

Analysing e-Business Transition within Logistics Framework

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ABSTRACT

The role of logistics in gaining competitive advantage and superior customer service is considered to be ever more significant. The same arguments are often used whilst considering the effects of e-business applications. Logistics is about managing materials, information and financial flows related to the products and services produced. Logistics connects several actors and several activities both inside a company as well as across organisational boundaries. Therefore, managing information and knowledge flows is a prerequisite for managing other important logistics flows.

The nature of competition and the dynamics of business relationships have recently been changed by e-business and applications related to it. For e-business to become a standard business practice is only a question of time. In the future, Internet and other information and communication technology will be a natural part of business models and processes. New technology brings about new opportunities as well as new challenges. New technology, new models and forms of service and new ways of operating in a network economy are a prerequisite for a profitable business. Therefore, it is justified and interesting to find out how companies actually deal with these phenomena in practice.

Most of development and growth expectations of e-business are related to business-to-business (b2b) e-commerce. At the same time there is a significant need for research of new business models related to b2b-logistics in the areas of industry, construction and commerce. In this study the case company represents building materials industry. Although the company comes from a conservative industry it has taken an active role in going into e-business. The aim of this study is to explore how the framework of logistics can be applied for studying e-business transition in b2b context. A case study is applied first to describe the business environment (the value chain) of the case company and then to visualise the effects of e-business transition on logistics flows and especially on information flows from the case company's

point of view. In this paper, information flows as part of logistics framework are first discussed. Then, the e-business transition in general is presented. Next, the e-business transition within logistics framework is considered. The case study includes discussion of the background and the objectives for the case company's e-business adaptation, description of the business environment of the case company and visualisation of e-business transition on information flows between the case company and one of its client organisation groups. The case is applied to describe and document the present state of e-business transition and to figure out the future needs and opportunities of development.

INTRODUCTION

The role of logistics in gaining competitive advantage and superior customer service is ever more significant. Lambert et al. (1999) have quoted that during the past 30 years logistics has increased in importance from a function barely necessary to an activity where significant cost savings could be generated, an activity that has enormous potential to impact customer satisfaction and hence increase sales, and a marketing weapon that could be effectively utilised to gain a sustainable competitive advantage. According to Ballou (1999) from just about every standpoint, whether cost, value to customer, or strategic importance to a firm's mission, logistics is vital. New opportunities for logistics management, brought about by growth in the service sector, environmental issues, and information technology, will continue to support the vital nature of logistics during forthcoming years.

There are several definitions for the concept of logistics to be found in the literature. One of them is the Seven R's (Coyle et al. 1996, Shapiro et al. 1985), which defines logistics as "ensuring the availability of the *right* product, in the *right* quantity and the *right* condition, at the *right* place, at the *right* time, for the *right* customer, at the *right* cost". This definition of the Seven R's also indicates the essential activities of logistics and the role of logistics in interfacing with availability. In marketing the management of the "Four P's" (product, price, promotion and place) most of the emphasis has always been placed on the first three. "Place" – the right product, in the right place at the right time – has rarely been considered part of mainstream marketing. There are, however, signs that this view is rapidly changing as the power of customer service as a potential means of differentiation is increasingly recognised. Christopher (1998) has stated that customer service and logistics complement the basic or core product by providing additional value in the form of delivery lead time and flexibility, delivery reliability and consistency, single point of contact and ease of doing business.

In this study logistics means managing the material and information flows of a supply chain (a value chain) across the organisational boundaries. A supply chain consists of separate actors co-operating with each other. A supply chain includes all parties of logistics chain: clients, sales, distribution and production, raw material suppliers and primary production. Successive companies in a marketing channel are called the value chain.

According to Christopher (1998) both in consumer markets as well as in b2b and industrial markets the order-winning criteria are more likely to be service-based than product-based. While the power in the distribution channel continues to shift from supplier to buyer, there is a trend for customers to reduce their supplier base. They want to do business with fewer suppliers and often on a long-term basis. Such a transition from volume-based growth to value-based growth will require a much greater focus on managing the core processes. The basis for competing in this new era will be:

$$\text{Competitive advantage} = \text{product excellence} \times \text{process excellence}$$

Because companies have typically not managed well the total flow of material and information that links the source of supply with the ultimate customer, it has been noticed that there is a rich opportunity for improving the efficiency of that process. Essentially, logistics is a planning orientation and framework that seeks to create a single plan for the flow of product and information through a business. (Christopher 1998)

As Punakivi et al. (2001) have stated new technology brings about new opportunities as well as new challenges. New technology, new models and forms of service and new ways of operating in a network economy are a prerequisite for a profitable business. Therefore, it is justified and interesting to find out how companies actually deal with these phenomena in practice. There is also a significant need for research of new business models related to b2b-logistics in the areas of industry, construction and commerce. In this study the case company represents building materials industry. Although the company comes from a conservative industry it has taken an active role in going into e-business.

