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SOME REMARKS ABOUT CHALLENGES IN SUPPLY CHAIN MANAGEMENT – VALUE CREATION, RISK MANAGEMENT, INNOVATIVENESS AND DEMOGRAPHY

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Abstract: Globalisation processes, the development of information technologies, growing expectations of shareholders and increasing changeability of the economic environment force interdependence of activities undertaken by entities operating today. This refers in particular to supply chains understood as a network of organisations involved in a range of flows both in the area of tangible goods and intangible ones. The aim of this paper is to indicate leading modern management challenges facing supply chain participants. It pays attention, among other things, to the issues of risk management, increasing innovativeness, creation of value added for the customer and functioning of supply chains. The discussion presented is a result of literature studies in the area indicated. This study systematically investigates supply chain management literature, with an aim to map out what is the main challenges in supply chain management and what needs to be explored further. The review findings suggest that a majority of existing studies concentrate on value creation, risk management, innovation and demography.
Keywords: *supply chain, risk management, innovations, create innovations, demographic changes, value added for the customer*

1. INTRODUCTION

The dynamically changing environment of entities operating today forces them to look for new solutions matching the main challenges connected with conducting business activity. One of them is undoubtedly an approach to the problem of risk related to carrying out business activity. Particular importance is attached to this area in analyses concerning supply chain management, where risk is an inherent element of the complexity of processes that take place and are performed [11]. Large diversity of threats in supply chains is emphasised in studies by, among others [3, 9, 34]. Among the leading causes of the increasing vulnerability of supply chains, they point to globalisation, increased saturation of markets and intensity of competition.

A debatable issue is the problem of creation of value added for the customer in a supply chain. A good solution in this respect is to integrate activities undertaken in the area of supply chain management with marketing activity, to unite them as part of an added value chain in a broader sense. Such integration of an enterprise's activity on the supply and demand sides increases flexibility of value creation processes in an enterprise and subordinates them to

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fulfilment of the real needs of individual customers, allowing an enterprise to offer its customers added value they really expect based on their value for an enterprise.

Complexity of the environment, and in particular growing expectations of customers, contributes to increasing complication of processes taking place as part of modern supply chains. The necessity of introducing innovations additionally complicates these processes. In order to achieve market advantage, managers of individual entities, or leaders of supply chains, should focus on taking joint initiatives. Often, these are business models, or unique customer service solutions that are of particular importance in activity based on cooperation with numerous suppliers and sub-contractors. As a result, processes taking place in the supply chain are optimised, bringing benefits to all supply chain participants, including the consumer.

Thus, the dynamic nature of a supply chain requires a comprehensive analysis of the relationships between the level of services and investments in resources. Enterprises cooperating in a supply chain more and more often take strategic decisions to include new innovations into its specific links. Such decisions require however prediction of the environment conditions, and in particular – more and more often – knowledge of the demographical structures of population. International studies show that demographical processes can help to predict approach to supply chain management [22, 28]. Within management studies, Polish literature distinguishes social logistics, i.e. management of material flows (along with accompanying information) fulfilling a special social role in order to receive specified spatio-temporal values (and complementary subjects) resulting from the needs of society and ensuring its proper functioning [39]. The link between the sub-discipline of social logistics and demography in defining activities aimed at organisational changes to maintain sustainable development of analysed societies is also indicated by TRZPIOT [40], among others.

2. CREATING VALUE ADDED FOR THE CUSTOMER AS A CHALLENGE IN SUPPLY CHAIN

According to the definition by Lambert, a supply chain is "the integration of key business processes from end users through original suppliers that provides products, services, and information that adds value for customers and other stakeholders" [20]. Supply chain perceived in such a way encompasses all processes occurring in added value chain, from cooperation with suppliers through operational processes to fulfilment of end users' needs. From the perspective of the problem of value creation, it is very important that every participant of a supply chain is really involved in creation of added value for the end user. Such approach in supply chain management is based on integration of involvement on the supply and demand sides in the value chain [14]. In this sense, supply chain management refers to all processes, technologies and strategies that together create the basis for cooperation with all suppliers, both internal and external ones.

