

SELECTION OF SUPPLY CHAIN MANAGEMENT SOFTWARE – PRINCIPLES AND RECOMMENDATIONS

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Abstract. *In order to deliver products to customers on time, enterprises want to accelerate business processes in supply chain management (SCM). SCM integrates logistical requirements of suppliers, distributors and customers in cohesive process which enables reduction of delivery time and inventory costs. There are many information technologies (IT) and software solutions supporting integration, optimization and management of supply chains. The basic aim of this research is to analyse various contemporary software solutions and trends in development and implementation of supply chain management software applications. Also, the paper gives principles and recommendations for selection of appropriate supply chain management software which can be useful for managers who make decisions on supply chains.*

Key Words: *information technology, supply chain management, SCM software, ERP.*

1. INTRODUCTION

Adjustment of information, material and financial flows is necessary for effective operation of supply chains. All stakeholders in the supply chain should participate in the management process regarding adjustment of the flows, in order for customers to receive ordered products on time. The management process encompasses material and parts procurement, manufacturing, distribution and retailing.

In the past, companies developed their supply chains starting with transport component of the chain. After transport, companies included warehousing, inventory control, packaging, customer service and purchase. Current industrial production is influenced by dynamic and continual changes. The changes, on the other hand, have an impact on activities and aims of supply chains which are multidimensional and include: minimization

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of costs, quality improvement of products and services, improvement of communication between firms in supply chain, increase of flexibility in shipment terms and response time, integration of IT with business process flows and reduced time of shipment. The achievement of these aims is a great challenge for each organization included in a supply chain. SCM is accepted by many enterprises as a solution for this challenge [6, pp. 735-762] [7, pp. 119-150] [12, pp. 75-108].

As we mentioned previously, many information technologies and software applications can be used as a support to SCM. The software applications support managers in solving problems in SCM and use opportunities which could occur in the process of supply chain management. SCM based on contemporary software is becoming a more interesting concept in business practice, while on the other hand in this research area there are many relevant theoretical contributions [3, pp. 119-143] [4, pp. 300-319] [17, pp. 9-64]. The contribution of the paper is the research and analysis of various software solutions and trends for the management of material, financial and information flows in the supply chain. The main aim of the research is to explain the process of SCM software selection and acquisition which is based on defined principles relating to business needs of an enterprises and features of the SCM software that is available on the market. By researching various software solutions and the process of SCM software selection, useful recommendations can be derived. Managers in organizations can use the recommendations in order to evaluate a number of software solutions and choose the appropriate one. Also the research might be a starting point for future studies of factors influencing SCM software selection which can be analysed in more detail. The features of SCM software could also be a subject for future research because of the dynamic changes on SCM software markets and continuous improvement of SCM applications.

In order to fulfill these aims and expectations, the paper is structured in six sections. In the next section, the challenges of SCM in new economic and technological conditions are explained. The third section is dedicated to a brief analysis of software applications from various vendors that can be found on the market and implemented in organizations for the purpose of SCM. In the fourth section, the features of contemporary SCM software which must be considered in the process of software selection are explained. Principles and recommendations that managers should follow in the process of software selection are analysed in the fifth section, while in the final section, concluding remarks on the SCM software selection are given.

2. SCM IN NEW ECONOMIC AND TECHNOLOGICAL CONDITIONS

Global economic conditions have changed in many aspects in the last decade. The value of the world export is growing rapidly every year [18, pp. 145-170]. Also, the structure of the main players in the world export has changed [16, pp. 645-652]. Presently, the EU participates in the world export with 42%, the USA participates with 9.2% (the value of internal trade has significant value in the USA), China participates with 6.7% (their share in the world trade is constantly growing), Japan participates with 6.4%, and the rest of the world export belongs to the other countries and regions. If we predict the future trend in global economy, a significant increase of global GDP induced by global trade is expected. In addition, all global distribution channels can not have the

same problems and the techniques for their solving now and before the expansion of IT, particularly before the internet revolution. The expansion of global trade and global information technology infrastructure are key generators for the implementation of modern logistic and distribution management systems.

At this time, it is more difficult to organize the shipment of the right quantity of the right products, to the right place and in the right time with acceptable costs and with minimal errors in documentation. Besides, sensitivity of consumers around the world enforces an increasing level of service from their suppliers. This causes greater costs of service, but on the other side it differentiates suppliers by power, rapidity and, in one word, the successfulness of their business and competitive strategy implementation. The increase of trade value implies the increase of supply costs on a firm level, whole distribution chain level and all distribution chains in one country. Logistic costs are nowadays a key factor in many industries and the trade sector and a very important aspect of operating economy as a whole.

