently robust perspective. Drivers are:
- The intensity changes throughout social- economic and technological environment, which leads to the acceleration of demand for innovation.
- Expansion of research and development on a global scale and the development of technology knowledge transfer.
- The existence of talent, flexible and skilled workers, who will consider setting up their own innovative enterprise better option, as the standard work in companies.
- Existing and newly prepared strategies and programs supporting innovation in SMEs.

Conditions for the success of a comprehensive program of support for innovative SMEs:
- Own innovation. Promote innovation outdated administrative methods are unproductive. Supporting methods must also respond quickly to change, retrieve best practices and other typical innovative practices.
- Own aspect ratio. Principles known as Lean Management, namely the elimination of waste and redundancy, continuous improvement, and more, can ensure a rational use of resources support a wider group of SMEs founders.
- Sustainability. Development and support of innovative SMEs must be continuous, as innovations.

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REFERENCES
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Abstract
Article addresses the challenges of developing innovative SMEs in the Slovak industry. Arise within a research issues agile businesses quickly adapting to changes in the business environment. Analysis of drivers of innovation for SMEs arising from the mega trends of strategic innovation in the industry. Formulates the strategic direction for innovative SMEs in Slovakia. Priorities are the development and production of new: components for the automotive industry; tools, fixtures, logistics equipment, measuring and testing components for flexibility changes in mechanical production engineering; automation and robotics; knowledge-intensive services; applications and lightweight composite materials to improve the performance of the products; new products and technological solutions to reduce energy intensity of production recycling and other components for sustainability. In conclusion emphasizes the need for effective support to innovative SMEs, the support system must meet the requirements of complexity, innovation, sustainability and be a lean.

Key words
Innovative SMEs, support system, mega trends of strategic innovation in the industry

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