

## CHARACTERISTICS OF SUPPLY CHAIN MANAGEMENT IN BULGARIA

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**Abstract** The aim of the article is to outline the characteristics of *supply chain management* (SCM) in Bulgaria on the basis of data from the Bulgarian business practice and to reveal the existing reserves for improvement. The research methodology includes the systemisation and development of variables measuring two aspects of SCM: internal – the integration between the company's functions, and external – the integration between the companies in the supply chain. Personal interviews on the basis of a questionnaire were used for the collection of the data. The general conclusion is that there are organizational prerequisites for internal integration of the logistics activities in the Bulgarian companies and they become more cooperative towards their partners too. But they lag behind the foreign companies in the areas of goals setting and performance management, the investments in information technologies and the greater focus on the relationships with customers. A main outcome of the research is the development of the model of SCM application in Bulgaria which constitutes of three phases: traditional relationships, coordination, collaboration and full integration. The second phase consists of three stages that correspond to different degrees of coordination. The role of the logistics sector for SCM is also assessed. Although the logistics service providers in Bulgaria lag behind the logistics sector in well-developed countries, as a whole they demonstrate an aspiration for the improvement of their competitive position and proneness to implement contemporary business practices which could contribute to the success of SCM application in Bulgaria.

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## 1. INTRODUCTION

The theory and practice of *supply chain management* (SCM) are broadly discussed in the scientific and the business circles all over the world and this is accompanied by an increasing number of publications in the area. SCM is based on the understanding that the challenges of the present-day competition cannot be effectively faced through isolated changes in the individual companies but through the development of collaboration between the participants in the production and the delivery of products from the initial sources to the end customers.

Globalization made most of the Bulgarian companies parts of international *supply chains* (SC). What is more, the accession of our country to the European Union brings to the forefront the European customers' high requirements for quality, service and flexibility. In this respect it is necessary for the companies to reveal opportunities to respond to these requirements through effective and efficient interaction with other SC members. The aim of the article is to outline the characteristics of SCM in Bulgaria on the basis of data from the Bulgarian business practice and to reveal the existing reserves for its improvement.

## 2. METHODOLOGICAL ISSUES OF THE SCM RESEARCH

The research methodology includes the systemization and development of SCM variables. The accepted approach is to view the Supply Chain Management concept in two aspects: internal and external. The first one is connected with the extent of coordination of the activities between the company's functions and the second one reflects the intensity and the content of the relations between supply chains members. The basic characteristics of SCM in this last aspect are viewed as coordination between companies in the spheres of material flows management, information flows management, knowledge flows management and relationships management. Thus the research approach brought to the measurement of SCM application with the following variables:

1. *Variables measuring the integration of the internal supply chains:*  
Organizational structuring of the management of the logistics activities;  
Extent of cooperation between functions; Level of information technologies;  
Compatibility of goals and performance measures between functions.
2. *Variables measuring the integration of the external SC:*

- *In the area of material flows management:* Content of communication; Supply base rationalization; Compatibility of goals between supply chains members; Compatibility and sharing of performance measures; Extent of feedback in the chain.
- *In the area of information flows management:* Technological capabilities for information sharing between SC members; Methods for information sharing; Functions participating in the inter-company communication.
- *In the area of knowledge flows management:* Knowledge sharing.
- *In the area of relationships management:* Stability of relationships; Scope of relationships management.

Each of the variables consists of a set of items which designate the application of different SCM practices. The methodology includes also an estimation of the internal validity and reliability of the variables through Cronbach's Alpha coefficient. The values over 0.7 reveal the high internal consistency of the variables.

The method of the personal interview on the basis of a questionnaire is used for the collection of the data. The questions are predominantly structured and include nominal, ordinal (5-level) and dichotomous scales. The research includes 151 enterprises, 30% of which are representatives of the cosmetic branch, 35% of the food industry, 6% - of the textile industry, 6% - of the chemical industry, 7% of the electro-technical industry, and the rest 16% of the enterprises represent different branches. Concerning the number of employees 86.8% of the organizations are small and medium enterprises. These are basically Bulgarian organizations (83.4%) selling their products mainly on the Bulgarian market (82.1%).