The aim of this study is to explore how the framework of logistics can be applied for studying e-business transition in business-to-business (b2b) context. The objective is to visualise and discuss how e-business adaptation can be observed within logistics. A case study is applied first to describe the business environment (the value chain) of the case company and then to visualise the effects of e-business transition on logistics flows and especially on information flows. Changes in information flows are observed and visualised studying the linkage between the case company and one of its client organisation groups. This study is a tentative one aiming to outline the possible need, area and method for a more extensive research. Also, one rationale for making this study is to make observations and thus to increase the understanding of the phenomenon in practice.

In this paper we will discuss the background and the objectives for the case company's e-business adaptation, describe the business environment of the case company and visualise e-business transition on information flows between the case company and one of its client organisations group. Information flows control material flows and therefore material flows as such are not visualised in this study.

INFORMATION FLOWS AS PART OF LOGISTICS FRAMEWORK

Karrus (2001) has pointed out that one of the main flows of logistics is the information flow which in fact means the availability of information when needed – not just the flow of it. The essential challenge for logistics is to identify, manage and effectively utilise these flows and reserves. Edum-Fotwe et al. (2001) have stated that information allows, forbids and directs the physical flows, and also enables the checking and confirming as well as provides proof and audit trails for transactions. Whereas this need for information has existed in the past, the urgency of obtaining the right information at the right time and from the right place has now become the essential criteria. Giving customers what they want, where and when they want it as effectively as possible, is the winning formula for doing business (McLean 1999). According to Singh (1996) the need for management of the information flow applies to all supply chains. Information itself does not “do” anything. People use information to do things.

The ability to streamline the structure of information and to influence and control its flow is a dramatically more powerful and cost-effective service than is that of moving and manufacturing physical products. The information surrounding a product or service is more important than the product or service itself. (Kalakota et al. 2001)

Implementation of information technology (IT) is not enough if it only transfers the previous data pool faster. The key variable is the management of the information itself. It is not so much the technology of the IT but the information that is transferred that leads to success. Successful information enriched supply chains must view their information as a strategic asset and ensure that it flows with minimum distortion. (Mason-Jones et al. 1997)

According to McLean (1999) for a supply chain to function efficiently and effectively, a tremendous amount of information must be shared across the supply chain from one end to the another. Rapid dissemination of accurate information is crucial to supply chain management (SCM), which makes IT a powerful SCM enabler. IT is a business-enabling tool, not a complete business solution. Companies that succeed in implementing SCM IT solutions are the ones that have a clear vision of how they intend to manage their supply chain before selecting a SCM software solution.

The whole nature of logistics management has been largely changed by the revolution in information technology. Information systems have become the driving force pressurising companies to reconsider their relationships with customers as well as suppliers. It is no longer possible to manage the business as if it were in a vacuum with no interconnections with other organisations. Supply chain integration implies process integration, both upstream and downstream. By process integration is meant collaborative working between buyers and suppliers, joint product development, common systems and shared information. (Christopher 1998) Also Alasaarela (1998) has stated that one of the corner stones of successful business operation is the

interaction between companies operating in network. The better and faster information flows from one company to another the faster it is possible to reply to new challenges and opportunities. Functioning of communication is thus an important matter of development and control. According to Christopher (1998) it is through the management of relationships in the supply chain that the business gains and maintains competitive advantage.

According to Mason-Jones et al. (1997) the real power of information only becomes evident when it is utilised throughout the supply chain. With current IT development, market information transference to all players in a supply chain is relatively simple to implement. The issue is to develop strategies that utilise this capability, to the best interests of the supply chain.

The importance of information and its associated technologies is currently recognised by most managers as the primary factor for future success of their organisation. Information systems are reshaping the organisation and also the nature of the linkages between organisations. During the last few decades technological developments have elevated the role that information plays in the survival of companies. This is causing a revolution in the way organisations in general treat information, information systems and associated technologies. Information has always been central to the efficient management of logistics but now, enabled by technology, it is providing the driving force for competitive logistics strategy. Equally, leading organisations have long recognised that the key to success in supply chain management is the information system. As a major resource for sustaining competitiveness, information and associated technologies need effective management based on a strategic outlook. (Edum-Fotwe et al. 2001, Christopher 1998, Maier et al. 1997)