Integration of activities undertaken on the supply side, e.g. in the area of logistics, operational activities and those on the demand side, e.g. those connected with marketing activity, is a basis for professional management of supply chain. In this situation, it is very important to take into account marketing approach in supply chain management. This is because sometimes marketing activities in an enterprise are taken independently from activities as part of a supply chain. Within this meaning, supply chain management optimises supply of resources and as such generates costs in the area of production and distribution,

while marketing activities are focused around revenue creation through identifying customers' needs and reacting to them [41].

The situation when supply chain management and marketing of an enterprise are separate areas occurs too often and is unfavourable for a company. Knowledge of customers' preferences, their real needs, should be an impulse for taking actions as part of a supply chain and make it possible to adjust market offer to customers' expectations. This is a prerequisite for activating value creation processes in an enterprise. "For economic processes to acquire value creation character, they should be organised in such a way that their implementation generates added value in line with expectations of customers and business partners, in particular investors. This is because, the interests of these groups of stakeholders are most important in the operation of business-oriented economic organisations." [45] Added value for customers should be created at level equal to their value for the company.

3. RISK MANAGEMENT AS A CHALLENGE IN SUPPLY CHAIN

As stressed in the introduction, the issues of risk in supply chain is a subject addressed by many researchers. However, an approach to risk management has been developed since relatively recently. Defining the concept of risk in supply chain, researchers highlight its specificity and complexity, which are inherent characteristics of the process itself. One of leading definitions of risk cited in literature on this subject describes it as "situations in the supply chain in which the decision maker does not know definitely what to decide as he is indistinct about the objectives; lacks information about (or understanding of) the supply chain or its environment; lacks information processing capacities; is unable to accurately predict the impact of possible control actions on supply chain behaviour; or lacks effective control actions (noncontrollability)" [42]. The definition clearly emphasises the importance of both risk and uncertainty as key components of a complex decision-making process. Although various aspects of supply chain risk have been analysed for many years, nowadays supply chain management is one of intensively developed areas in logistics research [1]. It is confirmed by, among other things, the number of scientific works that analyse problems in this area. In leading databases covering literature on management (SCOPUS, Emerald, Elsevier, Google Scholar) there is an increase in the number of publications addressing issues concerning risk, risk management, supply chains and logistics. For instance, the number of papers on the subject discussed included in the database Science Direct increased almost threefold between 2000 and 2015, with more intense increase observed since 2010 *(Figure 1).* The context of risk in supply chain management most often appears in connection with analysis of such problems as: supplies, product, environment, model or project. The main factors causing supply chain disruptions (i.e. risk sources) include transport delays, changes in demand, information asymmetry and insufficient integration of supply chain [1, 42]. At the same time, it should be stressed that while significant part of research concentrates on identification of risk sources, only a small share of it analyses and provides measuring instruments and indications in the area of risk management (this is illustrated, among other things, by the relation of the number of "supply chain" publications to "risk + supply chain management" ones).

Risk in the context of supply chain is undoubtedly a significant management challenge nowadays. Some authors even indicate the need of supply chain risk management (SCRM), which, relying on risk management methodologies (especially from the perspective of ERM) and business continuity management (BCM), highlights the specificity of the approach to

risk in this process, in particular high interdependence of the different processes and risks [12]. Both risk itself and risk management with reference to supply chain are defined in a multifaceted way. One of the works analysing this issue in great depth is work by KILUBI–HAASIS *Supply chain risk management enablers – A framework development through systematic review of the literature from 2000 to 2015* [16]. Showing a variety of approaches presented in this area, the authors indicated at the same time the main characteristics determining effectiveness of this process. These are: transparency of undertaken activities, their flexibility and interdependence. It is diversity and significance of an individual approach to the issues of supply chain risk, matching the specificity of an industry or even a given enterprise, that is stressed in both academic and practical studies. That's why case study analyses are considered to be so important.