The data is analysed with statistical methods (structural analysis, cluster analysis, t-test). A comparative analysis is carried out with results from other Bulgarian (Dimitrov, 2003); (Vodenicharova, 2010); (Ivanov, 2011) and foreign researches [The comparison is made with results from over 35 researches published in the period 1999 – 2004 in the following journals: The Journal of Supply Chain Management, Journal of Business Logistics, International Journal of Physical Distribution and Logistics Management, European Journal of Purchasing and Supply Management, International Journal of Logistics Management, Logistics Information Systems].

### **3. EXTENT OF SUPPLY CHAIN MANAGEMENT APPLICATION**

#### **3.1. Integration of the internal supply chain**

In most of the surveyed companies there are organizational prerequisites for internal integration of the logistics activities. The number of the Bulgarian companies than have a logistics department in their organizational structure increases (58% of the interviewed against 22% in 1999 (Dimitrov, 2003)).

This is due not only to the realization of the necessity for internal integration but also to the broad popularization of logistics in the Bulgarian business and to the presence of international companies with well working logistic departments as well. However the extent of the logistics activities integration (measured by the number of the activities performed by the logistics department) is still comparatively low. On the average the logistics department performs 4 activities.

The departments that interact best in the Bulgarian companies are those that carry out the main activities – purchasing, production, sales and service. This is no doubt an important factor for the in time satisfaction of customers' requirements, but the fast product design and market introduction will have an ever increasing importance for the achievement of this aim which insists on a high degree of integration between R&D and the other company's functions. That kind of integration, to our regret, is low in the interviewed companies.

Regardless of the significance of the information technologies for the success of the integration, the companies assess their capabilities in this area much lower than the necessary ones – the investments in systems such as ERP, DRP, MRP and Intranet systems receive comparatively low average estimates under 2.5. The situation is similar in the meat processing industry where there is nearly no usage of software products for the management of the logistics activities (Vodenicharova, 2010). This fact confirms the conclusion that other Bulgarian branches have also little interest in the computerized systems and technologies which can increase the quality of the logistics processes on all management levels.

A large part of the companies measure their performance, but not all of their employees realize what goals are followed – 30% from the interviewed point out that their employees are not familiar with the company's goals, nearly every second company admits that its goals are not quantitatively expressed and formally written goals are missing in 54% companies. Most of the managers continue to account for incompatibility of the measures between functions. In this way the absence of synchronized measures and clear goals very often leads to internal conflicts and inefficient usage of the resources.

### **3.2. Integration of the external supply chain**

The global processes in the world industry are directed towards the development of free trade which serves for the optimization of the positive effect of wealth and employment creation. They help for the achievement of compatibility between partners (Yaneva, 2003). Regarding the external integration the research results show that Bulgarian companies become more cooperative towards their partners too as they lessen the number of their suppliers, increase the duration of their partner relationships and establish joint communication structures consisting of appropriate methods for communication

(electronic ones, team meetings) and of representatives from different functions as participants in the communication.

However these positive trends are impeded by the limited character of the shared information which concerns basically the trade parameters of the transactions (prices, delivery and payment terms). Not all of the companies are ready to share information due to fears of losing strong positions. Obviously, in order to manage the material and knowledge flows, they should share not only operative information regarding orders, promotions, forecasts, prices, but also strategic information concerning company's strategy, investments, market knowledge, and new products' technology. This kind of information is often confidential and companies fear that if it is revealed to the competitors this could hamper their product and market strategies. That is why as supply chains members become more and more interrelated it is of paramount importance to find innovative ways for risk management in relation to information sharing with partners.

The analysis shows the presence of three more challenges that should be overcome. Firstly, the organizational barriers still exist which does not allow mutual goals setting in areas such as inventory management, quality management, strategic planning (average estimates under 3). The same conclusion is made as a result of a research on supply chains for compressed natural gas in Bulgaria – every SC member sets its goals for business optimization independently from the others (Ivanov, 2011). This leads to considerably high levels of inventories in the chain. It is clear that the main limitation in SCM in Bulgaria is the existence of companies not interested in the effects that their decisions have on the others and on the effectiveness of the whole SC. The absence of trust and the unwillingness to share information impedes the harmonization of strategic SC goals as well as the ways for their achievement. The development of a joint vision and the receipt of a broad support become the main problematic issues in the Bulgarian Supply Chains.

