

Cite This Article:

Lutsenko I. S. Ensuring effective supply chain management under uncertainty [Online] // *Economic Processes Management: International Scientific E-Journal*. 2016. № 3. Available:
http://epm.fem.sumdu.edu.ua/download/2016_3/epm2016_3_4.pdf

Received
August 18, 2016
Accepted
September 7, 2016

JEL Classification: C81, D81, M15

ENSURING EFFECTIVE SUPPLY CHAIN MANAGEMENT UNDER UNCERTAINTY

Lutsenko Iryna Sergiivna

*PhD, Assistant Professor of Management Department,
National Technical University of Ukraine
«Kyiv Polytechnic Institute», Ukraine*

Identified the main sources of uncertainty in supply chains and tools to mitigate them. The necessity of functional, spatial and temporal integration and linkage of decision-making at different management levels. Determined that the optimization of information flow can occur due to the "shrink" in time, volume and direction, this process should be preceded by a thorough analysis and rethinking of the business processes of a complex system of supply chains.

Keywords: supply chain, uncertainty, sustainability supply chain, efficiency of the supply chain, information, information flow, information system.

Introduction. Last twenty-five years, the concept of supply chain is actively developing presenting outstanding results in practice. In conditions of turbulent market environment one of the main problems of supply chain management is the uncertainty. The main sources of uncertainty in supply chains are considered to be such things as a rule of suppliers, customers, internal system (business processes, organizational structure, information and control system) and external system (natural disasters, political and economic crises, terrorism, piracy and the like). The only way to overcome uncertainty in supply chains is timely and appropriate managerial decisions. The complexity of the system and the structural dynamic leads to the formation of a large array of extra information that under appropriate conditions can become the main source of

uncertainty on the one hand and the lack of necessary information for the effective management on the other. Currently, there is acute need to develop special methods of forming information system of the supply chain, which will allow flexible use of various methods and algorithms for solving various problems of supply chain management depending on the nature and completeness of the data uncertainty.

Analysis of recent researches and publications. The conducted study based on scientific approaches prevailing currently in the field of control theory, systems theory, systems analysis, supply chain management. In the framework of system analysis and systems theory a special role is granted today, the information aspects of learning and functioning systems, integrated systems of decision support.

However, in these developments, there have been some shortcomings: the lack of common terminology, lack of understanding of the complexity of the properties of the supply chain (as a business process and as a complex system). Also observed methodological shortcomings concerning the relationship between decision-making levels in supply chains, in addition, the flow of information as a complex object management in supply chains leads to new requirements for planning of supply chains.

Previously unsettled problem constituent. Issues of supply chain management over the last decade found wide reflection in the economic literature. Considerable attention to their study from the standpoint of supply chain management under uncertainty draw such famous scientists as D. Bowersox, V. Lambert, Waters, B., D. A. Ivanov, Y. Krichavsky, etc. Analysis of scientific sources testifies to the importance of information, building optimal information systems in supply chains to ensure their effectiveness.

Therefore there is a need for further study of the problems concerning the development of information systems in complex supply chains, the creation on its basis the optimal management impact under conditions of uncertainty.

Main purpose of this article is to identify the impact of information flow and information systems in supply chains on the adoption of effective managerial decisions under conditions of uncertainty.

The methodological basis of research was made by scientific and special methods. To clarify the term "uncertainty" in the supply chain, identifying basic provisions of the essence of "sustainability" supply chains used methods of analysis and synthesis, induction and deduction, analogy. For the analysis of problems of management decision making in supply chains and evaluation of preconditions of increase of their efficiency, we used the

method of expert evaluation, systematization and generalization.

Information database articles are monographs and scientific publications of foreign and domestic scientists, other sources of information that are collected on a separate Ukrainian enterprises that are members of supply chains.

Results and discussions. The efficiency of supply chains based on sustainability of supply chains, the sustainability of the supply chains is regarded as a composite property of the supply chain, which characterizes the ability of the supply chain to store, sell, and restore the inherent supply chain target opportunities in a purposeful and unpurposeful action. To ensure the effectiveness and sustainability of the supply chain can only be due to managerial influence.

In our opinion the whole process of supply chain management can be viewed as a unit of planning supply chains and block the functioning of supply chains. The planning and implementation of the plan always takes place in conditions of uncertainty (any person who takes management decisions can't know everything about the current state of supply chains and does not have the breadth of knowledge about the dynamics of development supply chains in the future).

