

E-logistics: Slovenian Transport Logistics Cluster creation

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Abstract: In the pursuit of enhanced competitiveness organisations are today searching for innovative business models in order to foster economic benefits. In Slovenia, several clusters are being formed, including the Slovenian Transport Logistics Cluster (STLC) as one of the most important. The STLC is currently in the stage of dynamic growth, demanding business model formation and adequate informatisation. The main goal of the paper is to present the informatisation of the STLC, bridging the gap between Supply Chain Management (SCM) and e-Logistics. The STLC's informatisation is presented in several phases. The first phase involves business modelling of the existing business processes of organisations (AS-IS model). The results of the first phase allow an in-depth view of the STLC that is used in the future in the business model setup. Next, TO-BE processes are created which are to be implemented and supported via informatisation. The result of the informatisation project is revealed to be homogenous and transparent business activity between cluster members. The purposes of the STLC's informatisation are to create a business model, standardise business processes, allow cost cutting and improved business performance, reduce operating times, support asset management, and trace shipments which are the basics of economic competitiveness.

Key words: SCM, e-logistics, cluster, informatisation, business renovation

1 Introduction

Tougher competition in all industrial sectors sharpened by globalisation and the fall in global supply is forcing companies to optimise their business processes and adopt new ways of achieving mergers or partnerships that directly lead to lower business costs. With these strategic alliances new management strategies are being formed, such as clusters, supply chain management (SCM), e-logistics etc. Some authors suggest that logistics are 'worth' 10% to 12% of GDP (Sahay, 2003). According to AMR research (Challenger, 2001), e-logistics has the potential to cut costs by 10%. Based on these two references we can conclude that e-logistics can save our money by up to 1.2% of GDP. It is therefore no surprise that in the last few years top management in highly effective companies such as Hewlett-Packard, Compaq, Digital Equipment Corporation, Xerox, Dell and Benetton Group has been in favour of the supply chain and therefore e-logistics (Romano, 2003).

There is a collection of literature indicating the importance of clusters and networks not only between firms, but along the value chain and across industries. The networks involved in these clusters are integral to knowledge generation and diffusion, technology

transfer, sharing risks and costs, allowing firms to access new markets and opportunities and, finally, building a comparative advantage in the global market.

Porter (Porter, 1990) defines clusters as geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions. He proposes a model that provides conditions that have to be met for a firm to be internationally competitive and successful. This model focuses on four primary conditions which he arranges in a diamond-shaped diagram: factor conditions, demand conditions, structures of firms and rivalry and related and supporting industries. The 'Related and Supporting Industries' feature of the diamond denotes the importance of clustering for developing an international competitive advantage incorporating two features of a healthy cluster: the presence of vertical support through internationally competitive supplier industries which ensure cost-effective and speedy deliveries; and the presence of horizontal support in internationally competitive related industries to co-ordinate and share activities with and to stimulate local competition.

In the article informatisation of the STLC will be presented through the project called "The Modelling, Analysing and Renovation, Standardisation and Informatisation**the Modelling, Analysing,

Renovating, Standardising and Informatising?” of Business Processes of the Slovenian Transport Logistics Cluster, which is being carried out by the Business Informatics Institute of the Faculty of Economics at the University of Ljubljana, Slovenia. Informatisation offers logistics companies not only better connectivity with their customers and suppliers but also improved performance and faster responses. To achieve an appropriate informatisation level, the STLC must invest in modern information technologies. A possible solution is to use the Internet with its costless policy and in the last few years high security as the most appropriate communication channel.

For all logistics companies it is assumed that they? control the global logistics chain of their customers and therefore depend on the successful implementation of information technologies which leads to lower inventory costs, better customer retention, asset management etc.

2 The Transport Logistics Cluster in Slovenia

The STLC was formed to compete with the European logistics market. It is an association of 12 companies and 3 institutions: freight forwarding and shipping agencies, port services, ecological and university research institutions. Currently, transportation-logistics service suppliers within the STLC prepare common education programmes, market presentations, equipment acquisitions and complete service developments. The STLC’s vision is to create comprehensive conditions for its members that enable them to offer full logistical support above and beyond the Slovenian transportation route relative to the markets of Central and South-east Europe. Slovenia is encountering fiercer competition by virtue of it having joined the European Union on 1 May 2004 and it is only through harmonious co-operation between the companies associated in the STLC that they can succeed in the European market.

