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ABSTRACT

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Abstract

Process innovation in reverse logistics indicates an innovative reengineering of a specific reverse logistics procedure in practice. This study concentrates on creating new process models for customer returns of pharmaceutical products to the wholesaler in order to streamline and simplify the return activities. The assigning organization is a Finnish pharmaceutical wholesaler Company A (Pseudonym used). The topic was approached through investigating the underlying reasons why a new return process is required, what are the concrete obstacles in the existing process, what are the change possibilities, and how the process is actually changed to meet the desired benefits?

The empirical research was conducted by using a constructive research approach. The research includes seven steps: finding a practically relevant problem, examining the co-operation with the target organization, obtaining a practical and theoretical understanding of the topic, innovating the problem solving construction, implementing the solution, pondering the applicability of the constructed solutions, and contemplating the theoretical contribution of the research. The research involved two phases of data collection and analysis: First, 13 departments connected with the reverse logistics activities in Company A and two customers were interviewed. The objective was to map the existing process and find the main problem areas for improvement. Secondly, the created process constructions were presented to the project supervision group, who determined the realistic realization of the new processes.

The existing customer return processes were mapped by producing the process flowcharts from the current return activities. The return volumes and the problem sections were made clear and change levers were identified in order to create a framework for designing new reverse logistics processes. The process change possibilities were categorized as: automatization and optimization of processes through developing IT applications, operational change through applying zero return policy, and infrastructural change through centralization of operations. The IT initiated change was seen as realistically realizable process construction by Company A. It is where the customer is given the responsibility to input the return data into an online application, which creates an easily manageable transaction in Company A's ERP (Enterprise Resource Planning) system and simultaneously diminishes the workload. The constructions comply with many of the innovation attributes, indicating that the term "process innovation" in this research is just.

Key words	Processes, innovations, logistics, return, change
Further information	

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Tiivistelmä

Prosessi-innovaatio paluulogistiikassa merkitsee tiettyjen paluulogistiikan prosessien muutosta käytännössä. Tämä tutkimus keskittyy luomaan uudet prosessimallit lääketuotteiden asiakaspalautuksiin tukkukauppiaalle virtaviivaistaakseen ja yksinkertaistaakseen palautuskäytäntöjä. Toimeksiantajaorganisaatio on suomalainen lääketukkuri Firma A (Pseudonyymi). Aihetta lähestyttiin tutkimalla perimmäisiä syitä, miksi uusi palautusprosessi tarvitaan, mitkä ovat konkreettiset ongelmat nykyisessä prosessissa, mitkä ovat muutosmahdollisuudet ja miten prosessi todellisuudessa muutetaan vastaamaan toivottuja hyötyjä.

Empiirisessä tutkimuksessa käytettiin konstruktiivista tutkimusotetta. Tutkimukseen kuului seitsemän vaihetta: käytännönläheisen ongelman löytäminen, yhteistyömahdollisuuden selvittäminen kohdeorganisaation kanssa, käytännönläheisen ja teoreettisen tiedon omaksuminen, konstruktioiden kehittäminen, ratkaisun käytännöntoteutus, konstruktioiden soveltuvuuden pohtiminen ja tutkimuksen teoreettisen hyödyn tarkasteleminen. Tutkimus sisältää kaksi aineiston keruu- ja analysointivaihetta: Ensimmäiseksi haastateltiin 13 osastoa, jotka ovat osa paluulogistisia toimintoja Firma A:ssa ja kahta asiakasta. Tavoitteena oli kartoittaa nykyinen prosessi ja selvittää ongelma-alueet kehitystä varten. Toiseksi muodostetut prosessikonstruktiot esiteltiin projektin ohjausryhmälle, joka määritteli uusien prosessien realistisen toteutettavuuden.