John. Vorst and G. A. G. Belens allocate three basic types of uncertainty [1, p.412]:

1. Characteristics that are inherited, creating a predictable deviation. The uncertainty associated with them is reflected in high volatility of demand, supply or process indicators, creating difficulties for planning and controlling activities in supply chains, significantly affecting the operational and economic efficiency of supply chains.

2. Characteristics of the system, which are expressed in the internal structure of the circuit and depend on such factors as the architecture of the system, information and control systems.

3. External impact — market, technological, political, weather events affecting the company.

The Russian scientist D. Ivanov [2, p.120] provides a similar classification of uncertainty, although more focused on information source of uncertainty: the uncertainty of the environment, behavioral uncertainty, uncertainty of goals, personal and logical uncertainty. Considering that uncertainty is a system-wide basis, it can be argued that it is present in the supply chain always, but it can be reduced. Today there are a lot of scientific research [1- 6] on the impact of uncertainty on supply chain and means to reduce this influence. This balance of objectives, and liquidity, capacity reservation, system event management in supply chains, and things like that. All sources of uncertainty and means for its reduction is necessary to determine at the stage of planning of the supply chain, to constantly monitor the sustainability of supply chains in the implementation of the plan and to respond quickly to dangerous influence of internal and external environment on the complex characteristics of circuits. To achieve resilience of supply chains under uncertainty can balancing the violations (focused and unfocused) and the volume management action for the elimination of negative consequences. Management actions under conditions of uncertainty mainly related to the introduction of additional features in the plans of the supply chain (e.g. safety stocks, additional trains, reserve suppliers, etc.) and adaptive management during the implementation phase of the plan [2, p.495]. In fact, in the supply chain there is a need to narrow the influence of the external environment and to expand managerial influence. The supply chain management refers to integrated planning and management as a complex system has a number of problems. First, it is associated with functional integration of purchasing, producing, transportation, and warehousing activities. It is also relevant to the extensive integration of these activities among geographically dispersed facilities and markets. In addition, it considers to measure the integration of these activities

within the strategic, tactical and operational planning [4, p.532]. This integration requires linkages and a logical sequence of decision-making concerning the supply chains at various levels of planning. For adequate planning to provide for the development options are much more important than the forecast. In our view, the success of the implementation of any plan depends more on the range of possible options than the expected end result. Second is the impossibility of planning for the long term with clearly defined parameters, as a rule, all types of plans, ranging from strategic operating and finishing must be constantly adjusted in the light of uncertainty. Thirdly, the problem of planning the most complex and it consists in the impossibility of foreseeing the prospect of the emergence of new threats (uncertainties) for the participants of the supply chain (negative development) and new opportunities (positive development).

We think that all these problems of supply chain management under uncertainty more effectively overcome by optimizing the flow of information. Information flow is the main place of formation of the sources of uncertainty within the system of the supply chain and outside the system.

Constantly analyzing and managing information flow according to the goals and values of supply chains can simultaneously solve two problems:

1. Reduce certain types of uncertainty behavioral uncertainty, uncertainty of goals, personalista, logical, etc.) directly related to the movement of information flow in the supply chain, thereby narrowing the breach of the system.

2. To improve management action to violations in the system.

We offer to optimize the information flow is possible due to the "cuts" in time and volume and changing the direction of information flow. The reduction of time passing information through the supply chain can be achieved by rethinking the business processes and the use of

modern hardware, software and technical information support [7, p.226]. Greater complexity is a question of reducing the volume of information in the system and change the direction of flow. The number of information sources is constantly growing in the middle of the supply chain and beyond, so the information system needs to set the selection criteria of the importance of information for making adequate management decisions. In turn, the definition of criteria, their ranking in importance for the information system of the supply chain involves conducting management of the company analyzing all the incoming and outgoing flows, which requires a thorough understanding of how, in what form and in what business processes will be displayed in the information flow, under what management actions it can be used. We find it especially important before the optimization of the information flow in the supply chain to provide the possible complications of relations between participants of supply chains.

Conclusions and prospects for further researches directions.

1. It was revealed that the effectiveness and sustainability of the supply chain can be achieved only at the expense of managerial influence also defines the role of information, information flow and development of optimal information systems in the supply chain to make timely and appropriate managerial decisions in conditions of uncertainty.