However, what is new is that there is a dimension to information that enables supply and demand to be matched in multiple markets, often with tailored products, in ever-shorter time frames. The Internet has perhaps provided one of the biggest breakthroughs of the late twentieth century when its potential impact upon supply chain management is considered. Figure 1 highlights some of the current applications of Internet-based concepts to supply chain management. (Christopher 1998)

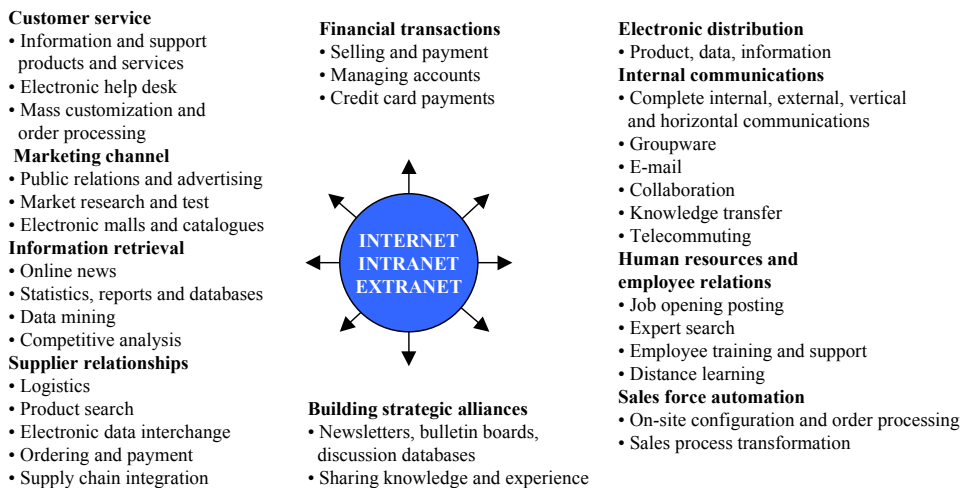


Figure 1 Internet applications and the supply chain (Christopher 1998, p. 273, source A.T. Kearney)

Internet offers new opportunities by enabling commercial transactions between firms. As a consequence several virtual enterprises as new evolutions of supply chains have emerged. Internet-enabled tools and their management are the new frontier of supply chain management (SCM), asking for a real assessment of methods, procedures and goals, and for the definition of standard behavioural protocols: this, according to Villa (2001), is the contribution which industrial world is now asking for to researchers.

E-BUSINESS TRANSITION IN GENERAL

e-Business utilises Internet for business transactions. Supply chain transactions that involve e-business include the flow of information, product and funds. Firms have used e-business to provide information across the supply chain, negotiate prices and contracts, allow customers to place and track orders, allow customers to download orders, and receive payment from customers. A b2b e-business involves transactions between two companies. Business-to-business supply chains have used the Internet in a variety of ways to improve performance. e-Business is expected to provide significant payoff in most b2b supply chains. Speculation abounds that e-business will lead to reduced prices, higher productivity, and lower labour costs. (Chopra et al. 2001)

In this context, e-business means the new business models and processes enabled by information and communication technology. e-Business transition means the process of adapting these new business models, processes, tools and methods.

As Kalakota et al. (2001) have stated the impact of e-commerce is happening in phases. In its first phase (1994-1997), e-commerce was about presence: making sure that everybody had a Web site. The second phase (1997-2000) of e-commerce was

about transactions – buying and selling over digital media. Today, e-commerce is entering the third phase (2000-?), with the focus on how the Internet can impact profitability. Kalakota et al. call this phase e-business, and it includes all the applications and processes enabling a company to service a business transaction. e-Business is not just about e-commerce transactions or about buying and selling over the Web; it is the overall strategy of redefining old business models, with the aid of technology, to maximise customer value and profits.

Kalakota et al. (2001) have described 20 major trends that are driving organisations to become e-business enterprises. These major trends driving e-business are illustrated in Table 1.

Table 1 Major trends driving e-business (Kalakota et al. 2001, p. 38)

Trend Category	Trend
Customer	1. Faster service 2. Self-service 3. More product choices 4. Integrated solutions
e-Service	5. Integrated sales and service 6. Seamless support 7. Flexible fulfillment and convenient service delivery 8. Increased process visibility
Organisational	9. Outsourcing 10. Contract manufacturing 11. Virtual distribution
Employee	12. Hiring the best and brightest 13. Keeping talented employees
Enterprise technology	14. Integrated enterprise applications 15. Multichannel integration 16. Middleware
General technology	17. Wireless Web applications 18. Handheld computing and information appliances 19. Infrastructure convergence 20. Application service providers

The above mentioned 20 trends contain four common threads:

- Convenience. These trends directly impact consumer self-service and ease of use.
- Effectiveness. The trends directly impact the relationship between the enterprise’s customers and its environment.
- Efficiency. These trends impact the internal structure and operating activities of the enterprise.
- Integration. These trends push for one-stop-shopping consolidation. (Kalakota et al. 2001)

According to Chopra et al. (2001) to fully exploit the advantages of setting up an e-business a firm must understand the key differences between using the Internet and other channels for the flow of information, products and funds. A company must

identify the value by using the Internet before replacing other channels. An e-business allows a firm or supply chain to exploit the following revenue enhancing opportunities:

- Offering direct sales to customers
- Providing 24-hour access from any location
- Aggregating information from various sources
- Providing customisation of information and personalised information
- Speeding up time to market
- Implementing flexible pricing
- Allowing price and service discrimination
- Facilitating efficient funds transfer

Supply chains have used e-business to reduce costs by decreasing product handling with a shorter supply chain, postponing product differentiation until after the order is placed, decreasing delivery cost and time with a downloadable product, reducing facility and processing costs, decreasing inventory costs through centralisation, and improving supply chain co-ordination through information sharing. The cost reduction has varied with the extent to which an e-business has exploited these opportunities. Successful b2b supply chains have used e-business to lower their transaction costs for processing an order and exchange information to better match supply and demand. For unpredictable demand Internet exchanges offer a significant opportunity because of their ability to aggregate both unmet demand and excess supply, and more efficiently match the two. (Chopra et al. 2001)

E-BUSINESS TRANSITION WITHIN LOGISTICS FRAMEWORK

According to Punakivi et al. (2001) the needs for research and development depend strongly on the e-business level and development of a company. Figure 2 illustrates development stages of logistics in e-business. In the first stage the company develops only its own processes. In the second phase two successive companies in the supply chain develop operations in co-operation. Also information systems are being integrated. In the third and fourth phase all the members of supply chain or network are integrated.

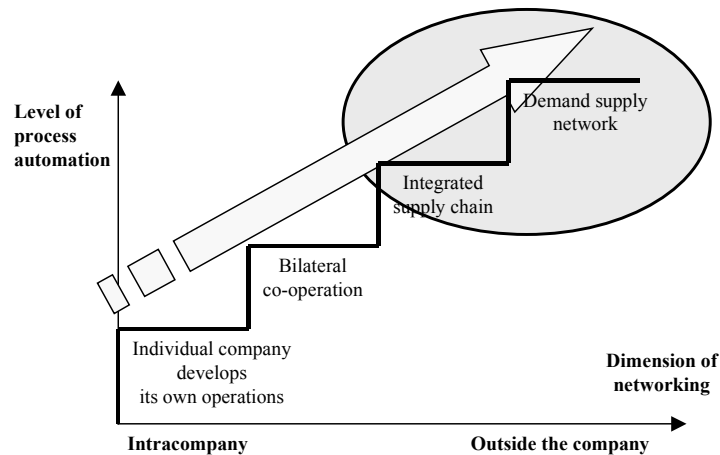


Figure 2 Development stages of logistics in e-business (Punakivi et al. 2001, p. 18)

Punakivi et al. (2001) also discuss the logistics elements of e-business. These elements are:

- Customer orientation: emphasis on service
- Total control of supply chain: optimisation and management of operations across organisational boundaries, downsizing current assets through improved flow of information, replacement of material and inventories with information flows
- Outsourcing and management of external resources: new possibilities brought by development of information management
- 7 days x 24 hours availability: round-the-clock service
- Contraction of period of time: shortening life cycles
- Networking: trust and real time information transmission are prerequisites
- New operations models
- Information flow: visualises changes in order, production and delivery information channels
- Delivery: different services based on individual needs of different customer groups and individual customers

Most of development and growth expectations of e-business are related to b2b e-commerce. (Punakivi et al. 2001)

CASE STUDY

The case company produces and markets sheet steel products, systems and related services: roofing systems, exterior and interior structures, combined structures and load bearing structures. The customers of the case company are building material retailers and hardware shops, single-family house builders, renovators and construction firms, construction designers, industrial house manufacturers and

assembly firms. For this case study the vice president and the e-business line manager of the case company have been interviewed.

Compared to classification by Kalakota et al. (p. 6) it can be stated that the case company has gone through phase one – www-visibility – and is now operating in phase two – concentrating on transactions over digital media (extranet contract clients). Prerequisites for a profitable business – new technology, new models and forms of service and new ways of operating in a network economy – are also under consideration in the case company and thus the company is slightly moving towards the third phase of e-commerce with the focus on how the Internet can impact profitability. On the other hand, compared to development stages of logistics in e-business by Punakivi et al. (p. 7) it can be stated that the case company is operating between stages one and two. The case company has been developing its own processes and is now moving towards developing processes and operations in co-operation with successive companies in the supply chain.