Nykyiset asiakaspalautusprosessit kartoitettiin tuottamalla prosessien vuokaaviot olemassa olevista palautustoiminnoista. Palautusmäärät ja ongelma-aihiot selvitettiin ja muutoskeinot tunnistettiin, jotta pystyttiin kehittämään puitteet uusien paluulogististen prosessien suunnittelulle. Prosessimuutosmahdollisuudet kategorisoitiin: prosessien automatisoinniksi ja optimoimiseksi kehittämällä informaatioteknologia sovelluksia, operationaaliseksi muutokseksi nolla-palautus – menetelmää hyödyntämällä ja infrastruktuuriseksi muutokseksi keskittämällä operaatioita. Informaatioteknologialähtöinen muutos nähtiin realistisesti toteutettavana prosessikonstruktiona Firma A:n puolelta. Siinä asiakkaalle annetaan vastuu palautustietojen syöttämisestä Internet-sovellukseen, joka luo helposti käsiteltävän tapahtuman Firma A:n toiminnanohjausjärjestelmään ja samanaikaisesti vähentää työmäärää. Luodut prosessit täyttävät monet innovaatio-ominaisuuksien ehdot, mikä merkitsee termin ”prosessi-innovaatio” olevan oikeutettu tässä tutkimuksessa.

Asiasanat	Prosessit, innovaatiot, logistiikka, palautus, muutos
Muita tietoja	

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PROCESS INNOVATION IN REVERSE LOGISTICS

Remodeling of customer returns process in pharmaceutical wholesale sector

Master´s Thesis
in International Business

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

Process innovation in reverse logistics explores an innovative process change in reverse logistics operations. The process modification concentrates on customer returns in the pharmaceutical wholesale sector through constructing new processes in order to improve the effectiveness and efficiency of the operations. The introduction to the reverse logistics process innovation in the pharmaceutical wholesaling sector explains the fundamentals concerning process change, reverse logistics, and the research approach. First, the background for the research identifies the practical problem to be researched and discusses the motives for the study. Secondly, the research question and its sub questions are analyzed. Thirdly, the constructive research approach is fused together with the topic and the research steps are divided across the thesis.

1.1 Background to the research on reverse logistics in pharmaceuticals wholesaling

Reverse logistics process innovation indicates an innovative change in a particular reverse logistics process. This subject area has not been extensively studied, not as a unified topic or as individual themes. The research subject is interesting from two perspectives. First, the theoretical aspect of the research combines the established innovation theory with business process change and applies the aspects of process innovation with reverse logistics. Secondly, the theoretical contribution is studied in practice by investigating a specific customer returns process and developing improved process constructions for simplicity and streamlining benefits.

Process innovation indicates an innovative process change (see, Davenport 1993), which in process reengineering literature is referred as a synonym for business process reengineering (BPR) (see, for example, Martinsons 1995) and in innovation literature as a unique type of innovation (see, for example, Tidd, Bessant & Pavitt 2003). Although, literature on BPR is covered extensively and elements of process innovation are determined by Davenport (1993), the feature of innovation regarding process change is left with limited recognition. By applying the innovation attributes (Rogers 1983) into the existing theory on process innovation, a more comprehensive view on the innovativeness of process innovation is achieved.

The pharmaceutical customer returns process represents the specific reverse logistics function to be changed. Reverse logistics has only recently gained recognition from companies and academic researchers (see, for example, Rogers & Tibben-Lembke 2001, 141). Rogers and Tibben-Lembke (see, 1998; 2001) have identified the fundamentals of the reverse logistics operations and Ritchie, Burnes, Whittle and Hey

(2000) and Mollenkopf, Russo and Frankel (2007) have studied the pharmaceutical returns management in United Kingdom and in Italy respectively, but the remodeling of pharmaceutical customer returns process to wholesalers has not been researched.

The process change of pharmaceutical customer returns through process innovation has not been previously studied. Therefore, this study provides a unique insight to how process innovation is conducted in practice, what are the elements of the Finnish pharmaceutical customer returns process, and how do they contribute to the existing theory on process innovation and reverse logistics. The focus of the research is signified by producing improved pharmaceutical customer returns processes utilizing the approach to process innovation, and determining which of the processes can be realized in practice. Additionally, designating whether the constructions meet the attributes of innovative change are included in the research focus.