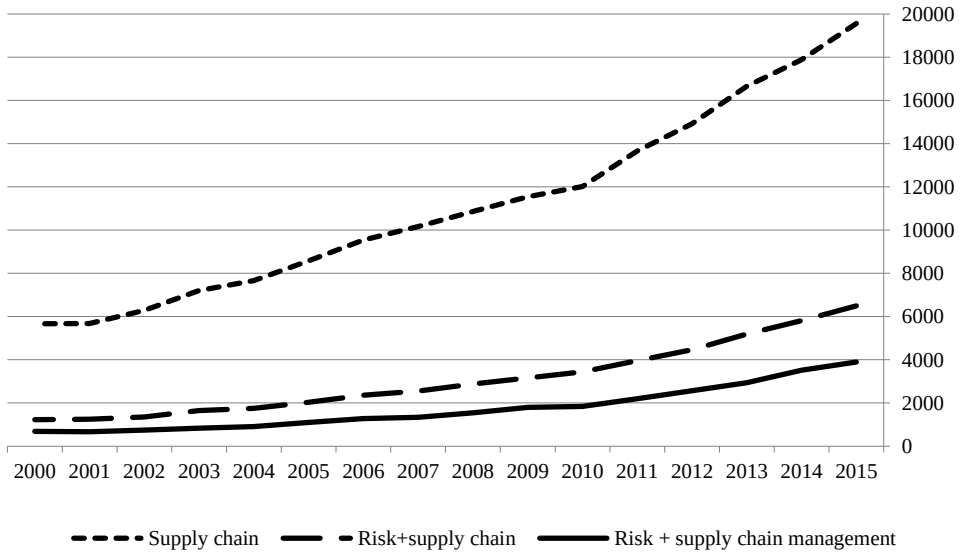

Figure 1. Number of academic literature in supply chain and risk areas
(Source: Own study based on http://www.sciencedirect.com/science/search [10. 07. 2016])

Summing up the above-outlined trends in modern studies of supply chains, it can be stated that risk management is undoubtedly a particular challenge to modern entities in this area. The complexity and multifaceted character of variables determining decision-making processes in this area requires that decision makers take a particular look at the problem of risk and its changeability in modern economic processes.

4. THE INNOVATIONS AS A CHALLENGE IN SUPPLY CHAIN

Modern entities constantly look for new ways to strengthen their market positions. Many authors, stress that innovations are vital in this area [e.g.: 8, 15, 26, 29, 31]. Of particular importance are here the scope and pace of creation and implementation of innovations. Enterprises that do not use new technologies fast enough are at risk of losses as a result of limited competitiveness of their products, and thus decreasing market share.

In modern management, particular attention is given to innovations that ensure a company a more permanent advantage over competitors in its industry [7]. Stresses that innovations permeate all spheres of a company's activity. They include changes to a product design, marketing method, offered price, service to the customer or changes to management organisation and methods. M. E. PORTER thinks that innovations are both technological improvements and better methods and ways of doing something; this may be manifested in changes to a product, process, new approaches to marketing, new forms of distribution or new concepts of management [26].

Thus, innovativeness is connected with involvement in implementation of innovative processes, which means ability to generate or seek and adapt new products, processes, technologies and organisational solutions [17, 32]. A. PÉREZ-LUÑO, J. WIKLUND, R. VALLE CABRERA stress that enterprises can independently generate innovations or introduce ready solutions from outside [24]. Enterprises' innovativeness depends on their innovation potential and their near and far environments, which can be both sources of limitations and numerous possibilities [20]. MACDONALD indicates the following as important for innovativeness: interactions between different areas in an organisation and relationships with its environment, including in particular with suppliers and customers [23].

In view of the above, the willingness and necessity of implementing innovations force managers to go beyond their company to establish broadly understood cooperation. This cooperation may involve both traditional trade contacts, creation of close relationships with suppliers and customers and entering into various alliances and cooperation agreements, or supply chains [25].