The central trends that are driving the case company to become an e-business enterprise (Kalakota et al. p. 6) are faster service, self-service, integrated sales and service and increased process visibility. For customers the self-service, ease of use and 24-hour access 7 days a week mean convenience. In the case company the efficiency is pursued by moving the focus of the sales department from small orders and routines to more demanding customers. According to the case company's representatives the company can not afford to ignore going into e-business. There is also the e-business hype that is driving the case company's e-business transition. By e-business transition the case company is trying to streamline operations through focusing on more demanding operations and decreasing routine work especially in the sales department. The case company is also striving for increased speed, reliability, flexibility and availability of information as well as avoiding needless operations and repetitions. In the case company the e-business also connects geographically scattered network of sister companies. Furthermore, there seems to be an external, environmental demand for e-business adaptation.

As previously mentioned one of the aims of this study is to visualise the effects of e-business transition on the case company's b2b information flows specifically in the domestic roofing systems order-delivery process and in the linkage between the case company and the hardware shops. The roofing systems business acts as a pilot in the case company's e-business adaptation. The focus of this study is on b2b relations. This means that the interface between the case company and individuals as end users is not within the scope of this study.

The linkage between the case company and the hardware shops was chosen because the aim of the case company management has been to handle small orders through e-business. In this case the hardware shops are the channel through which most of the small orders are received. In domestic roofing systems business hardware shops are also the biggest group both in number and in net sales. Furthermore, hardware shop contracts construct 60 % of the case company's Internet e-commerce (CaseNet) contracts (total 120). CaseNet is the case company's Internet e-commerce

application, open 7 days a week and 24 hours a day. CaseNet has been in use since October 2000 and until September 2001 ca. 1000 orders have been handled through CaseNet. The objective is 20000 orders/year – the total volume of orders being 70000/year. The operations of CaseNet include product information, ordering, stock size monitoring, order state monitoring (delivery time, haulier etc.) and order history reports.

The case company has made a selection in either increasing or decreasing the focus on different customer groups. There is a growth of focus on construction firms and industrial house manufacturers. There is a decrease of focus on hardware shops that do not offer the service that is needed in selling roofing systems. Hardware shops are also the channel through which most of the small routine orders are received. The objective of the case company is to move the small orders (3-4 order lines) to be handled via CaseNet, to teach the hardware shops in self service and thus to move the sales personnel's focus from routine work and small orders to more demanding customer orders. This focusing from routines and small orders to more demanding customer orders has been a strategic choice of the case company. Through adaptation of e-business the case company aims at developing processes, re-organising priorities and rationalising time consumption in the sales department. The results are expected to be measured through time saved and better customer service and thus improved competitiveness.

Figure 3 illustrates the business environment (the value chain) of the case company in its domestic roofing systems business. In this study the focus is on the circled relationship between the case company and the hardware shops.