The research procedure began by the researcher introducing his research idea on investigating logistics process change in practice by constructing a new process in order to gain efficiency and effectiveness in operations. Company A (pseudonym used), a Finnish pharmaceutical wholesaler, became interested in the research due to its practical nature and they had identified their reverse logistics process to be investigated prior to the research in order to map the existing process thoroughly and explore how the process could be simplified and streamlined, thus the specific process was available for the study. More specifically, the reverse logistics process entailed the customer return operations, which had been neglected in the past; hence concentration was required. The interests of both parties were met, because the researcher gained a specific logistics process that could be investigated and changed through the elements of process innovation, and the company found a tool to map the existing process and provide change possibilities for improved operations.

The researcher was appointed as a team member to the reverse logistics project in Company A. The role entailed mapping the existing process and interviewing customers and Company A staff members involved with the customer returns. Also the researcher would take part in constructing the improved processes. The project was mutually beneficial, because Company A would receive information the current situation and gain designed purpose-constructed change modifications, and the researcher received a concrete research topic to apply theoretical contributions to a practical predicament. Because of this reciprocally advantageous situation the research provides both practical and theoretical contribution to the study.

The title of the thesis: ”Process innovation in reverse logistics: Remodeling of customer returns process in pharmaceutical wholesale sector” signifies a study on process change effort in the area of reverse logistics. Changing processes and reverse logistics may not be familiar concepts due to their novelty and therefore the lack of representation in scientific literature. Process innovation indicates viewing a particular

business function as a process involving cross-functional operations in managing the process flow and changing the process in an innovative manner to gain certain desired benefits. According to Davenport (1993, 1) business should be viewed through key processes, not through functions, divisions, or products. This is because firms strive for ten-fold increase in performance rather than 10%. Process innovation and its constituents including the process view, business process reengineering (BPR), elements of innovation, and the practical implications on process innovation are discussed in chapter 2.

Reverse logistics, a sub concept of supply chain management, represents the particular processual function under investigation and the subject for change. Although the concept of process innovation is more difficult to explain, reverse logistics requires perhaps a more thorough introduction. The Council of Supply Chain Management Professionals (CSCMP), formerly known as the Council of Logistics Management (CLM) define supply chain management as such:

> *"Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies." (CSCMP Website 2008)*

Supply chain management integrates and links business functions and processes together by driving process and activity coordination in marketing, sales, product design, finance, and information technology. (Ibid.) When narrowing the scope towards logistical procedures in supply chains the logistics management is defined as:

> *"Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements." (CSCMP Website 2008)*

The typical logistics activities are inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning, and management of third-party logistics services providers. Also in varying degrees it includes sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service. (Ibid.) The reverse flow of goods, as stated in the logistics management definition, indicates the reverse logistics activities researched in this thesis. Reverse logistics has traditionally been viewed as an unimportant channel or completely ignored (Reverse Logistics… 2007, 7). Especially in the applied setting firms do not

focus on the reverse flow of goods, but rather enhance the forward flow efficiency as much as possible. In chapter 3 the fundamental features of reverse logistics are reviewed, how the process is managed and how goods are disposed, and finally the reverse logistics process implications in the Finnish pharmaceutical wholesale sector are investigated, thus narrowing the scope for the actual research on constructing a new reverse logistics process for Company A.

Presenting the background to the research by introducing the theoretical concepts along with the motivation for research, the actual research procedure is to be enlightened. The next section introduces the main research question and the sub research questions.

1.2 Research question and sub questions

This research considers the relevance and importance of reverse logistics and process innovation scope in theoretical and more importantly in practical setting. Creating an innovative process construction that satisfies Company A's desires on efficiency and effectiveness requires asking specific questions, to which the research provides answers. The research question and sub questions derived from it enable categorizing and analyzing the research findings. In this study the research question is formulated from the basis of Company A's requirement toward improved reverse logistics process and the theoretical aspect towards reverse logistics, innovation and process change.