In such a turbulent time, new solutions for optimization of global supply chains should be found. The old modes of material and information flows management have been replacing fast by new methodological techniques and technologies. Logistic management which partially optimizes material flows in one system is replaced by new concepts, business practices, innovations and ideas directed towards moving the boundaries between various companies in a distribution channel from the primary producer to final consumers. A great interest for SCM leads to a search for new solutions for supply chain optimization. The solutions enable cost control with acceptable level of customers' service on both bid and demand side of the supply chain. In combination with the absolute increase of trade, new models of supply and distribution channels are implemented. The IT and internet revolution have a key role in this situation. New software solutions enable companies to plan and manage their supply chains. All these things lead to the emergence of new mode of communication, connection, achievement and collaboration in supply chains.

SCM is placed in context of unique business process and material and information flow. The flow goes through the entire distribution channel and each individual company as a participant in the supply channel is only one shackle in the supply chain where inter-organizational boundaries are blurred. Each logistic process in an enterprise is part of a wider and greater process taking place in the whole supply chain. Therefore each managerial logistic decision should be suitable to principles of specific management in the whole supply chain.

Each participant in the supply chain, from suppliers to retailers, has a possibility to manage their own segment of the supply chain by support of IT. IT, particularly internet technology, enables connection of all participants in the supply chain. IT makes SCM more efficient by integration of demand planning, forecasting of manufacturing, material procurement, order processing, inventory allocation, order fulfillment, transport services, receiving of goods, invoicing and payment. IT enables free flow of material, financial and information resources in the supply chain [15].

IT supports SCM in three different segments:

1. the purchase side of the supply chain,
2. the internal part of the supply chain and
3. the sell side of the supply chain.

1. The purchase side of the supply chain refers to the activities of an enterprise with its suppliers. The intention of IT application is to improve purchase activities and relations with suppliers by use of electronic procurement potentials.

2. The internal part of the supply chain includes all processes referring to transformation inputs to outputs and processing of business transactions related to the transformation. Transaction processing systems (TPSs) are used for that purpose.

3. The sell side of the supply chain implies all activities participating in the shipment and delivery of products to customers. IT can support the sell side of the supply chain in two fields: the activities of customer relationship management (CRM) and the acceptance of orders from customers and delivery of products and services.

In order to effectively apply IT in SCM, an organization foremost has to differentiate between transaction and analytical information technologies and systems. These technologies have different forms and functions. Transaction information systems refer to acceptance, processing and joining rough data on historical and current operations of the supply chain (e. g. TPS, ERP systems and electronic commerce systems). Analytic information systems are related to development and application of systems for evaluation of decisions regarding the supply chain. The decisions are based on the models built from the database (e. g. forecasting systems, systems for supply chain network optimization, systems for manufacturing planning, etc.)

3. SCM SOFTWARE SOLUTIONS AND PROVIDERS

The flows of products, information and money through a distribution system of supply are a permanent source of problems. However, in these flows there are great opportunities for improvement of everyday enterprise business activities. Actually, the main aim of SCM software is to solve the problems and optimize activities and resources in the supply chain. SCM software has been going through an evolution process that started several decades ago with techniques and methods for optimization of supply chains. In 1940, George Dantzig designed and implemented Simplex method as a base of linear programming and mathematical optimization discipline and it was the first phase of optimization. This optimization gives scientific explanation for decision making in the conditions of limited resources. The second phase of optimization took place in 1990s of the last century. What is characteristic of the phase is the application of optimization tools for problem solving in the supply chain by design of supply network and transport planning. Finally, the third phase of optimization is under way and is based on supercomputing.

The third phase of optimization is important because it aims to solve the problems which were unsolved earlier. Today, the performance of modern computers enables real-time analysis both in the case of decision making and in the case of automated actions. The best example for this is IBM semiconductor factory which processes a great number of variables and makes optimization of all activities every five minutes. That was completely unthinkable in the second phase of optimization [1].

As a result of evolution of the supply chain optimization models and methods, many software tools are developed for facilitation and support of the management of supply chains. Software vendors or application service providers (ASP) offer software tools and

other software services based on the contract. The services are related to hosting, management and access to SCM software applications.