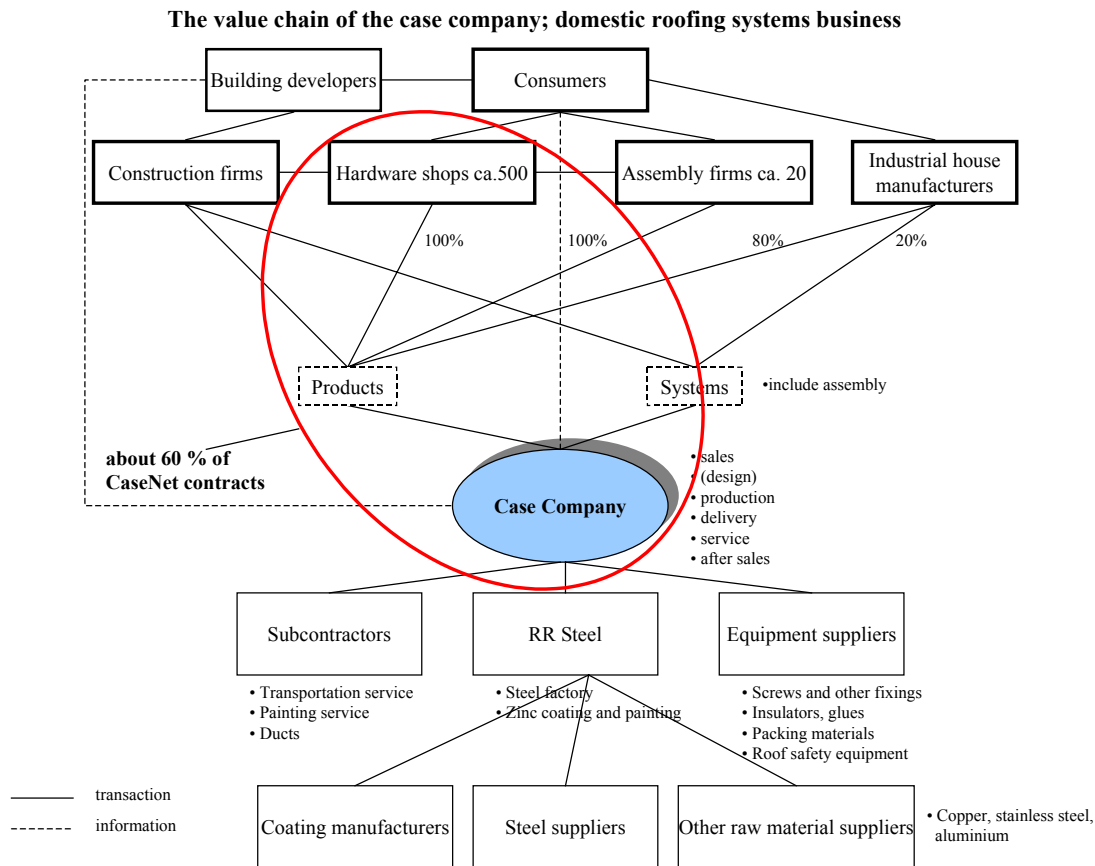


Figure 3 Business environment of the case company; domestic roofing systems business

Next, the visualisation of e-business transition on information flows between the case company and the hardware shops is illustrated. Figure 4 illustrates the traditional order-delivery process (information flows and operations) of a case company in its roofing systems business. The process is traditional and does not include possibilities of www-orders, usage of e-mail, mobile technology applications, centralised e-service or centralised information management. Characteristics for the traditional order-delivery process are personal contacts, service calls and sales visits, manual actions and traditional mailing.