Research question: *How can a pharmaceutical wholesaler change its reverse logistics process in order to gain process streamlining and simplification benefits?*

By answering the research question the optimal process change options are presented, which provide the desired benefits for the target organization. The research question is approached through four sub questions that provide more detail by dividing the research findings into distinctive categories. The sub questions are:

- Sub question 1: *Why a new construct for reverse logistics process is required by Company A in pharmaceutical wholesale sector?*
- Sub question 2: *What are the problem sections in the current reverse logistics process in Company A?*
- Sub question 3: *What are the radical and incremental change possibilities available for streamlining the reverse logistics process in the pharmaceutical wholesale sector?*
- Sub question 4: *How the constructed process is realistically realized in order to simplify and streamline the reverse logistics operations?*

All of the sub questions combine theoretical and empirical information into a holistic answer, thus providing a specific contribution to the main problem. The first sub question addresses the underlying reasons why the existing reverse logistics is to be changed. The second sub question contemplates the existing customer returns process and specifies the problem section faced in conducting the current operations. The third sub question concentrates on the change function and explores the construction possibilities available for solving the research question. The fourth sub question examines the quality of the created constructions through investigating the reactions from Company A's directors determining the realistic realization of the new processes.

Although the research questions are formulated and the study itself is divided into distinctive steps and introduction to reverse logistics process innovation is presented, a generation of a frame concerning the research needs to be established. The framing concentrates mainly on the practical reverse logistics elements that cannot all be covered during the research. As explained, the research focuses on customer returns process, which is the primary interest of Company A. The return process change focuses distinctively on returns from customers and improving the reverse flow of goods. This indicates excluding the improvement of forward flow operations for the benefit of reverse operations. More specifically, the returns derived due to picking error deliveries, the objective is to improve only the flow back towards the wholesaler, not create methods to decrease picking errors.

The research frame excludes packaging returns indicating that no attention is placed on packaging returns in the empirical research phase. The packaging returns were excluded because Company A wanted to solely focus on pharmaceutical item returns from customers, besides the packaging return process meets the qualifications of Company A. Also, from the research perspective, including packaging returns in the research scope indicates mapping and improving an entirely different return process overlaying the return process of pharmaceutical items. Disposition activities are a central element in reverse logistics operations, however the disposition process is only briefly mentioned, but no construction is created to alter the process. As explained above, Company A's wanted to focus on the customer return function from the point when the to-be-returned item is placed in the reverse flow to when the returned is processed in Company A. The disposition activity is integrated with the return processing, which is why it is mentioned, but the disposition process is not improved. Again, from the research viewpoint, including the disposition process in the process innovation scope would have expanded the research considerably. By framing the packaging returns and the disposal process outside the research scope, the study remains more specific and detailed.

The next section explores the phases of the constructive research approach and how it is conducted in reverse logistics process modification concerning pharmaceutical

returns. The research phases provide the structure for the thesis, which indicates directing each research step to a specific chapter.

1.3 Constructive research in reverse logistics

The research approach utilized in the study is called constructive research approach extensively covered by Lukka (1999; 2000; 2003; 2006). Constructive research indicates creating a construction in order to solve a practical research problem and thus contributing to theory. As explained in the background section of the introduction the research focuses on investigating the existing pharmaceutical product return process from customers to the wholesaler, where the wholesaler (Company A) acts as the project commissioner.

The research is divided into distinctive steps: finding a practically relevant problem with potential for theoretical contribution, examining the potential for co-operation with the target organization, acquiring a thorough understanding of the topic both practically and theoretically, developing the actual construction, implementing and testing the solution, contemplating the applicability of the solution, and identifying and analyzing the theoretical contribution.

The first step of finding a practically relevant problem is covered in the introduction section of the thesis. The section 1.1 discussed the remodeling of customer return process in the Finnish pharmaceutical wholesale sector and its potential for both practical and theoretical contribution. Because process innovation is not extensively studied in theoretical literature, therefore exploring the features of process view on business, business process reengineering and innovation theories and combining them into a more comprehensive outlook on process innovation is a compelling and theoretically relevant topic. Reverse logistics is also a fairly novel topic and only recently it has received attention in both practice and in academic literature. Changing a reverse logistics process in practice enables the fusion of theoretical knowledge and practical process change efforts, which provides a unique opportunity to gain knowledge on reverse logistics process change and simultaneously contribute to theory by discussing the findings.