Slovenia has all the attributes of a distribution and logistics hub: a fortuitous geographical position at the heart of the region intersected by traditional trade and transport routes – the location of choice for international companies planning their future regional distribution set-up.

Two pan-European transport corridors (No. 5 linking Barcelona and Kiev, and No. 10 from Salzburg to Thessalonica) intersect in Ljubljana, the capital of

Slovenia. Slovenian companies’ excellent track record in the logistics business coupled with modern transport infrastructure is a proven recipe for high-quality and cost-competitive services tailored to clients' needs. As an EU member state Slovenia is a gateway for Asian and EU manufacturers and traders to faster and more reliable trade routes that meet at fully equipped logistics centres.

Shipping to Slovenia’s only cargo port – the Port of Koper – means gaining 7 to 10 days for ships arriving from Asia compared to sailing to Europe’s northern ports. Its total maritime throughput is about 15 million tonnes. There are currently 11 modern, fully equipped terminals specialising in various types of goods, storage facilities for general cargo and several special warehouses. Special advantages are available in the 4.7 sq. km. of the port’s economic zone with its 324,000 sq. m. of covered and sheltered warehouse facilities and slightly less than 1 million sq. m. of open-air storage.

The motorway density in Slovenia is higher than the EU-25 average and the links with the neighbouring EU member states and South-east Europe are equally good. Currently, there are over 500 km of well-maintained motorways and 1,050 km of trunk roads. The extended motorway network is scheduled for completion by 2013.

As the railway service is regaining its importance, modernisation of this infrastructure is one of the national priorities. Freight traffic is well-developed while the rail links between the Adriatic Sea and the landlocked CEE countries offer many opportunities. Both freight and passenger services with South-east Europe have expanded in the last few years. The national rail operator Slovenian Railways (SŽ) runs both passenger and freight services and possess a railway infrastructure, including 60,000 sq. m. of warehouse space.

Three international airports provide easy access by air to Slovenia. The central Slovenian airport and cargo facility is Aerodrom Ljubljana located 25 km from the capital. Scheduled flights operated by several airlines carry passengers to important European destinations. The airport was recently renovated, its infrastructure extended and the cargo terminal modernised. Maribor Airport mostly handles cargo transport whereas Portorož Airport only has facilities for smaller planes.

Slovenia is well situated to serve the markets of Central, Eastern and South-east Europe. Thanks to its strategic geopolitical position and decades of close

economic ties with its neighbours, Slovenian companies are true connoisseurs of the regional markets. This also includes knowledge of the various languages, differences in legislation and, particularly, mentality along with a business culture in specific areas which originates from personal ties maintained over many years.

Transit traffic has always played an important role as traditional transport. As traditional trade routes are being reopened, there is a clear upswing in road and rail transport services. Further, Slovenian transport and logistics companies have been proactive in the last few years in exploiting investment opportunities in South-east European markets where Slovenia is one of the most important foreign investors.

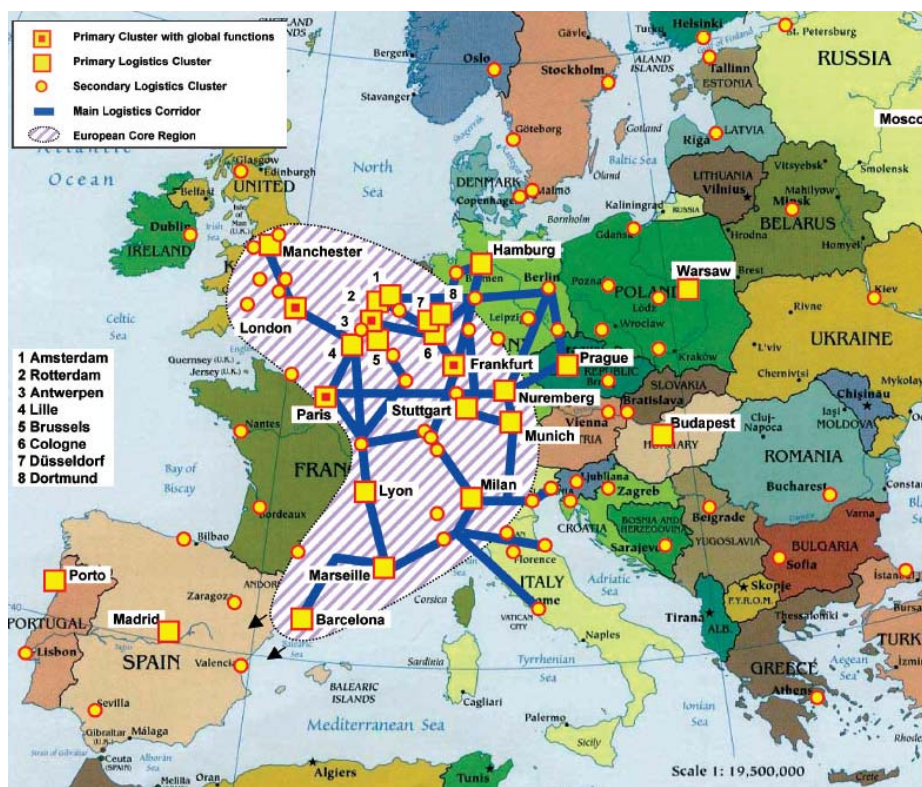
Slovenian freight forwarders, carriers and warehouse operators have up-to-date fleets of vehicles and mechanised and computerised warehouses with state-of-the-art technology. Ever more firm offers their customers modern logistics hubs, along with the possibility of outsourcing complete logistics services. The number of companies specialising in transport services forging strategic links is rising and the focus on transport is broadening to include the full range of logistics activities. Slovenian logistics companies and related organisations are joining forces in the TLC.

