

INNOVATION IN SUPPLY CHAINS

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- Abstract -

Globalization is such a phenomenon, which provides opportunity for economic organizations to acquire more types of resources thanks to the expansion of market opportunities. In this globalized world it goes without saying that a high quality product or service itself is not enough to achieve long-term goals. The competition (which today basically exists between supply chains/networks, rather than between firms) is getting harder and harder in order to attract new customers, to increase market share, or just to maintain the existence. The competition always forces companies to aspire after new things. This constraint refers not only to products and services, but to the technology, to the processes, to the leadership styles, to the organizational culture and to the establishment of partnerships as well. To meet the requirements of today's competition, organizations must harmonize their resources and processes within the confines of some kind of cooperation in order to create value for the customers and for the national economy as well. The aspiration for newness is one of the most important key factors of the competitiveness of organizations. The efficient operation of a firm depends on several factors. Among these factors, innovation and partnerships (between companies and their suppliers/customers) are the most significant ones. Consequently, by applying new methods and innovation, competitive advantage can be achieved not only for a company, but for the whole chain as well. This paper (based on a Hungarian, nationwide research) demonstrates the role of innovation in competitiveness, moreover it gives a general idea about how inter-organizational co-operations influences the development and realization of innovation processes which affect more member of the supply chain.

Key Words: *innovation, supply chains, cooperation networks, competitiveness*

JEL Classification: M20

1. INTRODUCTION

The existence of supply chains dates back to the emergence of companies and inter-company collaboration. Since the inception of **economic division of labour** decades ago and, along with it, **specialisation** the satisfaction of consumer demand requires inter-company collaboration. Prompted by the changes which have occurred in the operational environment (globalisation, information society, process approach, increasing need for flexible and economical operation, etc.) the significance of **supply chains** has increased and the recognition has been formulated that the management of real processes between companies contains opportunity that allows participating companies to improve their competitive position. **(Gelei,2002:5)** Companies, by combining their productive assets, can reduce their production costs, as a result of which a source of **efficiency improvement** is created. The explanatory reason for this is economies of scale and scope. In the course of cooperation partners can enhance the division of labour, thus exploiting the advantages stemming from economies of scope or, combining capacities, can produce and distribute with lower production costs. An additional source of cost savings is created if partners exploit synergies inherent in research and development, rationalise their sales and advertising activities, or reduce their administrative costs. **(Motta,2007:257)**

2. COOPERATION AND INNOVATION IN SUPPLY CHAINS

2.1. The economic motivations for the emergence of supply chains

Supply chain activities are closely linked to a more efficient satisfaction of demands, the pursuit of efficient and economical operation, and last but not least an increasingly higher degree of **value creation**. The products represent **value** to consumers, the value of which is made up of several elements: utility value, place value, time value and property value. Utility value is the sum of product functions which enables the product to satisfy demands. This ability has to be connected to the consumer in space and time for the satisfaction of the actual need to be realised. Utility value is created by production, while **logistics** is responsible for place and time value. Property value is created through the purchase transaction and marketing plays a key role in its formation. However, consumers are demanding more place and time value, and in terms of utility value would like an ever-expanding selection. Therefore, nowadays it is said that it is not primarily products, but individual **supply chains that are competing** with each other. This is where the problem of the length of the supply chain arises. Logistics effecting

place value costs a significant amount of money; therefore, attempts should be made to reduce these costs with the most efficient methods possible. Attempts are often made to achieve cost savings in other areas of economic activity, for example in manufacturing. Two methods are available to this end; one of them is to exploit economies of scale and the other is to use manpower of an appropriate cost level. (**Logisztikai Innovációs Füzetek, [Logistics Innovation Booklets],2010:5**)The condition of efficiency and economy demands not only of national economies, but of companies as well, that they **collectively** and jointly attain common goals, or jointly engage in economic activity in the interest of enhancing efficiency, satisfying demand, and increasing competitiveness.