The section 1.1 explained the motivation for the research by both parties the researcher and the target organization. The section also presented the research outline of mapping the existing process and creating improved process constructions. The outline indicates the co-operation between the researcher and the target organization as completing the project and obtaining the research findings benefit both parties. Appointing the researcher as a member of the process development team the co-

operation strengthened, because an outsider perspective would have created distance between the target organization and the researcher.

Obtaining a deep understanding of the topic both theoretically and practically refers to the theoretical data collection and analysis as well as the data collection and analysis from the existing process from different parties involved in the customer returns process. Chapter 2 provides an extensive coverage on process innovation, process view, business process reengineering, and innovation theories. The background to the research explained the relation of reverse logistics to supply chain management and logistics in theoretical setting. Chapter 3 explores the theoretical aspects of reverse logistics focusing on the return function and includes industry specific information on the Finnish pharmaceutical distribution. Chapter 4 discusses the methodological features of the research, which can be associated with obtaining understanding of the research topic. For example, the steps of the constructive research approach are discussed in more detail. The deep practical understanding derives from consulting the Returns Department in Company A and interviewing the organizational units and a few customers linked in the reverse logistics process. Chapter 5 discusses the research from practical viewpoint.

Chapter 5 is the chapter presenting all aspects related to the empirical portion of the research. The existing process is identified and mapped, improvements are designed and the problem solving constructions are created, finally the practical implementation of the constructions is reviewed. Chapter 5 integrates the existing process with creation of the new one and the realistic realization of the constructions is analyzed. Finally, the conclusion chapter (chapter 6) extrapolates the entire research by observing the applicability of the presented constructions and analyzes the theoretical contribution of the research.

2 PROCESS INNOVATION

The essence of this thesis is about reengineering a reverse logistics process and exploring the innovative features connected to the change. This chapter introduces the theory of business process reengineering (BPR) and connects the attributes of innovation to the change function. The term process innovation, first introduced by Davenport (1993), is used to describe the phenomenon. However, the scientific literature is somewhat paradoxical in explaining process innovation, because of the limitations in incorporating innovation theory in the process change. First, the overall term process innovation is discussed briefly to illustrate its constituents in order to provide a clearer view on the topic. Secondly, the above-mentioned components of process innovation are explored, where the fundamentals of business processes and their change are studied and also the elements of innovations are viewed. Finally, the innovative features are combined with the BPR theories to provide an understanding of process innovation in wider scope and deeper meaning.

2.1 Characteristics of process innovation

Innovating a constructive solution is a significant part of the research approach utilized in this study; therefore the term process innovation is used to emphasize the importance of innovativeness in the process change. Process innovation indicates a combination of disruptive business process improvement with innovative applications (Davenport 1993, 1). This signals the key elements of business process change being the understanding of processes, process reengineering in improving performance, and the characteristics of innovations. This section focuses on describing the theory on process change, first by introducing the existing process innovation concept, and then accentuating business processes and business process reengineering.

Tidd, Bessant & Pavitt (2003, 10) define process innovation as:

> *"[C]hanges in the ways in which the products and services are created and delivered."*

As explained above by Davenport, the term process innovation describes a radical process change initiative, which is also referred as business process reengineering and business process redesign (Davenport 1993, 2; Stoddard & Järvenpää 1995, 82). Martinsons (1995, 262) describes business process reengineering (BPR) being an umbrella term representing large-scale process innovations using information technology. In Davenport's (1993, 2) view reengineering is only a part required in a radical process change and the term process innovation incorporates visioning and planning the intended new work strategies, the actual process designing phase, and

finally the implementation of the change in technological, human, and organizational dimensions.