An enterprise can decide to buy the complete software solution with all services or develop its own software solution internally. A huge advantage of ASP complete solution is that initial technological investment for setting up a business is not necessary. A small business that is searching for a SCM software does not have to obtain financial resources for buying one and many servers for web software, hiring staff for installation and administration of the software, etc. Presently all these services could be ordered and received within a day and their monthly costs could be several hundred US dollars. For example, a recent startup ASP product is eCommerce Storefronts that could cost \$200-\$400 monthly. Its advantages are: great bandwidth for data transfer, online support 24 hours a day, opportunity for increase of capacity, and daily ASP data backup [2, pp. 637-660].

Therefore, many ASPs offer simple best of breed software solutions. Companies such as Verio and WebHosting.com offer classical ASP scenario: virtual web hosting. These companies provide hardware, software, bandwidth and human resources for web site hosting of firms and individuals. The companies provide hosting for a hundreds accounts on the same server. Web hosting companies usually offer some e-mail services.

On the other hand, there are traditional ASPs that sell great and costly integrated suite of applications, but also offer a „pay-as-you-go“ model for small clients. Typical example for this is the software for web site management, auction software for web sites and software for online advertising. *DoubleClick for Advertisers*, an advertising firm from the USA, helps you manage, optimize and report on online advertising campaigns.

Like most enterprise software, SCM software market met the global recession in 2008/9. The revenue of the top SCM software firms declined by 0.7 percent between 2008 and 2009. Firms that offer large suites of integrated applications, such as Oracle and SAP experienced the greatest decline (3.7 percent between 2008 and 2009). Meanwhile, smaller specialist firms that offer best of breed SCM software solutions generally incurred lesser revenue declines during the recession [14].

According to Gartner Group [14], the revenue slightly increased in 2010 and 2011 by 2 and 4 percent respectively. However, presently there is the trend of increasing interest for planning and supply chain management and ASP market is dramatically enlarging. This trend is reinforced by improvement of SCM software so optimization has been embedded in ASP software supplements in the last few years [8, pp. 395-400]. Thus there are many providers of excellent software applications for SCM on the market, such as:

Manugistics (Rockville, MD) embedded various methods for providing optimal solutions in integrated supplement for supply chain planning. The name of the software supplement is Supply Chain Navigator.

I2 Technologies (Irving, TX) bought CSC Operations Planning Group (Austin, TX) in 1997 to increase optimization features of its software for supply chain management of commodities. Also, I2 Technologies bought Optimax Systems, a pioneer in application of genetic algorithms for optimization of assembly line arrangement.

Logility (Atlanta, GA) embedded optimization software of INSIGHT, Inc. in its software products. INSIGHT, Inc. has been a provider of optimization software for supply chains for twenty years. *Logility's* supply chain management software offers to organizations state-of-the-art global supply chain management, visibility, and replenishment solutions.

SynQuest (Atlanta, GA) is a global provider of Supply Chain Event Management (SCEM) solutions. These software solutions allow companies to monitor their extended supply chains for events and exceptions that could impact their ability to fulfill customer orders, satisfy inventory needs, and manage shipping requirements. By implementing SCEM solutions, customers dramatically increase supply chain efficiencies, balance inventory with demand, lower costs, and make better use of their assets.

ILOG, Inc. (Mountain View, CA), offers ILOG software components for mathematical programming, programming limitations, business rules and visualization. At the same time, this firm supplies ASP providers with optimization software for supply chains.

Infor TM is a global provider of ERP solution for manufacturing, distribution, retailing and service. Infor company has over 70000 customers in over 100 countries. With basic ERP applications, Infor company offers a set of fully integrated additional solutions for logistics and optimization of warehousing. Infor WMS Infor Warehouse Management System is a software for management of warehousing that enables total monitoring of material and product flows with control of all activities and originated costs as well.

XSB, Inc. is a firm that provides SCM optimization software based on web technologies. This firm offers WEAVE® software which is automatized web-based tool for SCM optimization. It also enables interactive searching in order to locate and compare various items. In that way, users can identify similar items and suppliers' prices as well.

Manhattan Associates is a midsize supply chain management vendor apropos supply chain management software provider. The company has been headquartered in Atlanta, Georgia since 1995 and operates around the world.

Beside these software vendors and their application solutions, many companies use Enterprise Resources Planning (ERP) software for management of the internal and external part of the supply chain. The intent of ERP is to integrate all business processes in organization and to use this integration for performance improvement in relations to customers [9].