References

1. Vorst J.G.A., Beulens A.J.M. (2002). Identifying sources of uncertainty to generate supply chain redesign strategies. *International Journal of Physical Distribution & Logistics Management*. 32, 6, 409–430. [in English].
2. Ivanov D. (2009). Upravlenie zepamii postavok. St. Petersburg: Polytechnical University. [in Russian].
3. Juttner U. (2005). Supply chain risk management: understanding the business requirements from a practitioner perspective. *International Journal of Logistics Management*, 16(1), 120–141. [in English].
4. Bowersox D., Closs D., Cooper V. (2002). Supply Chain Logistics Management New York: McGraw-Hill Irwin. [in English].
2. The influence of uncertainty on the supply chain and means to reduce this influence. These funds include: the inclusion of additional features in the plans of the supply chain (e.g. safety stocks, additional trains, reserve suppliers, etc.) and adaptive management during the implementation phase of the plan.
3. Analyzes the problems of supply chain management as a complex system that requires functional integration, spatial and time integration. This integration requires linkages and a logical sequence of decision-making concerning the supply chains at various levels of planning.
4. Optimization of information flow is due to the "cuts" in time, volume and direction. The reduction of time passing information through the supply chain is achieved through rebuilding business processes and use of modern hardware, software and technical information support. Reducing the amount of information in the system is due to the setting of selection criteria the importance of information for making management decisions that are important and acceptable for all participants of supply chains.
5. In the further research we will look at the use of the principles of partnership in the formation of information systems in the supply chain that would best meet the goals and values of all participants.

5. Hallikas J., Karvonen I., Pulkkinen U., Virolainen V., Tuominen M. (2004). Risk management processes in supplier networks. *International Journal of Production Economics*, 90(1), 47–58. [in English].
6. Krichavsky Y. (2005). Logistichne upravlinny. Lviv. Lvivska Politexnika. [in Ukrainian].
7. Lutsenko I. (2009). Konseptualni zasadu formuvannoi komputerizovanoi informasiynoi logistichnoi sistemu pidpruemstva. Ekonomichnyi Visnyk NTUU «KPI». pp. 225–229. [in Ukrainian].

ЗАБЕЗПЕЧЕННЯ ЕФЕКТИВНОСТІ УПРАВЛІННЯ ЛАНЦЮГАМИ ПОСТАВОК В УМОВАХ НЕВИЗНАЧЕНОСТІ

Луценко Ірина Сергіївна

*к.е.н., доцент, доцент кафедри менеджменту,
Національний технічний університет України
«Київський Політехнічний Інститут», Україна*

Ідентифіковані основні джерела невизначеності в ланцюгах поставок та засоби щодо їх зниження. Обґрунтована необхідність функціональної, просторової та часової інтеграції та взаємозв'язку прийняття рішень на різних рівнях управління. Визначено що оптимізація інформаційного потоку може відбуватися за рахунок «скорочення» у часі, об'ємах та напряму, цьому процесу має передувати ретельний аналіз та переосмислення всі бізнес-процесів складної системи ланцюгів постачання.

Ключові слова: ланцюг поставки, невизначеність, стійкість ланцюга поставки, ефективність ланцюга поставки, інформація, інформаційний потік, інформаційна система.

ОБЕСПЕЧЕНИЕ ЭФФЕКТИВНОСТИ УПРАВЛЕНИЯ ЦЕПОЧКАМИ ПОСТАВОК В УСЛОВИЯХ НЕОПРЕДЕЛЕННОСТИ

Луценко Ирина Сергеевна

*к.э.н., доцент, доцент кафедры менеджмента,
Национальный технический университет
«Киевский политехнический институт», Украина*

Идентифицированы основные источники неопределенности в цепях поставок и средства по их снижению. Доказана необходимость функциональной, пространственной и временной интеграции и взаимосвязи принятия решений на разных уровнях управления. Определено что оптимизация информационного потока может совершаться за счет «сокращения» во времени, объеме и направлении, этому процессу должен предшествовать тщательный анализ и переосмысление все бизнес-процессов сложной системы цепочки поставок.

Ключевые слова: цепочка поставки, неопределенность, стойкость цепочки поставки, эффективность цепочки поставки, информация, информационный поток, информационная система.