In order to comprehensively explain process innovation and its use and potential it needs to be divided into manageable sections. Davenport (1993) extracted innovation from the process view and radical process change and BPR was mentioned. Innovation will be reviewed individually, as will processes and reengineering. Through discussing the elements of process innovation the approach to successful process innovation can be formulated. First, processes and process view on business are defined, followed by a description on radical reengineering and BPR. Then innovation and its diffusion are viewed to provide insight to innovation theories, and finally the terms are combined into a holistic projection of process innovation. This approach enables a gradual move towards discussing the practical elements of process innovation and BPR in logistical processes.

2.1.1 Characteristics of business processes

Business processes indicate the means that a company conducts its business (Scherr 1993, 80). Adopting a process view in business is crucial for process innovation, because it emphasizes *how* work is done rather than *what* is done (Davenport 1993, 5; Tinnilä 1994, 5). Processes are focusing on the tasks and activities performed within an organization, which is in contrast to functional definitions (Tinnilä 1994, 5). Table 1 presents some of the business process definitions in academic literature.

Table 1 Business process definitions

Definition	**Author (s)**
Business process is a set of logically related tasks performed to achieve a defined business outcome.	Davenport and Short (1990, 12)
Business process is a structured, measured set of activities designed to produce a specified output for a particular customer or market.	Davenport (1993, 5)
Business process is a specified ordering of work activities across time and place, it has a beginning, an end, and clearly identified inputs and outputs: a structure for action.	Davenport (1993, 5)
A process is a set of linked activities that take an input and transform it to create an output. It should add value to the input and create an output that is more useful and effective to the recipient.	Johansson et al. (1993, 57)
Business process is a series of customer-supplier relationships that produces specific results at specific points in time.	Scherr (1993, 82)
Business processes are logically related, structured and measured set of activities to produce a clearly defined output from an input to create added value to the customer.	Tinnilä (1994, 5)
Business processes are sequences and combinations of activities that deliver value to a customer.	Coulson-Thomas (1994, 21)
A collection of activities that takes one or more kinds of input and creates an output that is of value to the customer.	Hammer & Champy (2001, 38)

As the Table 1 illustrates all the process definitions are somewhat interlinked, meaning that every author describes processes as structured, linked, or a series of activities to provide something of value, turning input into an output. Processes are the necessary actions performed by an organization to produce value for the customer indicating the structure for operations (Davenport 1993, 7). Processes signify a horizontal view cutting across traditional vertical functional divisions (Coulson-Thomas 1994, 22). Traditionally different departments are responsible of tasks assigned to them, for example purchasing, logistics, and sales are all separate (Peppard & Rowland 1995, 8), but in viewing business as processes, the operations require multiple functional skills (Davenport 1993, 8).

Peppard and Rowland (1995, 12-13) classify three types of organizational processes being: strategic processes, which the organization uses to plan and develop for the future; operational processes, which perform the basic day-to-day functions; and enabling processes, which support the strategic and operational process performance. Davenport (1993, 8) states that process innovation demands, that the interfaces between functional units or product units are either improved or eliminated, and sequential flows across functions need to be made parallel through rapid and broad information movement. Johansson et al. (1993, 58) explain that comprehending businesses as processes instead of functions the focus can be concentrated on streamlining efforts for creating value with less effort rather than aiming to reduce costs through diminishing sizes of functions.

2.1.2 Reengineering business processes

Management wants a company to be lean, nimble, flexible, responsive, competitive, innovative, efficient, customer-focused, and profitable, therefore the attention is to be drawn upon how companies do their work and why do they do it the way they do (Hammer & Champy 2001, 9)? In the previous section (2.1.1) processes were identified to be the source for linking different organizational divisions together, performing activities, producing an output from an input, and creating value for a customer. BPR discusses changing business processes in order to gain dramatic improvements in performance, which involves streamlining the end-to-end processes through which value for customers is created and delivered (Talwar 1994, 40). In the following table (Table 2) BPR definitions are presented in order to illustrate the similarities and differences of BPR concept in academic literature. The BPR definition by Hammer and Champy (2001, 35), presented in the first edition publication in 1993, manifests as the standard definition in BPR literature (see, for example, Holtham 1994, 61; O'Neill &

Sohal 1998, 832; Al-Mashari & Zairi 2000, 11; Al-Mashari, Irani & Zairi 2001, 437; Zhang & Cao 2002, 146).