2.2. The significance of innovation from a supply chain perspective

It is important to distinguish between invention and innovation. Generally speaking, the concept of invention is interpreted to mean the creation of new ideas and concepts - in a narrower sense, of new scientific and technical ideas and concepts - which materialise in the form of tangible new products and processes. **Innovation** is a broader concept and includes invention and, beyond that, its application in entrepreneurial and corporate activity, as well as the aspect of the business objectives of the application. Consumers and users perceive innovation directly through the supply and utility of new products and services, while companies discern innovation from the standpoint of the utility of innovation and competitiveness. From the standpoint of society as a whole innovation results in technological, economic, social and cultural development, presuming that those interested exploit the opportunities inherent in innovation in a sufficiently responsible manner. (**Vágási-Piskóti-Buzás,2006:17-21**) The focus of corporate motivations in the short and medium-term is the **profit motive**, whereas in the medium and long-term **increased competitiveness** comprises the centre of attention. In terms of cooperation most of the time corporate actors subordinate all other considerations to these two related guiding principles. Innovation is important not only in the context of individual companies, but with regard to the entire supply chain, if they wish to continue to create value for consumers. **Innovation** affecting the entire chain can only be realised through extremely strong cooperation and the coordination of resources. For companies and supply chains keeping track of, adopting and applying the newest and most efficient achievements of scientific and technical progress is essential not only for their further development, but in order to maintain their results achieved to date. Companies always have to strive to develop new, more economical production processes and new, modern and competitive products, to acquire new, favourable

markets and to apply new and efficient organisational and management methods, i.e. to **become innovative**. (Dorogi-Rott,1985:5) This endeavour can lead to them acquiring new customers, retaining their existing customers, increasing their market share, and last but not least can contribute to making the national economy more competitive. If the question is raised as to why innovation is necessary, a very simple answer can be articulated independently of whether a specific company or some sort of business organisation, cluster, or cooperation is being examined. In the long-term companies are not able to remain on a growth path if they are constantly preoccupied with reducing costs. Innovation is a means of content renewal, and this renewal helps businesses and networks to retain their customers, be able to acquire new customers, and continuously remain competitive.

2.3. The interpretation of innovation in inter-company relations

In relation to innovation, it is not enough to talk about the fact that businesses have to strive for continuous renewal in the area of products or services, they must do so from the standpoint of developing the organisation, processes and procedures, and **building relationships** as well. The significance of inter-company cooperation has increased as the result of the competition of supply chains coming to the forefront and the emergence of time-based competition (Szegedi,2008:360). In such a competitive environment developing relationships and continuous development play a key role in gaining competitive advantages. The most important question is to decide whether companies are willing to **cooperate** in the interest of making their innovations succeed. Practice shows that those countries which have strong, collaborative company groups are able to boast of more significant innovation achievements. The other important area is the innovative collaboration between higher education and companies. Many examples also attest to the positive impact of this on countries' innovative achievements and improved competitiveness. (Csath,2010) Due to globalisation and the complexity of market relations, the demand for a market actor has been articulated who, either as a virtual or real organisation, meets a variety of needs from a single source by bringing together a wide variety of businesses. A picture is emerging of a platform which, without violating the principle of competition, is capable of cooperation, offering economic advantage to those exploiting the seemingly differing interests, not against, but alongside one another. There is agreement in professional literature that cooperation along the supply chain has a positive effect on the competitiveness of companies. Supply chain cooperation and alliances among companies can contribute to efficiently managing problems

