UDC: 007.5:656.9
Original scientific paper

THE INFLUENCE OF THE METHODS OF INFORMATION SYSTEM DEVELOPMENT ON THE FLEXIBILITY AND ADAPTIBILITY OF A FORWARDING ENTERPRISE'S ORGANIZATION STRUCTURE

Miroslav Žugaj

University of Zagreb, Faculty of Organization and Informatics, Varaždin, Croatia
E-mai: mzugaj@foi.hr

Ratko Zelenika, Slavomir Vukmirović

University of Rijeka, School of Business and Administration, Rijeka, Croatia
E-mail: zelenika@oliver.efri.hr or svukmiro@ri.tel.hr

This work analyses the methods of information system development from the point of view of its influence on the adaptability and flexibility of the organization structure of a forwarding enterprise. It considers the possibilities of the influence of an information system in the achievement of flexibility and adaptability and defines the scope of influence. In addition, it systematizes, compares and analyses the methods of business re-engineering and total quality management.

The characteristics of the influence have been analysed using the example of the supply chain management method which includes and integrates the most important components of information technology: computer-supported methods of business re-engineering, object-oriented methods and aids, hypermedia network services, application developments for the Internet, computer-supported methods for optimalization, and a decision support system in real time. Supply chain management has been considered as a key factor of organization structure designing.

Keywords: information system, methods, development, organization structure, flexibility, adaptibility, forwarding enterprise, influence.

1. INTRODUCTION

The increase in environmental dynamics of the forwarding enterprise in growing competition and world market globalization is influenced by numerous factors. The changes in the global market such as the disappearance of business barriers in relationships between organizations and within them, faster response to changes in enterprise environment, time-to-market, learning organization, shorter time to carry services out, etc. requires a more flexible and adaptable organization structure [9]. The forwarding enterprise needs to adjust its organization structure to changes in environment constantly and prepare it for relevant scenario adjustments through strategic and technological adjustments. To gain the flexibility and adaptability, an enterprise should be closer to the customer and his requirements.

Except for the need for quality and timely transport, there is the problem of the individualization of customer's requirements. The trend of changes is toward mass adjustment to the customer with the possibilities of configuration and performance of a customer's order according to his specific requirements and a flexible network organization.

The organization structure should be dynamic and capable of fast adjustment to radical changes in the forwarding enterprise environment. The key consequence of turbulent changes is the requirement of continuos business process improvement in the forwarding enterprise.

The requirements for fast changes in business process performance are greater in relation to the period of the traditional business system when it was enough to plan changes for three, five or ten years. As the characteristics in the forwarding enterprise environment change, a requirement for the increase of adaptability and flexibility of organization structure has appeared. The key capability of the reconfiguration of relevant business processes and activities of the forwarding enterprise is at any time being compatible with the changes in a forwarding environment. The key component to achieve flexibility and adaptability of the organization structure is the method of information system designing.

The new laws of transportation processes' deregulation and liberalization support a flexible design for transportation chains and the connections between the partners in the transportation process. The forwarding enterprise becomes more independent when choosing a business partner who is an active or potential partner of the transportation chain. Intermodal transport integrates two or more transportation modes. For example, in a determined transport relationship the goods can be transferred in trucks which are placed in vehicles or wagons transported by ships. Combining two or more transportation modes, one can design a transportation system based on complex transportation calculations and simulations which enable the synchronization of the performance of the fixed goals of a forwarding enterprise and the optimal use of vehicle capacity causing an increase in freight. The base framework of intermodal transport is called "door to door" and enables an integral and complex organization of goods transportation from the transmitter (supplier) to the recipient (customer).