The first attempt of enterprises to manage their resources and requirements in an integral manner was the development and use of Material Requirements Planning (MRP) systems. These were computerized systems for improvement of inventory control and manufacturing planning. In the second phase, Manufacturing Resource Planning II (MRP II) system was developed. ERP system practically represents an extension of the MRP II concept with additional functions for finance, distribution, human resources management which are integrated so that the overall requirements of the networked enterprise can be met.

ERP is a set of software modules enabling an organization to automatize transactions included in the organization business processes. The one of the modules in the ERP package could be the SCM module that automatizes supply chain transactions and integrates business processes related to SCM. Many companies prefer to purchase separate SCM applications rather than rely on the SCM module in an ERP system to manage the functions of the supply chain. SCM software is less complex and disruptive than ERP and it is more focused on the opportunities and problems of supply and distribution.

The ERP system enables greater data integration, use of available database and consolidation of a great number of various incompatible systems. The ERP system usually includes finance, order tracking, forecasting, sale analysis, local and global distribution and quality control. ERP systems have powerful tools for monitoring and reporting, but they are quite rigid and their use requires well defined data.

ERP systems are commercial software packages for small, medium and great enterprises. They encompass all standard business functions and can be adjusted to specific requirements of an enterprise in support of international standards. The use of ERP software packages contributes to the improvement of products and services. This kind of systems enables integration of complete operation of business system by support of unique software solution. The most popular software vendors and ERP packages are: SAP (BusinessOne, AiO, R/3); ORACLE (People Soft); BAAN (Baan ERP); Microsoft Corp. (Microsoft Dynamics NAV, Microsoft Dynamics AX, Microsoft Dynamics GP, Microsoft Dynamics SL); (Solomon); ASW Engineering (asw:dominus) [13, pp. 130-138].

The implementation of ERP system implies analysis of business processes, training of employees and implementing of new working procedures. ERP implementation phases are: selection of package, selection of modules, technical installation, customization, calibration, exploitation and maintenance. Implementation strategy can be incremental (step-by-step), total (big bang) and modular (module-by-module).

On the ERP software market, most implemented ERP modules are: financial accounting, control, material management (procurement and inventory), sales and distribution, planning and management of manufacturing, project management, investment management, equipment maintenance, quality management, system administration.

4. FEATURES OF CONTEMPORARY SCM SOFTWARE

Contemporary supply chain management is characterised as strategic, adaptive and demand driven process so software vendors or application service providers (ASP) should offer SCM software with these features. The new SCM software applications represent not only operating systems but fully integrated systems that improve planning and execution at all levels and support gaining competitive advantage. Therefore contemporary supply chain management software has to include the five features. The features imply that SCM software must support: 1. supply chains that are demand driven, 2. various supply chain strategies, 3. gaining the benefits of globalization, 4. risk management and 5. collaboration of participants in the supply chain [5].

1. Support to supply chains that are demand driven. Demand is the most important component of supply chain planning. A successful enterprise must make customer segmentation and create a value proposition for each segment. Also the enterprise has to manage demand so that it contributes to the accomplishment of enterprise goals. Managers of the enterprise can forecast and implement strategies by product grouping according to defined value propositions for each customer segment. Modern SCM software applications support forecasting demand, simulation of buying patterns and performance of "what if" analysis to align the supply chain with timely market conditions and the enterprise's goals.

2. Support to various supply chain strategies. Contemporary SCM software is able to facilitate multiple supply chain strategies based on demand types. SCM software can play a significant role in the selection of a supply chain strategy that is most suitable to the different products or product categories. Therefore modern SCM software supports simulation, analysis and planning. The software should also control changes in a product's demand and make dynamic proposals for changes in SCM strategies, with minimal interruptions. Common supply chain management strategies are the following:

- *Responsive SCM Strategy* is used for unplanned random demand. The demand requires postponement strategies and operational decisions based on frequent changes in demand. For example, manufacturers place greater emphasis on flexibility than efficiency so that they can respond quickly to changes in demand.
- *Agile Supply Chain Strategy* is used for unexpected variations in demand and is based on flexibility in decision making. In implementation of the strategy a great issue is: How to maintain the right balance between safety stock and service levels?
- *Lean Supply Chain Strategy* is used for predictable demand. Automated decision making based on forecasts, achievement of priorities and operational parameters is essential in implementation of the strategy. Lean supply chain strategies maintain short lead times, low ordering cost, low inventory levels and higher service levels.
- *Replenishment Supply Chain Strategy* is used for Known Demand whereby replenishment orders are automatically triggered when inventory levels fall below thresholds or re-order points. Typical of this supply chain would be when inventory is consumed and replenished two to three times a day from bulk storage or several times a week from a distribution center.