Table 2 BPR definitions

Term	Definition	Author
Business process reengineering	Radically redesign business processes in order to achieve dramatic improvement in performance.	Hammer (1990, 104)
Business process redesign	The analysis and design of work flows and processes within and between organizations.	Davenport and Short (1990, 11)
Business process redesign	The company's actions to restructure internal operations to improve product distribution and delivery performance to the customer.	Short and Venkatraman (1992, 7)
Business process innovation	One-time process innovation effort to achieve radical business improvement.	Davenport (1993, 24)
Business process reengineering	BPR is the means by which an organization can achieve radical change in performance as measured by cost, cycle time, service, and quality, by the application of a variety of tools and techniques that focus on the business as a set of related customer-oriented core business processes rather than a set of organizational functions.	Johansson et al. (1993, 15-16)
Business process redesign	Business process redesign is the fundamental, one-time rethinking, innovation and radical redesign and analysis of critical, key business processes within and between organisations to achieve dramatic improvements in performance measured by several measures.	Tinnilä (1994, 24)
Business process re-engineering	BPR is: the constant search for, and implementation of, radical new approaches to business practice leading to step change improvements in productivity and customer service.	Miers (1994, 142)
Business process redesign	The critical analysis and radical redesign of work flows and business processes to achieve dramatic improvements in important measures of performance.	Martinsons (1995, 254)
Business process re-engineering	BPR is an improvement philosophy. It aims to achieve step improvements in performance by redesigning the processes through which an organization operates, maximizing their value-added content and minimizing everything else. This approach can be applied at an individual process level or to the whole organization.	Peppard & Rowland (1995, 20)
Business process reengineering	The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed.	Hammer & Champy (2001, 35)

Even though Hammer and Champy (2001, 240) did not invent BPR, they themselves portrayed that perhaps they discovered it, however, businesses had been reengineering processes long before the research by Hammer and Champy. Although, the definitions presented in the Table 2 differ slightly from one another, there are still clear similarities between them. Hammer and Champy (2001, 35-38) approach their definition through key words: fundamental, radical, dramatic, and processes. The word fundamental refers to what must be done and how to do it. The fundamental issues approached in reengineering are the ones that determine a comprehensive restructuring of the process how it should be, ignoring the way it is currently. Radical indicates the nature of change

in BPR. The change is not incremental or gradual improvement, but inventing new ways to approach work disregarding existing systems and procedures. Dramatic refers to the level of improvement. Radical indicated the novelty of improvement and dramatic refers to the magnitude of the change. Davenport (1993, 1) also notes the need for significant performance improvement instead of marginal advances. Hammer and Champy (2001, 36-38) also identify three company types related to the dramatic improvement, which are heavily struggling companies desperately in need of change, companies striving for leadership position and fearing overtaking by others, and finally leadership position companies taking stronger hold of their position and creating obstacles for rivals. The fourth key word is processes, which is the most important one in the definition. It is the most challenging factor in the BPR definition, because it requires the management to change their perception and thinking from divisions to process view.

As the definitions in the Table 2 indicate the BPR concept is associated with radical change in academic literature (see, for example, Stoddard and Järvenpää 1995, 81). The feature of radical or disruptive change categorizes BPR and process innovation away from incremental process change. Peppard and Rowland (1995, 156) associate the incremental and radical change as systematic redesign and clean sheet approach respectively, which are distinguished as identifying and understanding existing processes and systematically work through them to create new processes that provide the desired outcome, and fundamentally rethink the entire process and design it accordingly. Dennis, Carte and Kelly (2003, 33) discuss the clean sheet approach in investigating the structural benefits of groupware-supported BPR, which is BPR aided by team-based process enabling technology.