2. THE INFLUENCE OF AN INFORMATION SYSTEM ON THE FLEXIBILITY AND ADAPTABILITY OF A FORWARDING ENTERPRISE'S ORGANIZATION STRUCTURE

An enterprise can be defined as being flexible and adaptable if its development and stability enable the capability of relevant changes compatible with changes in the environment. These enterprises have this capability because they have a learning organization thanks to which they have a fast response to market changes, simultaneously maintaining the quality level and the effectiveness of the process. Other characteristics of a flexible and adaptable organization structure can be mentioned: great investment in information technology and focus on human resource development,

creation of cross-functional teams with the possibility of flexible reorganization, strategies to create flexible relationships with partners in the transportation chain and the high level of the participating management.

The process can be considered as a group of tasks in order to achieve special business results. As an example of the process, we can take forwarding service design, electronic interchange of transportation documents, or making a preliminary calculation in the choice of transportation relationships using software. The business processes of forwarding enterprises can consist of more functions or activities. For example, order processing can include the activities of electronic data interchange with the customer, order shipping analysis, and asking for more detailed instructions to perform the transportation of the goods. In the adjustment process of a forwarding enterprise to environment changes, many enterprises need to coordinate and synchronize the process of the transportation system. For example, coordination in the process of goods reception at the terminal, in the transportation documents and ensuring the arrival-on-time of the vehicles which transport the goods.

The key factor of flexibility and adaptability of organization structure is the ability to be flexible when co-ordinating with the relevant partners in the transportation process: carriers, banks, customers. The coordination and the establishment of relationships between the processes have been inhibited many times because of the hierarchic relationships in the organizational pyramid that can create barriers when establishing those relations with the forwarding environment.

Reducing the organization barriers and organization hierarchy, it is possible to reduce the task categories for each level thus allowing for the increase in organizational effectiveness. The method of information system design can be the instrument of integration and can enable a shorter transportation time-cycle, synchronizing the activity inside the forwarding enterprise and co-ordinating the enterprise's activity with the activity of the transportation chain partners. Choosing and using a relevant method of information system design or combining such methods, forwarding enterprises can increase integration and co-ordination, intensify team-work, reduce the inventory, accelerate goods flow and decrease the cost and time of transportation.

The information system manages the information and goods flow and influence on the organization structure (e.g. sources (transmitters) and destinations (receivers) of information, locations for loading and unloading of goods, choice of partners in the concrete transportation process) between the individual teams and organization units. The information system can have a key influence on flexibility and adaptability; the key characteristics of this influence include the framework of an open and decentralized information system. A closed and centralized information system establishes unnecessary boundaries for the partners in the team in terms of approach, storage, finding and interchanging information about goods flows and the forwarding enterprise position in the organization of these flows. The open information system enables a flexible interchange of information amongst the enterprise's employees. Modern methods of information system development create assumptions of a better co-

ordination mechanism between the organization units inside the forwarding enterprise and between the enterprise and its partners in the transportation process.

The critical activities and scope of influence of the information system design methods in the organization of a transportation process are [1]:

1. Analytic and decision-support capabilities to redesign the supply-chain structures and manage the goods flow;
2. Process the effects and activities of the forwarding enterprise which are focused on the environment and include: shipment consolidation and planning, handling and manipulation of goods, inventory management, dynamic booking of the transportation capacity according to the optimal use of vehicle storage;
3. Information system development by use of the leading information technologies (e.g. Open EDI and Web in electronic data interchange, SCM and OOA&S methods);
4. Capacity for organization changes in goods flow management and creating the cross-functional teams inside and between organizations;
5. Rapid development in the management methods and the influence of information technology on the integration of methods of information system design in strategic methods for a business system development.

3. PROCESS-ORIENTED METHODS OF INFORMATION SYSTEM DESIGN IN A FORWARDING ENTERPRISE

Process-oriented methods are focused on organization management. From the point of view of the process-oriented method, the information system has an important influence on the structure, function and behaviour of an organization system. Besides describing the organization, the purpose of an information system is giving the required information to the decision makers during the decision process. From this point of view, the information system is the managing element of an organization system and has influence on the designing of the organizational structure. Users make decisions based on the information and perform activities which influence the organization system. Describing and managing the organization are the organizational views of the information system which are adjusted to determine the purpose of the information system.