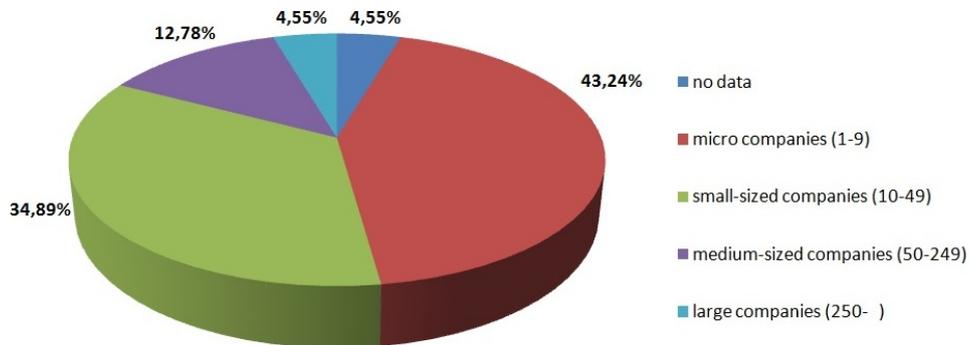
stemming from size and scarce resources by increasing innovation and reducing costs. (**Arend - Wisner, 2005:404**) However, the complex set of relationships resulting from supply chain network membership not only increases transaction costs, but can also represent various constraints for (mainly small and medium-sized) companies. For example suppliers belonging to the SME sector around the world are forced to connect to the IT system of their supply chain customers (**Grean – Shaw, 2000:3**). It is true of most industries that all members of the supply chain benefit from innovation implemented by one company in the chain. Generally speaking, innovation brings about a reduction in costs and an increase in demand. When innovation creates an opportunity for a company to cut back on its marginal costs, thus enabling it to set its prices at a lower level and generate larger quantities of output, both customers and suppliers may benefit as a result. Innovation, which increases the perceived value of the output of the supply chain also has the effect of increasing demand, as it increases the number of customers who are willing to purchase the product at a given price (**Gilbert-Cvsa, 2003:617-618**).

3. FINDINGS

For local businesses innovation presents an opportunity to join the mainstream of the global economy, on one hand participation in the supplier network of global companies, and on the other hand involvement in the network of companies serving the local market and meeting local specificities. Although it is now a matter of common knowledge that globalisation cannot create the conditions of progress for all, it still plays a significant role in dismantling any barrier from the **international flow of production factors**. These processes are headed up by global companies with extensive connections throughout the world, which in themselves have highly complex supply chains. A nationwide survey conducted in Hungary by the **Kodolányi János University of Applied Sciences** and the **National Innovation and Technology Office** draws attention to the nature of existing relationships and supply chain participation at Hungarian companies (INNOTARS research programme). The main research objective was to assess the current situation and innovation potential of domestic small and medium-sized enterprises. The aim of this study is to address in detail the questions and answers which serve to do a credible job of presenting the collaborations characteristic of domestic firms. In the framework of the **INNOTARS research programme** we had the opportunity, on the basis of questionnaires received from 814 entrepreneurs, to determine the factors affecting and accompanying innovation. A number of questions

also arose which concerned the cooperations and the building of relationships. Figure 1 shows the proportion of companies which participated in the survey by size.

Figure 1: The distribution of companies participating in the research by employee headcount (%)



Source: INNOTARS research program

A business relationship can be described as strategic if it contributes significantly to the partners' strategy and entails the collection and linking of necessary skills. Consequently, the diversity of network relationships is determined fundamentally by its contribution to the implementation of the company's strategy. When deciding to open to new markets, launch a new product or service, or establish a new organisation, a company must make strategic decisions. Decisions regarding building or maintaining **relationships** are strategic in nature, as partners seek mutually beneficial economic situations in the framework of **long-term cooperations**.

Table 1: The interpretation of innovation in the Hungarian SME sector

An important form of innovation would be	number of companies	proportion (%)
new market opening	515	63.27%
new product/service	335	41.15%
new supply sources	301	36.98%
new technology	188	23.10%
establishment of a new organisation	82	10.07%
other	16	1.97%
total number of firms:	814	total number of companies, 814 = 100%

Source: INNOTARS research program

Table 1 shows why it is possible to link the concept of supply chains and innovation. Innovation in the traditional sense of the word means launching a new product or service and bringing it to the market. However, today the interpretation of innovation has broadened significantly and has come to include the formation of new relationships and sources of supply, as well as more significant organisational developments. Today, innovation and networking are essential elements of strategy formulation.

The development of relationships, alliances, and supply chains is greatly influenced by the intensity of market competition (Table 2 illustrates the perception of market concentration) and the extent to which the profiles of individual companies resemble each other. According to the vast majority of companies surveyed there are many different types of companies in the market and the companies' activities demonstrate a high level of diversity. All this enables small and medium-sized companies, provided their resources and the nature of their activities permit, to favour specialisation and the division of labour. In addition, they can jointly take action in order to create value for their customers at a higher level of quality and efficiency. The emphasis is on value creation, higher added value and, consequently, on complex service activities, supplementary and related services.