New warehouse facilities and distribution centres are being built to satisfy requirements following Slovenia's accession to the EU as warehouses in areas bordering other EU countries are being used in the transit business (http://www.investslovenia.org/industries/logistics_and_distribution/, 2008).

The reason underlying the STLC's creation is the growth in TLC formations worldwide, especially in Europe (Figure 1). From the STLC's point of view the following European TLCs are especially relevant since they represent direct competition:

- Seine-Normandie Logistics Cluster (<http://investmentinnovation.wordpress.com/2007/11/14/seine-normandie-logistics-cluster-best-practice/>)
- Cluster Transport Logistique Wallonie Belgium (<http://clusters.wallonie.be/transport-logistique/en/>)
- Unitrans Holdings (http://www.unitrans.co.za/content/operation_freight_logistics.asp)
- Turku Logistics Cluster (http://info.tse.fi/logonbaltic/uudetsivut/files/B_russels/07_Hirvilammi%2016102007.pdf)

Figure 1: European TLCs



Source: <http://www.europe-re.com/system/main.php?pageid=2242&articleid=8738>

3 Supply Chain Management, Logistics and E-logistics

With the development of information technologies and information knowledge it was discovered that SCM and e-logistics have a close connection with logistics. The successful integration of SCM depends on the implementation of e-business in logistics, called e-logistics. Later these two terms are reflected in the system of e-logistics which, along with the use of modern information technology, complements SCM and logistics.

SCM as a management category has strongly evolved in the last few decades, introducing several key issues spanning from the strategic to the operational level (Simchi-Levi et al., 2000):

- the strategic level deals with decisions with a long-lasting effect on the firm. This includes decisions regarding the number, location and capacity of warehouses and manufacturing plants, as well as the flow of material through the logistics network.
- the tactical level includes decisions typically updated anywhere between once a quarter and once a year. These entail purchasing and production decisions, inventory policies and transportation strategies including the frequency with which customers are visited.
- the operational level refers to day-to-day decisions such as scheduling, lead-time quotations, routing, and truck loading.

In this paper we introduce and discuss business process modelling and renovation as a methodology that supports TLC members in their strategic-level decisions.

3.1 Supply Chain Management

In the last few years companies have been increasingly realising that the efficiency of their business depends heavily on collaboration and co-ordination with their suppliers and customers (Hieber, 2002). In order to boost their competitiveness they carefully manage the supply chain.

A supply chain is the stream of processes involved in moving goods and services from the customer order through the raw materials stage, supply, production, and distribution of products to the customer. All organisations have supply chains of varying degrees

depending on the size of the organisation and type of product manufactured. These networks obtain supplies and components, change these materials into finished products and then distribute them to the customer.

Managing the chain of events in this process is what is known as supply chain management. Effective management must involve co-ordinating all the different links in this chain as quickly as possible without losing any quality or customer satisfaction, while still keeping costs down.