Total Quality Management (TQM) is, according to the definition by the American Federal Institute for quality, the strategically integrated system for enterprise management which in an integrated, systematic, consistent and global way improves the performance and quality of the complete organization and of every individual process. Business process re-engineering (BPR) is defined as the radical redesign of the designed business processes and organization structure of a business system based on changes designed to achieve radical improvements in critical areas of performance (price, quality, financial, service, speed).

BPR is a revolutionary approach to business improvement, and TQM is the already evaluated one. While the goal of BPR is to find the right processes which add value and to redesign them in a different, more effective way, the goal of TQM is the continuous improvement of current processes. To achieve flexibility and adaptability in the organization structure, the forwarding enterprise needs both methods: BPR for radical changes of organization structure related to market changes, and TQM for maintenance and enhancement of the organization structure. In Table 1 the differences between the methods of radical redesign and continuous improvement of business processes are presented [4].

Table 1. Differences between innovative and continious improvement activities

Innovation	**Continuois improvement**
Creativity	Adaptibility
Individualism	Teamwork
Specialist-oriented	Generalist-oriented
Attention to great leaps	Attention to details
Technology-oriented	People-oriented
Information:closed, proprietary	Information: open, shared
Functional (specialist) orientation	Cross-functional orientation
Seek new technology	Build on existing technology
Line and staff organization	Cross-functional reorganization
Limited feedback	Comprehensive feedback

The breakpoint can be defined as the achieved state of organization structure development of the forwarding enterprise which is analogous to changes in the enterprise's environment. Figure 1 shows the directions of the BPR and TQM methods' influence. The arrows are breakpoints [4], [8].

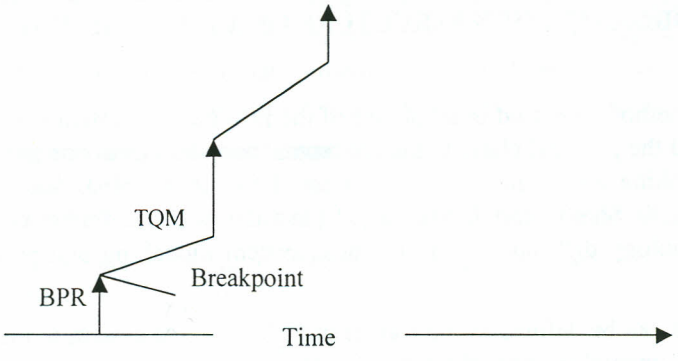

Figure 1. Directions of the BPR and TQM methods' influence

The breakpoint is defined according to the criteria of market system values:

1) quality (simplicity, robustness, process quality, continuous improvement),
2) prices (design, conversion, quality asurance, distribution, administration, inventory),

3) forwarding service (degree of satisfaction of customer's interest, flexibility to customer and market changes),
4) time (customer's inquiry - order - goods receipt and dispatch - goods carrying - goods arrival).

The information system is implicit in each criterion and integrates all of them. Achieving an information system breakpoint creates an assumption for each criterion's breakpoint.

The influence of this method on organization structure flexibility and adaptability can have result in these organization changes: tasks being reduced, elimination of redundant communication channels, implementation of automatic control in the processes, determination of synergy between people and technology, task simplification, parallel processing, changing the task's definition, function integration, centralized control with a decentralized decision-maker, innovative system analysis, innovation as active education [7].

Process-oriented methods use objects through which they integrate such data and processes, that the algorithm is focused on the object level. The objects are natural, flexible; they hide system complexity and they are simple to maintain. The information system changes are absorbed and performed on the object level by simple adding, modifying and deleting their operations. The importance of the process-oriented methods is the consistency which is present during all phases of the application's life cycle. Process- oriented methods formalize the analysis, design and implementation of the information system and create assumptions for the building of a flexible and easily changeable application with the minimization of the life cycle.