Traditional order-delivery process

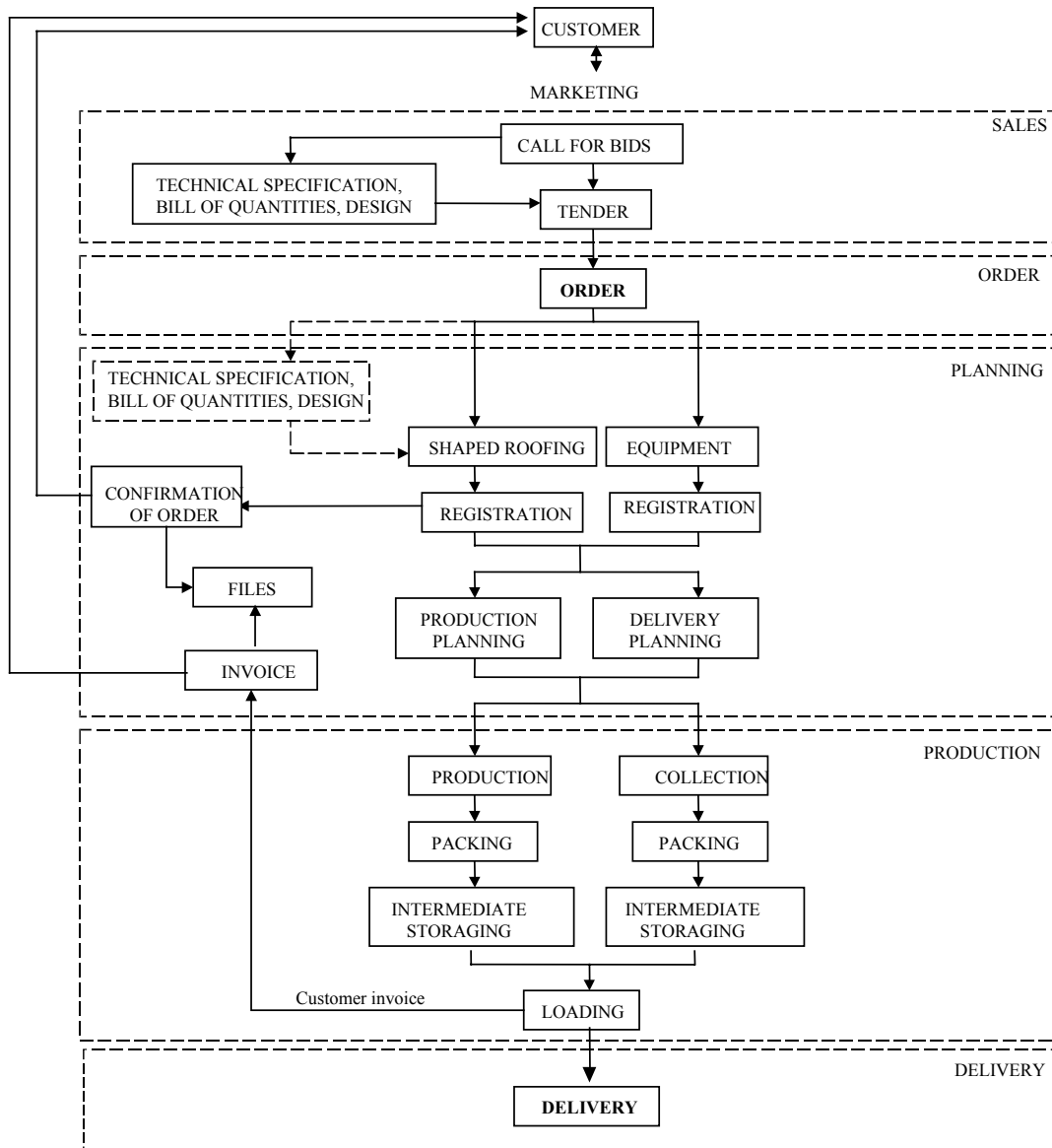


Figure 4 Traditional order-delivery process (adapted from Sallanniemi 1999, p. 38)

Figure 5 illustrates the present state of the order-delivery process (information flows and operations) of the case-company in its roofing systems business. Usage of e-mail, centralised e-service application and possibility of www-orders as well as mobile technology applications are characteristic for this state. In the present state the focus has changed from personal contacts to technological ones. This means a cultural and attitudinal change both among customers and case company's personnel.