According to Chopra and Meindl (Chopra and Meindl, 2001), a supply chain consists of all the stages involved, directly or indirectly, in fulfilling a customer request. A supply chain not only includes the manufacturer and suppliers but also transporters, warehouses, retailers, and customers themselves. Within each organisation, such as a manufacturer, the supply chain includes all functions involved in meeting a customer's request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service. Further, supply chain management entails the design, maintenance and operation of supply chain processes to the satisfaction of end users.

Within a TLC a supply chain is organised through transporters, transport organisers, warehouses and financial operators. An orderer no longer looks for the cheapest transportation but the cheapest transport option seeks the chance to execute an order. Integration of the SCM philosophy in logistics processes naturally calls for an advanced information system that connects all companies involved in a TLC and provides them with the appropriate information needed for bidding and, from the customers' aspect, allows the electronic ordering of logistics services.

3.2 Logistics

The main suggestion concerning the origin of logistics as a scientific discipline in economics stems from Oscar Morgenstern. The essence of Morgenstern's theory is (Morgenstern, 1955):

'Logistics activity offers exactly defined quantities of assets and serves for each branch which needed these assets and serves in order with their intention to sustain branches at the same level in present or in higher position in the future. This leads from the origin and must be orientated or with other words

transformed in space and time to reach the whole realization of these branches.'

As a science, up until the Second World War logistics only served military purposes. After the Second World War logistics became a civil science. Since then we can find many different definitions, including that given by Cooper (Cooper, 1993): the intention of logistics is to (in terms of order, quantity, quality, space and time) carry out the transportation of goods relative to the need to supplement business processes. It is intended for planning processes, executing and controlling the flow of goods, warehousing and managing information from the production of goods through to selling them to the final customer with the aim to satisfy the customer.

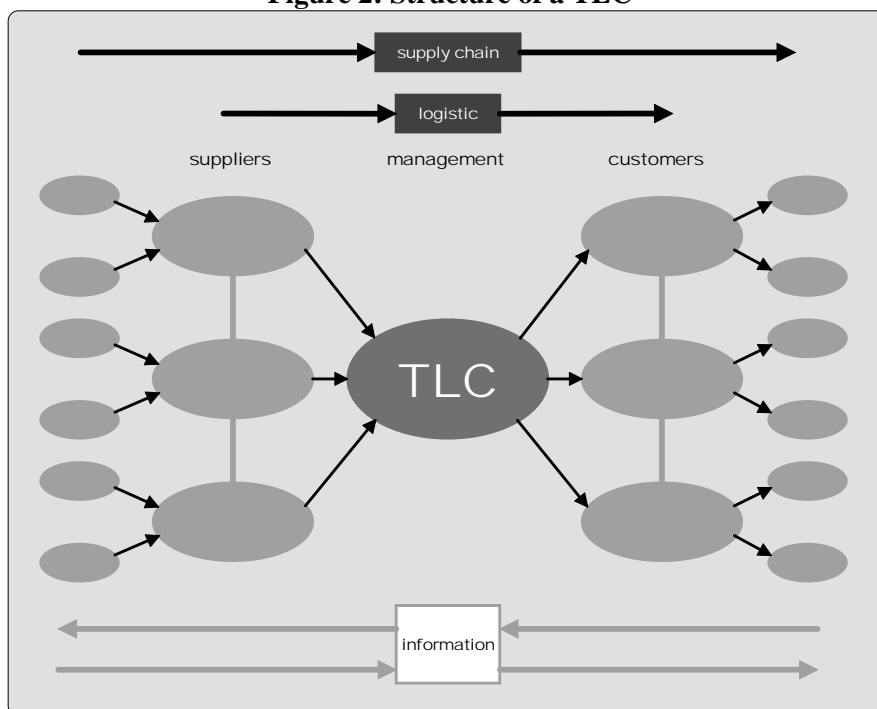
Logistical costs have an important influence on the pricing of a product. This was shown in a survey in which 200 European companies participated. The results were that logistics costs make up between 7.7% and 22% of the final price of products (Požar, 2002a). The research shows there is much cost-saving potential in logistics processes and a possible step is to consider logistics as part of the supply chain. Hence we can confidently rely on the following definition:

logistics is that part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customers' requirements (Ayers, 2001).

3.3 E-logistics

It is difficult to define e-logistics comprehensively because the potential impact of e-business on logistics and supply chain management is still not fully understood. One possible definition is that e-logistics simply means the processes needed to transfer goods sold over the Internet to customers (Auramo et al., 2001). Another and more sophisticated view is that e-logistics is a wide-ranging topic related to supply chain integration that has the effect of eliminating intermediaries (such as wholesaler or retailers) and fosters the emergence of new players like logisticians whose role is to adapt traditional logistics chains to take the requirements of e-business into account.