4. METHODS OF THE OBJECT-ORIENTED ANALYSIS AND DESIGN OF AN INFORMATION SYSTEM IN THE FUNCTION OF A FLEXIBLE AND ADAPTABLE ORGANIZATION STRUCTURE OF A FORWARDING ENTERPRISE

Object-oriented methods are used in all phases of the information system life cycle - from the logical and the physical phase to the conceptual and strategical one and they include ways of thinking about the business process. Leading scientists such as I. Jacobson, D. Taylor, R. Sheton and J. Martin [3] have developed a framework for object-oriented technology diffusion within business system modelling and problem solving.

Object-orientation can be defined as the way of modelling a real system in the real world [3]. Some fundamental frameworks applied in the business process are included in the object approach. In spite of a structural approach, where abstract methods are used, software modelling and development is based on using objects from the real world. Business object models are easier to understand than the traditional computer-centered models. Business people think in terms of people, places, things and events. Examples of business objects include: people and the roles they play (dispatcher,

carrier), places (warehouse, port), things (goods, trucks), and events (goods manipulation, carrying, delivering, contracting).

The object can be defined as a self-contained software package consisting of its own private information (data), its own procedure (private methods) which manipulates the object's private data, and a public interface (public methods) for communication with other objects. An object contains both data and logic in a single software entity or package. The object provides properties representing coherent concepts and a set of operations to manage these properties. The fusion of the process logic with data is the distinguishing characteristic of an object.

Every object is capable of acting in the same way as a real object behaves in the real world. Roles and responsibilities are assigned to the objects, and they contain all the information they need to carry out their actions. In the forwarding business system from the object-orientation view, the object can be a spreadsheet, database, vehicle, goods, transportation document or some other component of the forwarding business. The information system developer's task is to create new objects that define the communication processes and message flow between the objects in conjunction with business activities and implementing them in the applications. When a service is requested from an object, the object is sent a message, much like a traditional function call. The difference is that the rest of the system does not need to see how the object is implemented [5].

Object technology gives four key advantages to modern computing:

a) stability,
b) reusability,
c) encapsulation,
d) implementation.

The object describes the real world. During application design, it is more natural to think in real world terms and concepts, such as customer, carrier, invoice, order, than in terms of procedures or data structures. Using objects, the developer can design an application describing similar entities. The objects are defined as:

- knowledge (what they know);
- tasks (what they perform);
- relationships with other objects (how to function in relationships).

While object designing is not so easy, object-orientation is more effective for the application design from the aspects of:

- input, output and data flow;
- business activity effects in conjunction with the established goals and tasks of the enterprise strategy and organization structure;
- established goals and expected results in business system usage.

Designing with objects reflects the behaviour and relationship between entities in the real world and enables the changes which are performed in the model of a business system to be automatically implemented in applications. The natural attributes of the

objects enable the enterprise employees and management to have better communication with developers on a language level which is adjusted to the business objects - the user-oriented information system language.

Continuous process and procedure changes are followed by slight changes of the objects which are the stable application elements. For example, objects which represent the customer always include name, address, phone number and other unchangeable base information as well as other stable characteristics of behaviour. Such information is stored as an object, inherited and forgotten. When a customer's object is created, it can be used in different applications for the requirements of different business processes and organization units. The objects follow and anticipate business activities, so that, in accordance with business changes, they change only those object segments which are related to those being changed. The employee can manage the object without any programmer's intervention.

The key performance of the object-oriented methods consists of the fact that in system development and change, all their functions tend to change, but the object stays unchanged. In this way the object-oriented methodology enables an easier and simpler maintenance and flexible development of the system in relation to the traditional structural approach [5].

The problem analysis is the analysis and description of the real world, its entities, their attributes and their relationships. Therefore, it makes sense to use object-oriented concepts in problem analysis. The primary motivation for object-orientation is that, as a system evolves, its functions tend to change, but its objects remain unchanged. Thus, a system built by using object-oriented techniques may be inherently more maintainable than one built by using more conventional functional approaches.