The benefits of cooperation in networks include possibility of using network assets such as access to an already functioning base (e.g. customer database), relationships with third parties (suppliers, distribution channels, universities), a community of users (benefits of mutual contacts to exchange collections, information, experience) and a stream of ideas (one, dominant company leads in access to the latest ideas and solutions [35]. Cooperation with competitors, suppliers, customers and other institutions increases enterprises' capabilities of company management. Regular suppliers allow the problem of supply control to be eliminated [4]. All the above-mentioned activities are designed to enable information and staff exchange and support in creation and implementation of new innovative undertakings.

In view of the above, particular attention should be paid to the impact exerted by entities forming supply chains on the process of information generation. The functioning in an integrated supply chain contributes to generation and implementation of innovations in all links of a supply chain. Managers of the individual supply chain participants consider implementation of innovations that first of all contribute to effective management of all phases of the supply chain, and second increase their competitiveness on the market.

In traditional initiatives, consisting of cooperation between enterprises, the main premise for undertaking this type of activity is usually possibility of achieving individual benefits by enterprises. In the case of a supply chain, the main aim of starting cooperation is to optimise processes that take place in the supply chain, assuming benefits to all participants of the supply chain, including the consumer. The scale of cooperation in the supply chain is significantly larger than in traditional relationships of enterprises, it spans a longer time horizon and includes a larger number of partners [2]. By introducing new management techniques, an enterprise can achieve increased efficiency, decreased costs and increased quality, which as a result also benefits customers of a company through better and cheaper

products and services. All these premises, as well as the necessity of defining new ways of building market position in the modern world, contributed to researchers of supply chain management becoming more interested in creation and implementation of innovations as part of the supply chain as a whole. More and more often, authors mention building market position of whole supply chains instead of single entities.

At this point, like in the case of risk, it is worth referring to the number of scientific works that analyse problems in the area of supply chain management as well as creation and implementation of innovations within supply chains. With the same assumptions as above, we can see an increase in the number of publications addressing issues of innovations, management of innovations, supply chains and problems connected with their management.

As the Science Direct database shows, the number of papers on the subject discussed significantly increased between 2000 and 2015, especially in 2010. In the case of innovations, increased interest expressed in the number of publications on this subject has already been visible since 2004 *(Figure 2).*