3. Response to challenges of globalization. The challenges of globalization are related to factors such as delays, longer lead times, substandard quality and lesser customer service. On the other side, there are benefits of globalization related to higher revenues and lower labor costs. New SCM software should support: 1) real time updates using GPS, RFID and other types of integrated tracking and identification systems, 2) interconnected supply chain partners providing real time visibility to product movement and 3) collaboration on planning, execution strategies and risks reduction. Presently leading supply chain software applications provide varying levels of these critical capabilities in order to minimize the challenges and gain the benefits of globalization [11, pp. 197-218].

4. Support to risk management. The lack of standardized processes, insufficient data and inadequate technologies are obstacles for effective risk management. Supply chain software vendors are improving features of their products to better understand risks, manage risks and reduce negative impact of risks. Risk management is supported by models of software simulation. Supply chain software provides real-time updated information on unexpected events and facilitates the implementation of contingency plans.

5. Support to collaboration of participants in the supply chain. SCM software providers try to develop products that offer methods to facilitate relationships and improve collaboration between business partners in the supply chain. The new supply chain software supports collaboration that goes beyond hierarchical, departmental and organizational boundaries. The software enables that departments, trading partners and other stakeholders interactively collaborate on operational tasks and planning activities. For example, SCM software that supports sales and operational planning enables coordination and synthesis of inputs from all internal and external stakeholders. Also, collaborative features of SCM software are improved by integration with CRM (Customer Relationship Management) software and SRM (Supplier Relationship Management) software.

5. RECOMMENDATIONS FOR SCM SOFTWARE SELECTION

Fundamental investigation of SCM software features is of invaluable importance for SCM software selection and acquisition. When considering a SCM software acquisition, the management of an enterprise should follow several principles and recommendations in the process of supply chain software selection [10]. These recommendations can be defined as follows: analyse business needs related to supply chain, evaluate SCM software features in the context of business needs, assess SCM software compatibility with existing systems, provide interoperability of SCM software with customers' and suppliers' systems and evaluate reliability of SCM software provider.

Analyse business needs related to the supply chain. All the functions of SCM are not equally important to an enterprise. The enterprise needs to specify which functions are the most important to supply chain management. In other words business needs of the enterprise must be identified, evaluated and prioritized. These needs can be aligned with business strategy of the enterprise and evaluated against multiple supply chain software features and solutions.

Some of these business needs are dependent on industry in which the enterprise competes. For example, luxury goods firms may need serial tracking while commodity manufacturers may pay attention to shipping products to the customers to agreed deadlines, and so on.

Other business needs of the enterprise which is significant for SCM software selection is determined by internal business conditions and information systems strategy and influenced by partners of the enterprise and business strategies of its customers. If customers of the enterprise base their business on a just-in-time operation, SCM software should support the enterprise to meet specific targets for delivery times and quantities. If the enterprise operates with numerous highly automated warehouses, SCM software should be suited to this condition and support functions of the warehouses.

Evaluate SCM software features in context of business needs. ASPs have different approaches to supply chain management software solutions. An enterprise should choose the supply chain software provider whose products are the best in the functions that are most important to the enterprise and meet business needs of the enterprise in the best way. In choosing the right ASP, the enterprise needs to undertake objective evaluation and analysis that ranks the providers according to criteria that their software products meet in comparison to business requirements of the enterprise.

There are basic differences between planning and execution activities in supply chain management. Some SCM software providers are better at supporting planning activities of SCM, such as finding the best routes for delivery. On the other hand, there are SCM software providers that are better at supporting execution activities, such as scheduling parts delivery in the right quantity and the right time.

Assess SCM software compatibility with existing systems. In case where an enterprise chooses ERP software for SCM and other business processes, this new integral information system replaces all or most of software applications in the enterprise. However, if the enterprise implements only software for supply chain management support, the new software applications must work with the existing enterprise information systems with a minimum of unnecessary disruption. Besides unnecessary disruption, there is necessary disruption that is caused by changes in business processes and existing enterprise information systems which have to be done. The necessary disruption must be supported by SCM software in order to achieve effective SCM.