The objects are reusable. The customer object, for instance, can be used in commercial, freight or financial applications. A transaction object can be used in any application that uses a transaction. For instance through the inheritance, a new child-object can be quickly created, inheriting the functionality and the attributes of the parent-object. The programmer has only to define the new attributes that make the child-object different from the parent-object. This has the potential for a higher programming productivity and minimiziation of application time development. For instance, when the inheritance mechanism is used for the new type of bill of lading, the new object automatically contains fixed data. Then only new specific data needs to be added.

A programming language supports the encapsulation and allows the programmer to define the classes that contain both methods (behaviour) and attributes (data) which are unique for all the objects of that class. With the encapsulation of data and methods inside the code, in other words, with their hiding from the environment outside the object, minimizing of code complexity and more flexibility towards changes and extensiveness is achieved. Class is the definition of its objects and the objects are the instances of their class. The polymorphism allows objects to respond to identical messages in different ways. In the context of design and analysis, the object-oriented

application, as compared to the structural oriented applications of the development phase, is iterative and recursive, which enables the incremental development, an early prototyping and an unlimited extension of applications.

5. THE SUPPLY CHAIN MANAGEMENT METHOD IN THE FUNCTION OF THE DEVELOPMENT OF THE FORWARDING ENTERPRISE INFORMATION SYSTEM

The Supply Chain Management (SCM) method is used on a strategic level and is based on co-ordinating total enterprise resources with the circumstances by which the enterprise works in its environment. An information system is incorporated in enterprise strategy and it is developed in conjunction with business goals and in an enterprise strategy development framework. Computer support and object-oriented methods are used in information system development.

The base goal of the SCM method is to increase the competitive advantage and consolidate the forwarding market position in the circumstances of having strong competitors and the need for rapid requirement changes of active and potential customers of the forwarding services. SCM creates assumptions for the establishment of forwarding enterprise-based goals: reduction of transportation costs and time (efficiency) and establishment of better forwarding service quality (effectiveness). The SCM method creates possibilities for the rapid implementation of relevant changes in organization structure and strategy in order to cope with environment changes [2].

The phases of the SCM method are [6]:

1. Analysis of the current processes;
2. Estimating costs and effectiveness of all the processes (synthetic and analytic);
3. Estimating total time;
4. Identification of relevant current and potential partners in the transport process and the connections between them;
5. Identification of opportunities from the environment;
6. Building of a transport organization model;
7. Consolidation of goods flow;
8. Planning of goods supply;
9. Planning of the computer relationship (by Intranet, EDI, Web, groupwork) with the business partners;
10. Information system designing on the micro level (intraorganization) and the macro level (interorganization - between the forwarding enterprise and the partners in the transportation process);
11. Defining goods flow;
12. Anticipation of changes in the organization of transport from the aspects of the changes in the forwarding environment;
13. Defining priorities;
14. Scheduling resources and work tasks;
15. Implementation.

The SCM in the organization of a transportation process uses a model of a transportation chain which is designed as a network that contains the nodes that can be represented as objects (e.g. customer, carrier, terminals, warehouse). Between and inside them, the goods are processed. The business processes are generated and performed in coordination and synchronization between the partners in the transportation chain (nodes) and the lead to the output statistic numbers (e.g. transportation time, costs). From the organization point of view, any node should have the possibility of communicating with any other node without the requirement of going through the hierarchic arrangement. This model enables a systematic change of nodes and goods flows and an analysis of the effects from these changes in the global transportation chain. For example, the plan can focus anywhere from the optimization of inventories to the minimization of transportation time. This method can influence the flexibility and adaptability of the transportation chain: e.g. the costs of the implementation of a new transportation chain (which is followed by great investment) and the effects achieved can be compared and analysed using simulation methods. The object-oriented analysis is good for the building of a model and this method can effectively analyse the state of an object and simulate changes within and between the objects.

With the optimization of the distribution network, the optimal location for every partner of the transportation process can be determined; the relevant configuration is set, the partners in the transportation chain collated from the point of view of goods and transportation relation; transportation time is defined, and the carriers for goods transportation are selected.