Table 2: The perception of market concentration according to the companies participating in the research

Competition players	number of companies	proportion (%)
the market is ours alone	18	2.21%
the market is covered by a few firms	126	15.48%
a few large and many small firms	252	30.96%
many different types of companies	414	50.86%
no data available	4	0.49%
total number of firms:	814	100%

Source: INNOTARS research program

Although according to the vast majority of companies participating in the research there are many different types of companies in the market, the largest percentage of companies (Figure 3) considers the intensity of competition to be very strong. Stronger competition among firms would presuppose that companies knowingly and systematically cooperate in order to serve consumer demand at the highest possible level, as together it would be possible to make products of a higher quality available to them within a shorter period of time. Today those (networks of) companies can be really competitive which are able to offer goods and

services suitable for consumption in the shortest possible amount of time, along the most efficient lines of production and distribution, at the highest possible level of quality and at a low cost level. Our hypothesis has it that cooperation is less typical of Hungarian firms and that they seek to carry out their activities independently. However, it is important to note that in order to judge this accurately foreign benchmarks are necessary, the exploration of which will constitute the subject of future research.

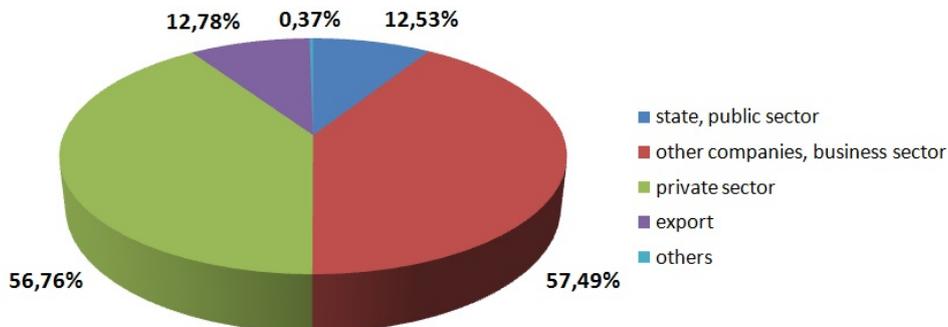
Table 3: The perception of the intensity of market competition according to the companies participating in the research

Nature of competition	number of responses	proportion (%)
weak	75	9.21%
intense	201	24.69%
very strong	397	48.77%
unfair	284	34.89%
total number of firms:	814	total number of companies, 814 = 100%

Source: INNOTARS research program

In time-based competition the customer and total customer satisfaction (TCS) are of paramount importance, as the success of the chain depends primarily on the level of effective demand it can generate and serve. In the course of building relationships it must be clarified who the users of the company's or network's products are. The Hungarian SME sector produces products and provides services primarily for other companies or private individuals, and cooperates with others in the interest of being able to create value for these target groups. Figure 2 illustrates the clientele distribution of companies included in the research.

Figure 2: The key customers of companies participating in the research



Source: INNOTARS research program

Companies work together not only to efficiently organise the provision of goods and services, but to be able to implement developments that they would not otherwise be able to realise using only their own resources. In more developed national economies **knowledge sharing**, **knowledge transfer**, and **open innovation** are tried-and-true practice and intrinsic to enhancing competitiveness. Unfortunately, in Hungary the same process is less common and this, along with several other reasons, explains the unfavourable position of the competitiveness of Hungarian companies and the Hungarian national economy. Table 4 illustrates Hungarian companies' lack of propensity to cooperate for instance in the course of research/development activity.

Table 4: With whom do companies cooperate in the course of innovation or R+D implementation?

Who is R+D carried out by?	number of companies	proportion (%)
by the company itself	530	65.11%
in cooperation with other companies	129	15.85%
with universities and research institutes	71	8.72%
with consulting firms	94	11.55%
with other partners	75	9.21%
other solution	9	1.11%
total number of firms:	814	total number of companies, 814 = 100%

Source: INNOTARS research program

Table 5 provides help in interpreting the relationship between supply chains and innovation. Today in the context of innovation the emphasis is increasingly being placed on activities such as organisational development, the establishment of new organisations, the implementation of new management methods, or relationship building. Innovation can also mean that companies cooperate and establish a new strategic alliance, or innovation can appear in already operational supply chains as well. Accordingly, innovation can create supply chains and the supply chains can create and apply innovation. The members of the chain also have to continually innovate, because without continuous innovation they will lose their competitive advantage. At that point, even in cooperation with others, they will not be able to create value, competitive operation and profit for themselves.