Figure 2: Structure of a TLC



If we consider it more broadly, e-logistics means doing e-business within a TLC between companies (B2B) and outside of it between the TLC and customers (B2C) over the Internet. This whole integration of e-business ensures that from the outside a TLC looks like one company even though it is

composed of many. If we want to implement the e-logistics philosophy in all companies inside a TLC we must renovate their business processes. Renovated processes are the basis for implementing e-logistics through logistical processes and are necessary for results that will reflect an improvement through the

added value chain. Figure 2 shows how a supply chain and logistics with appropriate information satisfy customers. To ensure an appropriate information flow from customers to suppliers, among suppliers and among customers, a TLC needs comprehensive e-logistics.

4. The role of information technology in SCM

Information technology (IT) is an important enabler of effective SCM. Much of the current interest in SCM from the IT point of view is motivated by technological solutions that enable an SC change and the abundance of data an SC has to manage in order to manage operations effectively. IT is most commonly viewed as a support function in SCM since it spans all building blocks of the SC. IT provides a competitive advantage for many SCs. When applying SC strategies that reduce cost and lead times and improve service levels, the timeliness and availability of relevant information is critical. In addition, a growing number of companies is providing value-added IT-based services to their customers as a way of differentiating themselves in the marketplace, and developing strong long-term relationships with their customers.

The role of IT is not limited to its support function. In this article, business process modelling has been used in order to articulate and simulate possible business model proposals for the STLC.

The main purpose of developing and analysing business process models is to find revenue and value generators within a value chain or a business model's value network. There have been a number of attempts to formally describe and classify a business process model. Venkatraman et al. (1998) defined a business process model as a co-ordinated plan to design strategy along three dimensions: customer interaction, asset configuration and knowledge leverage (Venkatraman, 2000).

A business process model is an abstraction of a business that shows how the business components are related to each other and how they operate. Its ultimate purpose is to provide a clear picture of the enterprise's current state and to determine its vision for the future. There are several reasons for producing business process models (Eriksson et al., 2000):

- A business process model helps us understand the business: a primary goal of business process modelling

is to expand our understanding of the business and to facilitate communication about the business.

- A business process model is a basis for creating suitable information systems: descriptions of the business are very useful for identifying the information systems needed to support the business. Business process models also act as a basis for engineering requirements when a particular information system is being designed.
- A business process model is a basis for improving the current business structure and operation: since it shows a clear picture of the business current state a business process model can be used to identify the changes required to improve the business.
- A business process model provides a polygon for experiments: a business process model can be used to experiment with new business concepts and to study the implications of changes for the business structure or operation.

A business process model provides a basis for identifying outsourcing opportunities; by using a business process model the core parts of a business system can be identified. Other parts considered less important can be delegated to external suppliers (Trkman et al.: 2007).

5. Business model of the STLC

A business model may be defined as a model of a company while doing business in a certain environment while a certain environment is everything that influences the business processes of a company, such as buyers, suppliers etc. It also shows a system that firstly enables the implementation of business processes in terms of providing added values or goods to clients or users, secondly provides different users at different levels inside the company with the optimal quantity of information and instructions needed to carry out individual procedures or work processes and activities and, thirdly, gives stakeholders an assurance of capital stability and capital profitability (Kovačič, 1998).

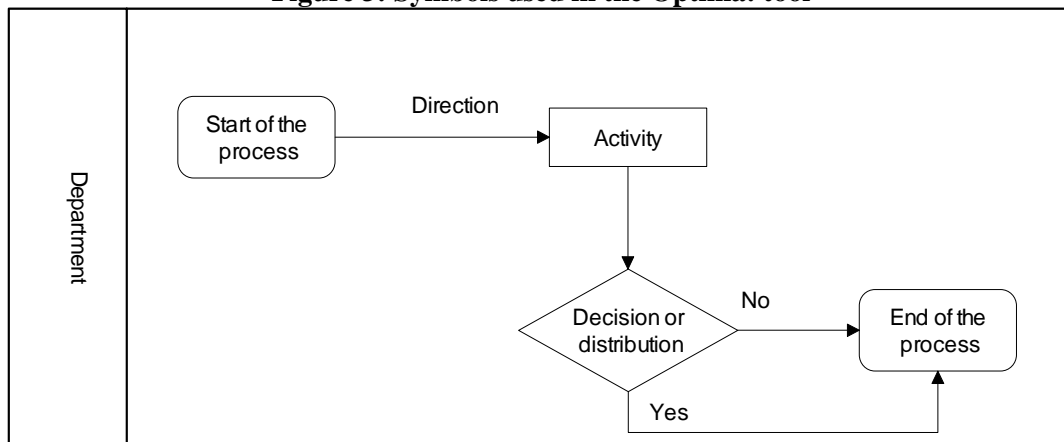
A business model determines the business rules which