The basic elements of the distribution network are:

a) places,
b) carriers and dimension of storage from the point of view of transportation relations and segments,
c) goods to be transported (mass, dimension, amount, price),
d) partners in the transportation chain (customer, carrier).

The SCM method includes the integration of the business processes not only for the organization unit level, but also with the relevant partners in the transportation process too. The analysis showed that the enterprises included in a program of integrated transportation chain management noticed some improvements of which the most important are:

- inventories reduced by 50%,
- delivering of goods on time increased by 40%,
- transportation time decreased by 27%,
- profit for partners in the transportation chain increased by 17%.

The SCM method is based on the extended enterprise conception which is based on the responsiveness and orientation to the customer's requirements. The forwarding enterprise synchronizes basic plans: responsiveness to customers' requirements, costs and time minimization.

The method of transportation chain management in the basic strategic component is the creation of the three plans. The information technology enables the creation of an electronically-oriented organization of the transport process which creates a base to apply new methods in the organization of goods transport and responsiveness to the customer inquiries and orders, and market changes.

The electronic transportation chain is based on computer applications from the enterprises included in the transportation chain and telecommunication infrastructure. The basic components of the electronic transportation chain are:

- strategic methods of information system development (e.g. methods of enterprise resource planning (ERP) and methods of supply chain management);
- electronic data interchange systems (EDI, EDIFACT, Open EDI, data interchange from the Internet and Web pages);
- applications for quantitative analysis and simulation in the transport planning and optimization of goods transport, configuration of the transportation network, inquiry processing and customer order processing;
- process management between the partners in the transportation chain and improvement of the effectiveness of the global transportation chain based on the flexible differentiation of forwarding services which enable adding new value for each partner.

In the implementation of the method of supply chain transportation, these facts need to be achieved for the flexibility of the organization structure in the transportation chain.

6. CONCLUSION

The dynamic and turbulent characteristics of the forwarding business with stronger competitors and freight decreasing require quality, flexible and integral applicable solutions where the customer is the centre of the transportation system. The business process flexibility of the forwarding enterprise is made possible by the integration of adaptable components in an information system which can follow the dynamics of forwarding business and which is due to the OOA methods applicable in the whole forwarding enterprise independent of the existing hardware and software platforms already integrated. The object methods must enable the business process to be supported on all levels - vertical, horizontal and lateral. The increased decentralization of forwarding tasks and activities requires a flexible architecture of the information system for distribution and application logic in order to meet the organization's requirements.

The object-oriented methods consolidate advances in the standard finish solution and individual application software package. The alternative for the forwarding strategists and designers of the information system "buy or make", disappears after the creation of the possibilities of adjustment for the special requirements of the individual organization units of the forwarding enterprise. The object-oriented technology enables the development of generic applications which consist of specific and generic

components. The library of the classes of generic forwarding applications enables on-time and responsive adaptability to the business and organization changes inside the forwarding enterprise and in its environment.

The process-oriented methods create the assumption of the on-time supplying of the organization unit with data and information in a relevant form, amount and values, and ensure relevant information for employees who supply their customers. Increased competition in the forwarding environment requires innovation and diversification of the forwarding services. The redesigning of the business process and diversification of the forwarding service require changes in the organization structure and network organization. The SCM method, based on the process-oriented strategies of information system development and object-oriented methods, creates flexible possibilities for the integration of specific activities and relationships into new processes. Integrated managing objects show the forwarding employees and managers critical business processes (transportation planning, vehicle booking) and critical situations (profit, effectiveness).

Process- and object-oriented thinking gives the formalism of analysis, design and implementation of the information and business system and enables, in relatively short periods, reliable and simply changeable applications in cases of a turbulent environment, system complexity and customer requirements. The SCM method enables the analysing and anticipating of changes in goods flow and the flexible response to these changes.

The forwarding enterprise using this method influences business systems which are a part of the organization in the transportation process, integrating and coordinating their activities. For the individual partners in the transportation process, the forwarding enterprise becomes the connecting component in the transportation process.