The second challenge refers to the development of compatible performance measures which should indicate the degree of goals achievement. The exceptionally low estimates of the variable *Compatibility and sharing of performance measures* (2.7 and 2.9 respectively) reveal the fact that incompatible performance measures are used in the Supply Chains. The companies should update their traditional measurement systems and synchronize them with those of their partners. This requires a different management style, new skills and competences, clear strategy, and inter-functional coordination.

The third challenge is connected with the information systems and technologies for inter-company communication. The research proved that they are still not enough suitable for effective SC integration. The item *information systems integration with suppliers and customers* has an estimate of 2.45 and the rest of the items (point-of-sales systems, delivery tracing systems, WEB-based catalogues) are also characterized with extremely low average estimates – around

and below 2. The research revealed scarce resources for investment in contemporary information systems providing for information visibility concerning demand, inventory and SC costs. What is more, the returns of these investments are not always evident for the managers and they find it difficult to achieve financial agreements for the allocation of the investment risk and respectively of the benefits from the investment. As an answer to these problems many companies rely on a strong support from partners that are ready to invest in new compatible systems, because ERP applications such as those offered by Baan, Peoplesoft, Oracle, and SAP are expensive for the Bulgarian companies. But yet considerable benefits could be realized even when isolated modules are implemented. These benefits vary from the improvement of the routine administrative functions to facilitation of decision making.

From the mechanisms for external integration knowledge sharing is very poorly represented. Just about one of five companies shares knowledge and experience concerning products, quality, logistics and company management as a whole. Only knowledge sharing for the development of new products receives an estimate around 3. It is still comparatively low in relation to the continuous shortening of products life cycles and the necessity to quickly develop new products which is hardly achieved without the mutual efforts of the main SC members.

The analysis of data reveals that companies moderately apply practices in connection with relationships management, especially those that relate to long-term agreements and the rules for roles and responsibilities alignment (estimates of 3.8 and 3.7). It can be concluded that they gradually start to shift the focus towards increasing the durability of the relationships and the extent of their formalization. However there are difficulties in viewing the chain beyond the first tier suppliers and customers. Companies rely strongly on them to solve problems arising in the relations with second tier suppliers and customers. The main reason for that is the lack of vision for the improvement of the whole SC performance and also the long and complex supply chains that include many members with different goals. A lot of companies usually find it difficult to integrate even one link in the chain what about several SC links.

The specific point here is that the extension of the scope of relationships management is more towards the clients rather than the suppliers – the companies strive more to understand the requirements of their second tier customers and to take part in the marketing decisions of their direct customers. In fact the comparative analysis of most of the variables in relation to suppliers and customers reveals that many companies focus on the downstream SCM and that the upstream integration with suppliers is of secondary importance. Even if they share some information with the suppliers (for inventory levels, for example), the manufactures ignore transferring information for future promotions and programs for customer service improvements, so that the suppliers can make a proper planning of their activity. Over 60% of the end product manufactures do not share information with their suppliers about sales and demand forecasts.

Thus the absence of a clear picture of the real demand does not provide an opportunity for the improvement of the decision-making process in the SC.

The research finds out too that the wholesalers apply in greater extent the SCM practices in comparison with the manufactures. The high score of the wholesales for most of the variables are explained with the fact that most of them are distributors of leading foreign companies on which many SC members depend or which have first started the collaboration as a direct source of knowledge in this area. On the other hand, the manufactures from which more than 80% are Bulgarian companies, apply in lower extent the SCM practices and this threatens their effectiveness. The competition of foreign supply chains encompassing Bulgarian distributors imposes two possible solutions for the Bulgarian manufactures. The first one refers to joining foreign SC and manufacturing products with foreign trade marks. This is the strategy followed by many cosmetic companies. The second solution assumes Supply Chain Management improvement for products with own trademarks which will require from the Bulgarian manufactures to direct the roles and responsibilities of SC members.