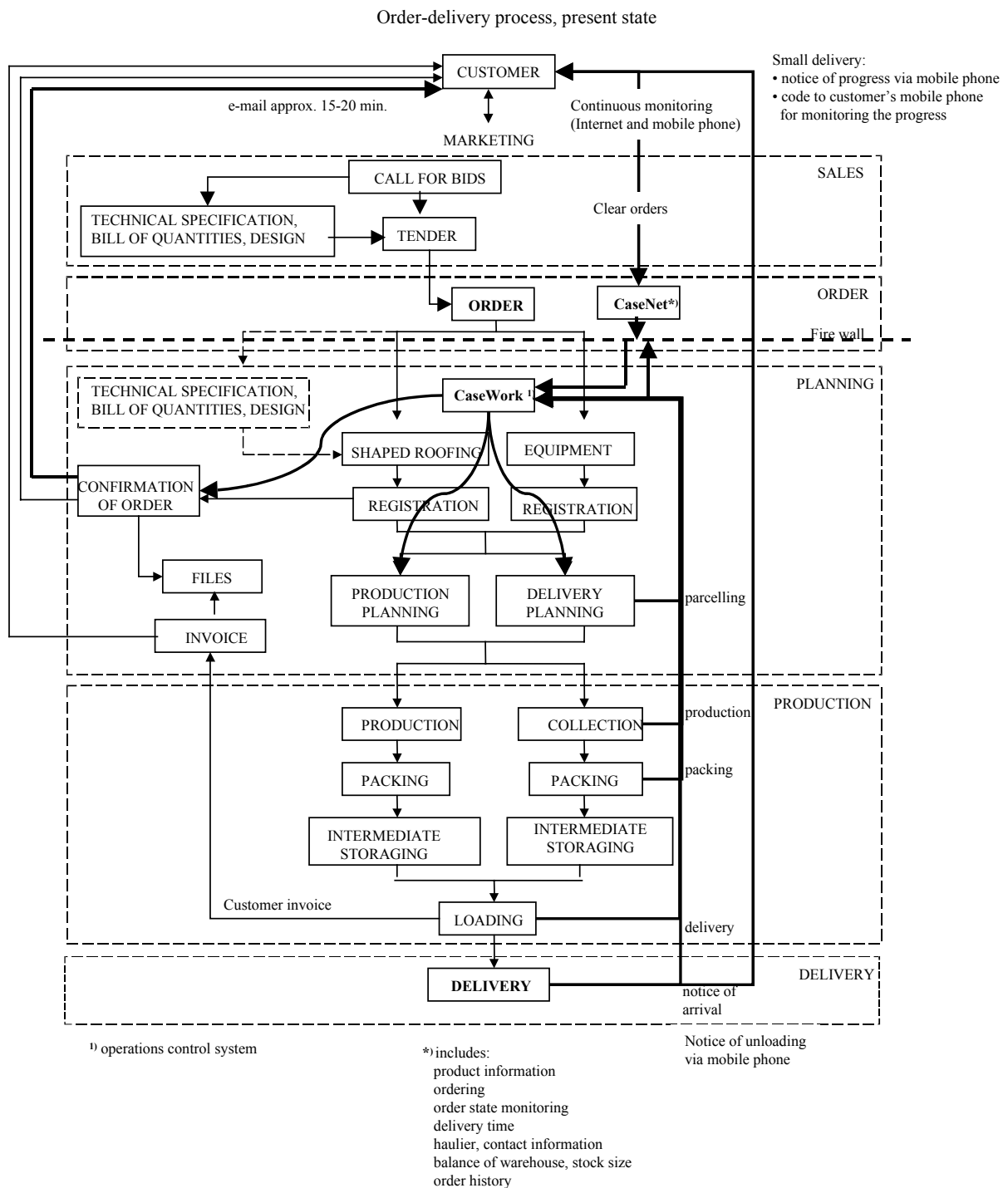


Figure 5 Order-delivery process; present state with e- and m-service applications

In the present state only the clear orders can be handled through CaseNet. If planning is needed the information flows traditionally – not the way presented in Figure 5 (the

bolded flows). The contract client can look for product information, stock sizes, order history reports etc. in CaseNet and also place an order via CaseNet. The case company's operations control system CaseWork picks up the orders placed via CaseNet and after manual checking of price and delivery time the order goes to planning of production and delivery and further into production. The confirmation of order is sent via e-mail to the customer. It is possible for the customer to monitor the order state via CaseNet where the confirmations of barcodes are reported during the production. The customer can also see the delivery time and contact information of the haulier through CaseNet. When the delivery is unloaded the haulier can confirm it by mobile phone and it can be seen in real time in CaseNet. Some of the hauliers inform the customer about the delivery to customer's mobile phone or they can report to customer's mobile phone a code with which the customer can check the delivery state via CaseNet.

In the future, the case company is planning to take in use electronic bills instead of traditional ones and electronic confirmation of order directly into customers' systems. Monitoring of material movements in production as well as in delivery with the help of barcodes and mobile confirmations has also been planned. Furthermore, the company is planning to implement an e-service called CasePrice for customised prices and discounts and an e-service called RoofNet for planning. The case company is planning to expand the present and the planned e-services into other customer groups as well. For industrial house manufacturers RoofNet would offer significant advantage in the form of planning. For construction and assembly firms the real time information of for example delivery time would be of monetary value. Electronic files of customers' buying habits, customised prices as well as profitability per customer are expected to help the company in managing the customerships. Direct connections to customers' systems are expected to be detected in savings of time, increased flexibility, increased accuracy of information, decreased manual work and avoidance of double work. This planned connection is assumed to engender the need for some kind of an adapter between different operating systems.

CONCLUSIONS

The aim of this study was to explore how the framework of logistics can be applied for studying e-business transition in b2b context. A case study was applied to discuss the background and the objectives of e-business adaptation (p. 8-9), to describe the value chain of the case company (Figure 3) and to visualise the effects of e-business transition on information flows between the case company and one of its client organisation groups (Figures 4 and 5). In other words, the case was applied to describe and document the present state of e-business transition, to explore how things are made in practice and to figure out the future needs, objectives and opportunities of development (p. 13).

The adaptation of e-business in the case company has followed clear stages. First the adaptation has been connected to company's overall strategy and then the objectives set for the adaptation have been clearly stated. The implementation has been carried

out first through www-visibility and then through e-service application (CaseNet) and mobile technology applications. In addition to technological solutions the implementation has claimed - and will be claiming - for changes in the modes of operation. In fact it seems that the technological solutions are only tools while the focus is on the modes of operation, on managing change and relationships and on learning and development.

This study has brought up some themes and topics for further research. These themes include

- analysing e-business transition also from the customer point of view
- comparing theoretical e-business promises and expectations with empirical ones
- analysing the need for change management in the changing operational environment
- figuring out e-business challenges and opportunities for logistics
- analysing e-business as a competitive edge for logistics
- considering information network as a re-definer of the organisational structure

Even though only one case has been studied in this paper it can be assumed that there are several companies at the same phase and stage in their e-business adaptation, making decisions concerning e-business and the modes of operation and applications related to it. This study is expected to help these companies by describing the present state of e-business adaptation of the case company, by documenting the applications the company has in use and the decisions the company has made as well as the objectives and plans for future development. In this paper the phenomenon has been studied only from the case company's point of view. Wider co-operation between the companies in the value chain is assumed to bring about new opportunities as well as challenges for e-business adaptation.

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From Idea to Knowledge