everybody must be able to abide by. In our case, these rules must be followed by the STLC members, which are: Viator & Vektor d.d., Intereuropa d.d., BTC d.d., Slovenske Železnice d.d., Luka Koper d.d. and Fersped d.d. To build the STLC business model we must determine an AS-IS model which shows the present business processes of all STLC members. Many different methods and techniques can be used for modelling business processes in order to yield an understanding of possible scenarios for improvement (Ould, 1995). IDEF0, IDEF3, Petri Nets, System Dynamics, Knowledge-based Techniques, Activity Based Costing and Discrete-Event Simulation are only some examples of widely used business process modelling techniques (Eatock et al., 2000). As noted by (Hommes, van Reijswoud, 2000) the rising popularity of business process modelling results in a rapidly growing number of modelling techniques and tools. However, most simulation software implements a model using the discrete-event method. In Kettinger et al., 1997, an empirical review is given of existing methodologies, tools and techniques for a business process change. The authors also develop a reference framework to assist in the positioning of tools and

techniques that help in re-engineering the strategy, people, management, structure, and technology dimensions of business processes. However, relevance is far more important than completeness (Davenport, Prusak, 1998) and simple models are far more understandable by non-specialists. Process modelling tools must be capable of showing interconnections between the activities and allowing a decomposition of the processes. These tools must help users conduct 'what-if' analyses and identify and map no-value steps, costs, and process performance (bottleneck analysis). They should be able to develop AS-IS and TO-BE models of business processes which represent both existing and alternative processes. They must be validated and tested before their implementation. They can be used to predict characteristics that cannot be directly measured, and can also predict economic and performance data that would otherwise be too expensive or impossible to acquire.

For the purpose of the project we used the Flowchart technique with the Optima! tool. Figure 3 shows the components of the business process.

Figure 3: Symbols used in the Optima! tool



If we look at the AS-IS model (Figure 4) of Viator&Vektor d.d. as one of the members of the STLC we can notice five general processes: Order Acceptance, Organisation of transportation, Realisation of transportation, Forwarding and Warehousing. The organisation of transport further

(Figure 5) consists of Organisation of transport with own transportation, Organisation of transport with transportation of STLC members and Organisation of transport with outsourced transportation. Other members of the STLC have a similar structure of their general business processes.

Figure 4: General processes at Viator&Vektor d.d.