Only the smallest firms do not have to modify the purchased SCM software. Other enterprises can not buy SCM software that completely fits to internal business processes and existing information systems. In these enterprises data have to be converted, processes have to be changed, integrations have to be developed and so on. However the enterprise can minimize the changes by adopting industry standard protocols and technologies, using integrations developed by software vendors and accepting pre-integrated solutions from online systems.

Provide interoperability of SCM software with customers' and suppliers' systems. Many business processes of an enterprise are connected and integrated with processes of its customers and suppliers. In that environment, interoperability of the enterprise SCM systems with systems of clients and suppliers of the enterprise should be achieved. In fact, the primary aim of SCM software is to integrate the supply chain of an enterprise more tightly. An enterprise should work with its suppliers and customers to identify what systems they are using and what their data requirements and processes are. After that, the enterprise should determine how its new SCM system can be integrated and benefit with systems of its customers and suppliers.

The most important and time-consuming phase of a new SCM system development is the process of data integration. The phase must be thoroughly tested to make sure everything works properly. The enterprise should start to make plans for this integration as early as possible by collecting information from its operation and from its customers and suppliers. In collaboration with its suppliers and customers the enterprise must double-check every detail regarding processes and systems integration. When the enterprise asks a supplier about formats for a specific category of data or transaction, it must require all details about the category.

Evaluate reliability of SCM software provider. Especially in present conditions of economic recession it is important to evaluate the reliability of possible SCM software vendors and the possibility of their survival in today and future turbulent environment. This is because an enterprise must develop long-range relationship with possible SCM software provider. It is better for the enterprise to choose software firms with a history in the supply chain management business and which deal with companies which are similar to the enterprise in size and complexity. If the enterprise operates on regional, national or global level, it should choose a SCM software vendor who also reaches the appropriate level.

6. CONCLUSION

Aims of supply chain management are multidimensional and include: minimization of costs, quality improvement of products and services, improvement of communication between firms in supply chain, increase of flexibility in shipment terms and response time, integration of IT with business process flows and reduced time of shipment. In order to achieve all these aims, organizations must implement the best software applications. In this context, the research presents and analyses many software solutions for supply chain management and gives useful principles and recommendations for the SCM software selection. These principles and recommendations can be useful for managers of enterprises of all sizes which participate in some supply chain. Also, results of this research can be used by the other researches in order to give additional recommendations for SCM software selection and expand the scope of investigation of all factors influencing this selection.

The research indicates that there are many SCM software applications for all sizes of enterprises and ranges of functions. But it is important to recognize that there is no single best solution for all circumstances. Therefore an enterprise has to define its objectives, business requirements and budget before selecting a suitable SCM software. One approach to supply chain management software is to select an integrated suite of SCM applications. An alternative approach is to select the best of breed software applications. Depending on business and IT requirements of the enterprise, the best of breed approach might be the best choice to gain specific software features. However, this approach generally requires creation of interfaces between applications. On the other side, the integrated suite of applications obtains a single system supporting broader process automation that goes across departmental boundaries. The SCM system is typically easier to implement as interfaces between applications are already made.

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IZBOR SOFTVERA ZA UPRAVLJANJE LANCIMA SNABDEVANJA – PRINCIPI I PREPORUKE

Slavoljub Milovanović

Da bi na pravovremen način isporučila svoje proizvode kupcima, preduzeća nastoje da ubrzaju poslovne procese u upravljanju lancima snabdevanja. Upravljanje lancima snabdevanja integriše logističke zahteve dobavljača, distributera i kupaca u jedan kohezioni proces koji omogućava skraćivanje vremena isporuke i smanjenje troškova zaliha. Postoje mnoge informacione tehnologije (IT) i softverska rešenja koja podržavaju integraciju, optimizaciju i upravljanje lancima snabdevanja. Osnovni cilj ovog istraživanja je da analizira različita savremena softverska rešenja i trendove u razvoju i implementaciji softverskih aplikacija za upravljanje lancima snabdevanja. Takođe, ovo istraživanje daje principe i preporuke za izbor adekvatnog softvera za upravljanje lancima snabdevanja koje mogu iskoristiti menadžeri u donošenju odluka iz ove oblasti.

Ključne reči: informaciona tehnologija, upravljanje lancima snabdevanja, softverske aplikacije, ERP.