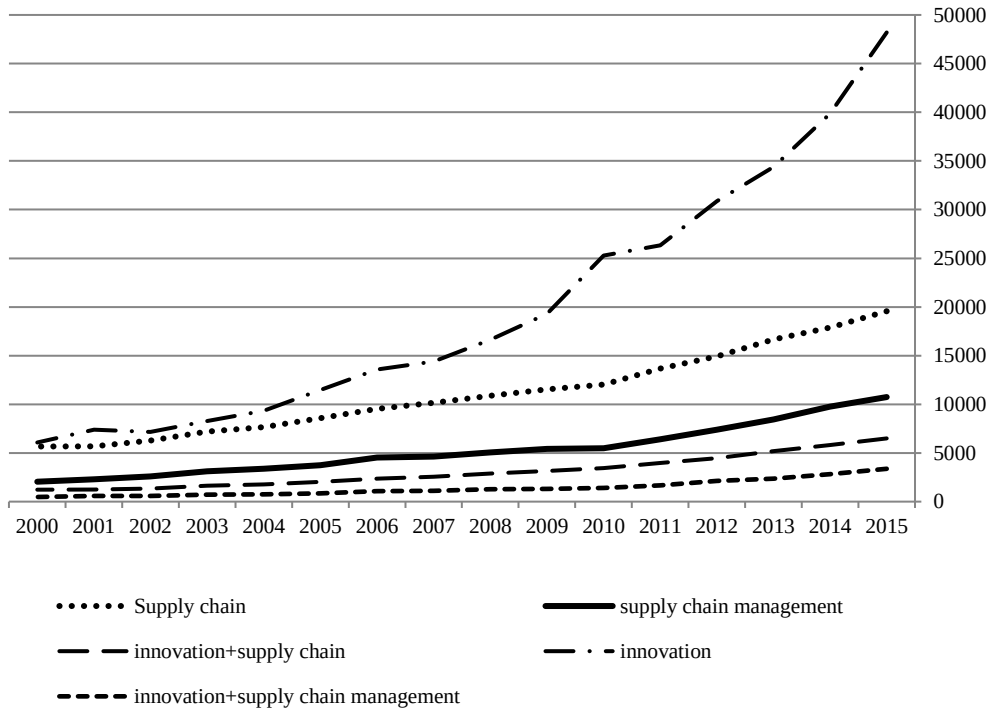

Figure 2. Number of academic literature in supply chain and innovativeness areas
(Source: Own study based on http://www.sciencedirect.com/science/search [10. 07. 2016])

As with "risk", databases show significant difference in the relation of research concentrated on innovations in the broad sense or supply chains. Much less explored is the area of management of integrated supply chain and its innovativeness, which can be illustrated, among other things, by a relation of the number of: "supply chain"/ "innovation" to "innovation + supply chain management" publications.

Innovation-oriented activities, taken as part of an integrated chain, bring effects when there is trust in the individual elements of the relation. In the long-run, focus on quality and innovations, as well as defining incentives for efficiency growth, reinforces cooperation, leading to better communication that co-determines the quality of cooperation [43]. As stressed by CHAPMAN, SOOSAY and KANDAMPULLY, innovativeness as part of supply chain can be achieved through activities in three dimensions (areas), such as: new technologies, new forms of cooperation and new knowledge and skills [6]. New form of cooperation is a dimension, that emerged as a result of recognising beneficial effects of transforming transaction relations into partnership-based ones. Reduction of the number of suppliers in favour of more lasting relations between participants of a supply chain caused increased competitiveness and reduction of costs [42]. However, the above-mentioned areas cannot be treated separately, as they are strongly connected with each other. The idea of management of innovations in a supply chain is to strive after sustainable development in each of these areas, which in turn should be translated into effectiveness of the whole chain. According to *Deloitte Raport* [37] on supply chains, being a winner in the area of innovations requires:

- "Thinking beyond supply chain – innovation is not a functional responsibility; every part of the organization must think about ways to innovate in multi-faceted ways and anyone can initiate it,
- Beginning piloting potential disruptive technology applications – this can help you keep pace with technology improvements and avoid scrambling to play catch-up as broader applications emerge,
- Building innovation capabilities – this is best done through experience and discipline; take action now to pilot and launch a handful of bold innovations that provide invaluable lessons learned for future innovations."

5. CONDITIONS OF THE SUPPLY CHAINS FUNCTIONING – DEMOGRAPHIC ASPECTS

Demographical structures (concentration of population, population by age) of many European countries vary by location. In Central Eastern European countries, according to Eurostat data,[5] around 40% of population lives in rural areas. Providing products to a large number of small communities is thus a huge challenge to distributors and requires a comprehensive approach within a supply chain to effective management of all links and processes that are performed in it.

As pointed out by SKIBIŃSKI–SIPA, among others, *the global demographic changes in life expectancy and economic statuses are shifting the way people do distribution logistics* [33]. Based on observed demographical tendencies, it can be concluded that the new approach to modern and future concepts of supply chain will require taking into account the following factors:

- increasing urbanisation – thoughtful planning, supply chain solutions and distribution improvements will be needed to keep up with urban growth.
- society ageing, especially in highly industrialised countries; by 2030 population aged over 60 will account for around 21% of world population (for comparison: in 2000 the accounted for 10%). An aging population will show changes in the rates and patterns of consumption.

[5] Eurostat database http://ec.europa.eu/eurostat/data/database [21. 07. 2016]

- globalisation and regionalisation occurring parallel as a response to changing economic environment and turbulences taking place in global economy to varying degrees in the different countries,
- different population growth rates – Nations with declining birth rates may see labour shortages.