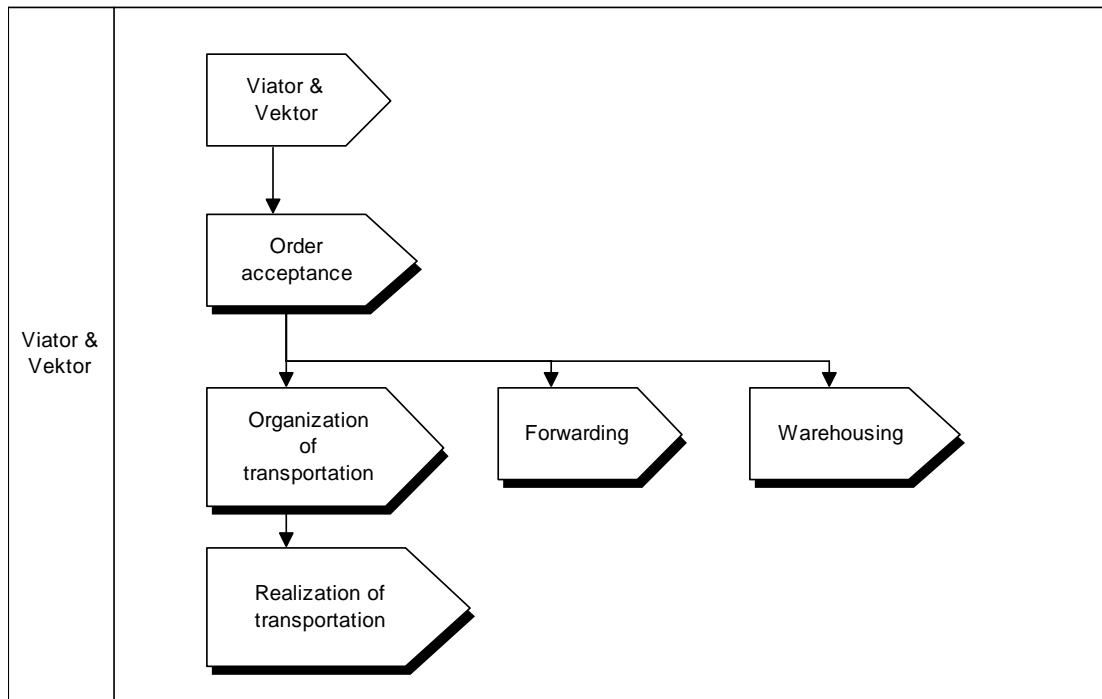
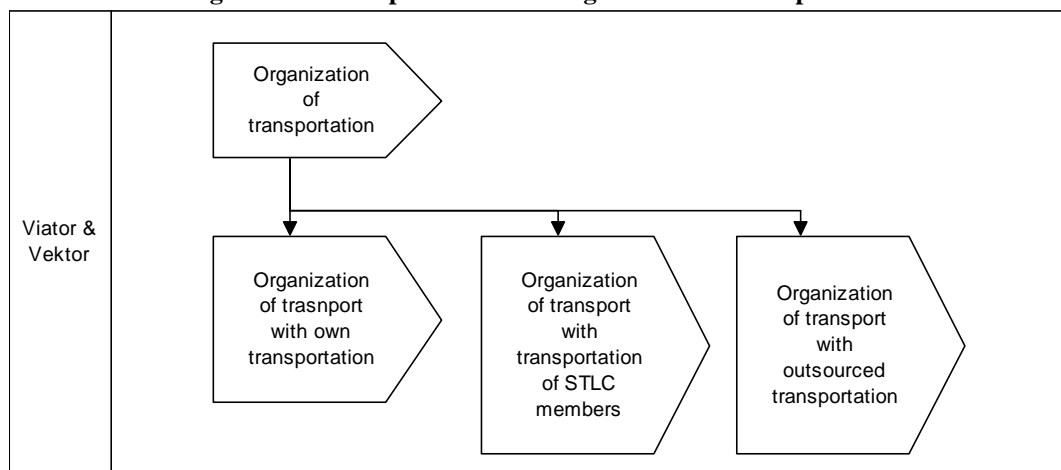


Figure 5: The subprocess of the Organisation of transportation



The organisation of transport at Viator&Vektor d.d. (Figure 5) involves three different processes for the same task. The processes presented in Figures 4 and 5 for Viator & Vektor are also executed in the other organisations in the STLC. The main problem is that these processes are executed in each organisation in a different way. The main goal of the project is thus straightforward – the standardisation and renovation of the existing processes.

The organisations involved in the STLC differ in the effectiveness of their different processes from order acceptance through to the realisation of transport. In the STLC we must consider if the specialisation of organisations is better than their generalisation. Which ever decision the STLC will take, it should be

properly backed up with an analysis of the business model and organisational changes, execution times, and business process changes.

6. Conclusion and Future Work

The goal of our project is creation of a business model, process renovation along with the examination and reengineering of current business policies procedures and activities. We believe the new paradigm can only be supported by:

- creating an environment of technology, enlightenment and receptivity;

- treating this as a holistic organisational transformation, not a technical issue;
- challenging the core assumptions and value propositions; and
- proactively establishing a distinctive Internet presence.

This case has confirmed that the analysis and carefully applied simulation of business processes is useful since it provides an insight into policies, practices, procedures, organisation, process flows and, consequently, shifts people's minds from functional to process organisation.

The project of "The Modelling, Analysing and Renovation, Standardisation and Informatisation**the Modelling, Analysing, Renovating, Standardising and Informatising" of business processes of the Slovenian Transport Logistics Cluster is in the first phase of generating an AS-IS model. Future work will focus on renovating the AS-IS model and create an appropriate TO-BE model on which a business model can be built.

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