The comparative analysis with results from foreign researches allows for the conclusion that concerning most of the variables the Bulgarian companies lag behind the foreign ones. The contemporary large-scale SCM programs are rare in the Bulgarian business. In spite of the gradual popularization of the concept the interviewed companies have not still put it into practice or they do not follow the general SCM tendencies brought out of the practice of the foreign companies. The discovered differences are largely in the areas of goals setting and performance management, the investments in information technologies and the greater focus on the relationships with customers.

#### **4. THE MODEL OF APPLICATION OF SUPPLY CHAIN MANAGEMENT IN BULGARIA**

The main aim of the cluster analysis is to assess the evolution of the companies in the area of SCM with the increase of the extent of integration. It leads to the formation of 5 groups of companies. The first one consists of companies which do not apply SCM practices (14.4%) and with every next group the extent of SCM application increases leading to the fifth one where the most advances companies are (8.2%). The biggest is the share of the companies which are in the intermediate stages of Supply Chain Management application. The examination of the variations of the items' values for the five groups allows for the differentiation of the following phases and stages that constitute the model of SCM application in Bulgaria (Fig. 1).



**Fig. 1** SCM variables for the different groups of companies (The first four variables from the bottom upwards measure the extent of internal integration)

**Phase I:** *Traditional relationships* (first group of companies). Here the management of activities in the Supply Chains is performed independently from the other SC members.

**Phase II:** Coordination. In this phase the bases of the integration is laid down which is expressed in purposeful efforts to coordinate the management of material and information flows only with the first tier customers and suppliers. The phase illustrates a state of semi-integration and it consists of three stages that correspond to different degrees of activities coordination.

*Stage 1 – Embryo:* A focus on the improvement of the operative performance (second group of companies).

*Stage 2 – Downstream Supply Chains integration towards customers:* A focus on the improvement of the effectiveness and control of the marketing and logistics activities down the SC (third group of customers).

*Stage 3 – Downstream and upstream SC integration:* Formation of strategic relationships with the main customers and suppliers and application of some of the integrative mechanisms (fourth group of companies).



**Phase III:** Collaboration (fifth group of companies): the integration encompasses second tier SC members and refers not only to the material and information flows but to the knowledge flows as well.

**Phase IV:** *Full integration.* It is characterized by integration of all processes in the whole SC which can be accomplished only with *excellent technological capabilities for information sharing*. Due to the fact that these capabilities have not yet developed in the Bulgarian business practice, relationships of full integration were not found out amongst the interviewed companies.

The phases of SCM application in Bulgaria are characterized by *the parallel evolution of the internal and the external supply chain integration*, in contrast to the companies in the highly developed countries where the internal integration usually precedes the external one. This special feature is manifested in the meat processing industry too (Vodenicharova, 2010) and confirms the results of earlier researches. It can be explained with Bulgarian companies relying on the closer collaboration with other SC members in order to reduce the negative influence of the instable environment (Dimitrov, 2003). Another possible explanation is the fact that not a small part of the interviewed companies are suppliers or customers of more powerful foreign companies which impose on them nontraditional forms of collaboration before they have reached a high degree of internal integration.

A great number of the Bulgarian companies consider necessary the improvement of SCM. Some of them declare that there is a need for *decisions from theory* which can be implemented in practice and the decisions referring to the interaction and partnership between SC members are of great importance (Ivanov, 2011). The model offers a base for comparison and assessment of the current SCM state for the companies. It is a valuable instrument for solving strategic issues in the area of SCM such as priorities for change and the nature of the change.

The arising problem is which company should direct the allocation of the roles and responsibilities between Supply Chains members. Coherence is achieved when they are in one and the same phase of SCM application. When one of the companies lags behind the others the challenge is to make the necessary changes in order to catch up with its partners. If the company has progressed more than the others then the challenge is to encourage them to apply Supply Chain Management practices. In other words, each company has either to increase its capabilities in the area of SCM or to contribute to its application in the whole SC in order to improve its competitive position.