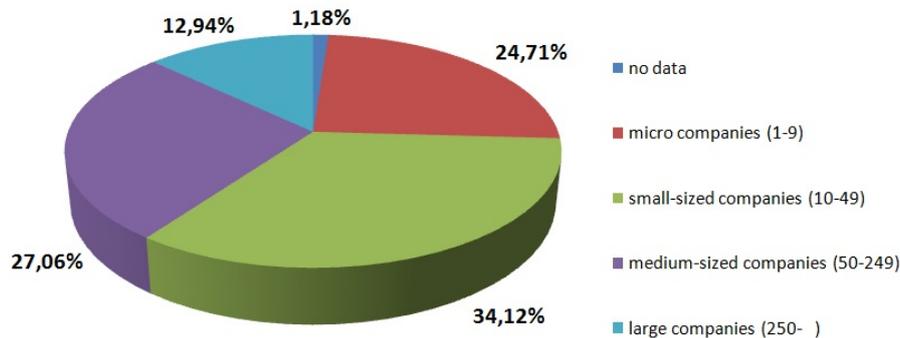
Table 5: What are the tangible benefits of innovation according to companies?

Benefits of innovation at the company	number of responses	proportion (%)
revenue growth	515	63.27%
improved competitiveness	472	57.99%
improved profitability	402	49.39%
developing relationships with new partners	399	49.02%
increasing market share	317	38.94%
cost reduction	316	38.82%
improved productivity	191	23.46%
other	19	2.33%
total number of firms:	814	total number of companies, 814 = 100%

Source: INNOTARS research program

In the course of the research we tried to gain deeper insight into the companies' operation and network of relationships not only by using questionnaires, but by conducting deep interviews. As part of this, 85 deep interviews were conducted nationwide with company heads. Figure 3 shows the proportion of companies that participated in this part of the survey according to employee headcount.

Figure 3: The distribution of companies participating in the deep interview by employee headcount (%)



Source: INNOTARS research program

Table 6 shows who companies seek to develop relationships with when they would like to implement an innovative process. Here it can be seen that building relationships with suppliers and customers is of paramount importance. Participation in the supply chain itself can also be explained by this, building

more efficient and preferably long-term relationships with customers and suppliers. According to our assumption Hungarian companies have also realised the importance of this, and are showing an increasing tendency to move toward this solution, but as yet this is by no means taking place at a high level. However, to support our assumption we consider it important in the future to take account of the results of international research.

Table 6: Who does the company work with most frequently if it would like to create something (value) new?

suppliers	37	43.53%
customers	39	45.88%
government/agencies	8	9.41%
universities	28	32.94%
research institutes	19	22.35%
other companies	27	31.76%
other	2	2.35%
		total number of firms (85) = 100 %

Source: INNOTARS research program

When we asked the company managers what they would need in order to be able to create more innovative things (Table 7), the highest proportion of them indicated money. Only 40% of companies indicated a need for relationships or knowledge in order to create value at a higher level of quality or in a new form for their customers and partners.

Table 7: What would the company need if it would like to create something (value) new?

information	29	34.12%
knowledge	36	42.35%
money	62	72.94%
technology	29	34.12%
relationships	37	43.53%
creative people within the company?	35	41.18%
an atmosphere which encourages innovation	37	43.53%
		total number of firms (85) = 100 %

Source: INNOTARS research program

4. CONCLUSION

Through cooperation in supply chains and relationships products or services can succeed, production and the provision of goods and services can be made more efficient, customer satisfaction can be enhanced, and as a result, through all of this, the competitiveness of companies and the national economy can be increased. In our opinion, Hungarian companies are gradually beginning to realise the potential of inter-company relations, but still have a low degree of confidence in partners. The activities of Hungarian companies and participation in various forms of cooperation are complicated by several social and macro-economic factors. In order to confirm the conclusions drawn on the basis of the results of our examination, we consider it necessary in the future to seek international (primarily European) benchmarks and compare them with our results.

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