In view of the above, the growing complexity of logistics processes and activities, necessity of constant improvement of distribution chains and channels, extension of the range of products or taking into account changing and varying customers' demand requires implementation of a range of very precise and thought-out activities as well as building new innovative concepts and strategies. Of importance is, as pointed out by GOŁEMBSKA, SALVADOR et. al., STADTLER, a skilful configuration of a logistics network understood as defining the structure of products and ways through which logistics products flow [10, 30, 37]. For this purpose, it is necessary to analyse input data for configuration, such as:

- a list of products of a specific production line,
- volume and structure of supplies of each of the products at customer locations,
- location of raw material sources and points of sale,
- warehousing costs and fee rates for warehouse space,
- supply and production costs,
- delivery frequency.

Table 1 presents a concept of logistics network configuration with the inclusion into the configuration stages of strategic analyses evaluating the impact of micro- and macro-environment factors on supply chain.

Table 1
Analysis of supply chain in the process of logistics network configuration

<table>
<tr><td rowspan="2">Analysis of the competitive environment of a supply chain</td><td colspan="2">SWOT analysis</td><td rowspan="2">Scenarios</td></tr>
<tr><td colspan="2">Analysis of the macro-environment
– economic sphere
– political and legal sphere
– demographic and socio-cultural spheres
– technological sphere</td></tr>
<tr><td colspan="4">Analysis:
of demand, location, economic-financial, outsourcing</td></tr>
<tr><td colspan="4">CONFIGURATION OF A COMPLEX LOGISTICS SYSTEM/LOGISTICS NETWORK</td></tr>
<tr><td>Centralisation/decentralisation
– number of nodes</td><td>Location of nodal points of network</td><td>Organisation of transportation processes</td><td colspan="2">Modelling of relations between nodes</td></tr>
</table>

(Source: Own work based on: [18])

Summing up, configuration of a logistics network is becoming a necessary activity in logistics of enterprises, taking into account a range of factors, such as: demographic environment, sales markets, transportation costs of raw materials and finished goods or warehousing costs. It should be stressed that complexity of decision-making processes grows with increasing product diversity and geographical coverage and changeability of demographical structures (number of target customers). Thus, effective management of modern supply chain requires complex analysis of a lot of data which usually has to be acquired in real time. As stressed by BUJAK, fulfilment of expectations that are generated towards the present and prospective supply chain and refer to permanent reduction of costs and time it takes to implement logistics activities is increasingly difficult, complicated and requires taking into account increasing amount of data coming from such a changing micro- and macro-environment [5].

6. LIMITATIONS AND FURTHER RESEARCH

While this study contributes to both literature, some limitations open up avenues for further research. First, supply chain management is a multidimensional concept, and we only investigated selected aspects of few areas in it (value creation, risk management, enterprises' innovativeness, demography). There are many other areas of challenges in supply chain management and future research should investigate the relationships between other dimensions of this concept. Second, our research aimed to identify selected challenges in an exploratory way. Future research could extend this research concept here identified complementing it with other areas, such as financial management or demand management aspects. Finally, our study based on a systematic analysis of the literature – future research could test our findings in management practice.

7. SUMMARY

The challenges signalled in this paper referring to supply chain management in modern economic and social conditions certainly do not exhaust the wide range of problems facing participants of these processes. However, the paper indicated leading trends in this area, stressed both in scientific and practical literature. Undoubtedly, the fundamental issue in this area is co-responsibility of supply chain participants for creation of added value for the customer. This can be achieved by integration of operational and logistics activities taken on the supply side with marketing activities taken on the demand side, which underlies professional supply chain management. The paper highlighted the role and importance of implementation of innovations and risk management as key processes in supply chain. These are processes aimed at reducing the uncertainty level connected with failure to achieve an objective (failure to achieve the expected value) and building a permanent market position of the different participants of a supply chain and its effectiveness as whole.

Moreover, the paper pointed out that observed demographical processes are becoming important for the functioning of supply chains, in particular in the international space, as the impact of micro- and macro environment factors is visible not only in the change of the approach to supply chain management, but also at the stages of logistics network configuration.

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