## **5. THE ROLE OF THE LOGISTICS SECTOR FOR SUPPLY CHAIN MANAGEMENT**

With business diversification and the increase of the complexity and vulnerability of SC more and more companies outsource their logistics

activities to make reliable and efficient deliveries. In many respects logistics service providers gradually transform themselves from performers of concrete tasks to business partners offering great opportunities for the integration of the material and information flows. That is why the degree of development of the logistics sector has a great influence on SCM application. It is expressed in the range of the provided services and in the understanding which the managers in this sector have concerning the strategic importance of SCM for the manufactures and the trading companies. In this respect it is important to reveal some of the results from the research of the state and trends in the development of the logistics sector in Bulgaria (Dimitrov, Velichkova and Rakovska, 2008). The research of the degree of the logistics sector development is made in 120 companies and 39 companies are assessed in relation to the challenges and opportunities which they face concerning the accession of Bulgaria to the EU.

The considerable fragmentation of the Bulgarian logistics sector speaks for the existence of restructuring processes in it. There are a great number of companies most of which are small providers of individual services. About 1/3 of the companies give a large priority to the niche strategy due to the high competition in the area of the traditional logistics services. The share of the 3PL companies offering complex logistics services is comparatively small (about 20%) and some of them act as a *lead logistics providers* (LLP) for some customers. Most of these companies are subsidiaries of foreign ones with well-established practice in the world.

The trend is the number of these 3PL companies to increase and the arguments for that are the following: Firstly, large parts of the surveyed logistics providers intend to enlarge their technical capabilities through the acquisition of own warehouses and transport vehicles. It is expected in the future to increase the share of companies which offer as basic services not only automobile transport but air transport and warehousing too, as well as value-added services. Secondly, many companies intend to offer more complex logistics services on the account of the individual ones. In the area of the offered services the actions that the surveyed companies intend to undertake will be focused not mainly on decreasing their prices but on the improvement of other dimensions of the services such as quality, diversity, geographic scope, extent of differentiation and opportunity for integration. Thirdly, some companies will merge with others in order to increase the range of services and geographic scope or will be acquired by more powerful competitors in the sector.

The logistics service providers marked as their essential strengths the partnerships with similar companies, their good financial state, the existence of an experience in the operations in the EU countries and the maintenance of long-term relations with customers (nearly 60% of the companies maintain long-term relations with customers). Even if the data about the information technologies in use show comparatively high degree of saturation of the management process

with them, the usage of contemporary systems for automatic identification of the products is low (Dimitrov, Velichkova and Rakovska, 2008, pp. 104).

Although the logistics service providers in Bulgaria lag behind the logistics sector in well-developed countries, as a whole they demonstrate an aspiration for the improvement of their competitive position and proneness to implement business practices which are already well established in leading foreign companies. Having in mind the demonstrated intention towards increasing the range of services including ones with management and integrative character and towards improving the information systems and human resources, we can state confidently that the Bulgarian logistics sector will not impede the further development of SCM in the manufacturing and trade companies. What is more, it could contribute to the acceleration of the success in this direction.

## 6. CONCLUSION

The research leads to the conclusion that the companies in Bulgaria gradually leave the traditional arm's length relationships and get near the cooperative ones which are a steady base for external integration of business processes. On the other hand traditional relationships have lead to the absence of trust and readiness to share necessary information. Overcoming these challenges on the part of companies that have the vision of the SC as a whole and the development of capabilities for SCM reveals great opportunities for performance improvement. Some of the Supply Chain Management practices may not be familiar to many managers but this is an argument to change the management priorities concerning the relationships in the chain.

The research also revealed that there are potential leaders in the chain which could direct the achievement of synergy and the establishment of closer relationships between suppliers and customers. It is necessary not only to realize that the collaborative relationships improve the performance of the Supply Chains as a whole but to determine the allocation of the benefits between the individual SC members. The challenges here are the management of the potential conflicts in the inter-organizational relationships and the fair allocation of the benefits which could encourage the companies in the initial phases of SCM application to make efforts for the alignment of their business processes with those of their main customers and suppliers.

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## **BIOGRAPHICAL NOTES**

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