REFERENCES

[1] W. Copacino. Fourth-party logistics: Beyond 3PL. *Logistics Management*. April 1, 1997.

[2] J. J. Coyle, E. J. Bardi and C. J. Langley Jr. *The Management of Business Logistics*. West Publishing Company, St. Paul, 1996.

[3] P. Fingar, J. Stikeleather. *Distributed Object for Business: Getting Started with the Next Generation of Computing*. SIGS Publications, Inc., New York, 1996.

[4] H. J. Harrington. Continuous versus breakthrough improvement: Finding the right answer. *Business Process Re-engineering & Management Journal*, Vol. 1, No. 3, 1995, pp. 31-49

[5] D. Herlea, S. Lam and M. Wu. *Structured and Object-Oriented Analysis and Design*. Software Engineering, Course Project Report,1997., http://www.cpsc.ucalgary.ca/~danah/613/prez/ new/report.html.

[6] MS Logistics Services, 1996, http://www.mslogistics.com.

[7] H. R. Rao. *Introduction to Business Process Change*. The Association for the Management of Organization Design, Charles St. Fredericksburg, http://www.acsu.buffalo.edu/~mgmtrao/link/1/ mgs607.

[8] N. Stojiljković. Business process re-engineering: Fundamentalni zadatak. *Infotrend*, No. 47. 1996, pp. 39-44

[9] T. Turnsek. The next generation of organizational structures. *Proceedings of the International Conference on Organizations and Information Systems*. Bled, Slovenia, 1992, pp. 81-90.

Received: 5 July 1998
Accepted: 1 November 1998

Miroslav Žugaj
Ratko Zelenika
Slavomir Vukmirović

UTJECAJ METODA RAZVOJA INFORMACIJSKOG SUSTAVA NA FLEKSIBILNOST I ADAPTIVNOST ORGANIZACIJSKE STRUKTURE ŠPEDITERSKOG PODUZEĆA

Sažetak

U radu se analiziraju metode razvoja informacijskih sustava s motrišta utjecaja na fleksibilnost i adaptivnost organizacijske strukture špediterskog poduzeća. Razmatraju se mogućnosti utjecaja informacijskih sustava za postizanje fleksibilnosti i adaptivnosti i definiraju se područja utjecaja. Analiziraju se međuovisnosti između metoda razvoja informacijskog sustava, poslovnog procesa i organizacijske strukture špediterskog poduzeća. Uporaba metoda razvoja informacijskog sustava špediterskog poduzeća razmatra se kao temeljni proces u oblikovanju organizacijske strukture špediterskog poduzeća, te kao temeljna pretpostavka njegovog funkcioniranja u turbulentnom špediterskom okružju.

Kao ključna metoda razvoja informacijskog sustava u postizanju fleksibilnosti i adaptivnosti razmatra se metoda poslovnog reinženjeringa. Analizira se koncepcija preoblikovanja poslovnih procesa špediterskog poduzeća temeljena na objektnoj tehnologiji. Sistematiziraju se i komparativno analiziraju metoda poslovnog reinženjeringa i metoda upravljanja kvalitetom.

Značajke utjecaja na adaptivnost i fleksibilnost analiziraju se na primjeru metode upravljanja opskrbnim lancima (Suply Chain Management). koja uključuje i integrira najznačajnije suvremene komponente informacijske tehnologije: računalno podržane metode poslovnog reinženjeringa, objektno orijentirane metode i alate, hipermedijalne mrežne servise, razvoj aplikacija za Internet, računalno podržane metode optimalizacije, alate za potporu odlučivanju u realnom vremenu. Metoda upravljanja opskrbnim lancima razmatra se kao strateški čimbenik oblikovanja organizacijske strukture špediterskog poduzeća.

Ključne riječi: informacijski sustav, metode, razvoj, organizacijska stuktura, fleksibilnost, adaptibilnost, špeditersko poduzeće, utjecaj.