Hammer and Champy (2001, 51-52) have a strong impression on the ‘restarting’ element of BPR, which rejects used constructions and assumptions and aims to invent new ways to work. They continue that BPR is not supposed to be confused with automatization, downsizing, reorganizing, software reengineering, quality improvement, kaizen, or total quality management (TQM). Automatization of work refers to using information technology (IT) utilities to alter the current process to be IT managed, in other words doing the same thing more efficiently (Ibid. 51). The use of IT does, however, have a significant role in process innovation, which will be discussed in the section 2.3. BPR does not necessarily result in loss of jobs or reorganizing the organization, but BPR and process innovation may result in a leaner organizational structure. Software reengineering is rebuilding obsolete IT systems with more modern technology (cf. Holtham 1994, 69-70). Kaizen means continuous improvement (Peppard & Rowland 1995, 89), which signals gradual improvement. TQM refers to managing an organization in a way that all product and service dimensions that are important to the customer excel (Ball, McCulloch, Frantz, Geringer & Minor 2004, 660). Quality improvement and TQM are about incremental change as well, which are

not to be confused with BPR or process innovation (Hammer & Champy 2001, 52; Peppard & Rowland 1995, 18; Coulson-Thomas 1994, 29; Davenport 1993, 145-146). TQM and quality improvement, however, complement BPR and process innovation initiatives (Martinsons 1995, 266).

The radical process change efforts to gain certain desired benefits for the reengineering organization and simultaneously create value for the customer characterize the fundamental elements of BPR. The following section introduces the innovation theory, which provides insight into defining process innovation.

2.2 Innovation and business process change

The task of explaining process innovation, in the context that incorporates not only the reengineering elements of business process change, but also the true intent of innovation deriving from established theory turns the focus to innovation literature. Essentially innovation is about change (Tidd et al. 2003, 10) and being able to change and adapt is critical for organizations to survive (Trott 2005, 5). The aim of this section is to view innovation from a theoretical perspective in order to clarify the strategic value of innovativeness, the radical and incremental innovations, and the added value created through innovative efforts. Also the attributes of innovations are determined in order to explain the diffusion of innovations within an organization. The criteria, which determines the value and the adoptability of a certain innovation holds a significance to this research, because these innovation attribute criteria are used to analyze the innovativeness of the constructive solutions presented for the case company. After the thorough review of the innovation literature the elements of BPR and the fundamentals of innovations are combined to explore the profound meaning of process innovation.

2.2.1 The scope of innovations

Innovation as a concept is far more versatile than the prevailing understanding in process innovation literature applies in its theoretical form. Process innovation literature regularly contemplates innovation as a novelty aspect that provides a degree of disruptiveness to the process reengineering (see, for example, Davenport 1993; Stoddard & Järvenpää 1995; Martinsons 1995); however, innovation is not only something with novel value, but also a contributor to the innovator's improved performance, which means monetary success derived from an idea conception manifesting as a tangible product or a service (Trott 2005, 15). Drucker (1993, 30) describes innovation as an act that endows resources with a new capacity to create

wealth. A truly successful innovation returns the value of the original investment and includes additionally gained proceeds (Burgelman, Christensen & Wheelwright 2004, 2). Hansen and Birkinshaw (2007, 123) see innovation as the process of transforming ideas into commercial outputs. In layman terms, when an invention, a tangible form of a new idea (Trott 2005, 15), begins to make profit it can be called an innovation.

Broadly stated innovation is a process through which new ideas, objects and practices are created developed, or reinvented signaling their development, implementation and diffusion (Slappendel 1996, 107-108). Innovations are categorized in product, process, position, and paradigm innovations (Tidd et al. 2003, 10), which are called the types of innovations. The innovation types indicate the changes in products and services offered, changes in the creation and delivery of the above-mentioned products and services, changes in the context of product and service introduction, and changes in the fundamental operating conduct of an organization, respectively.

Regardless of the type of the innovation, creating something new and commercially successful balances itself between radical and incremental change. Christensen (1997, 39-42) describes the incremental and radical changes in an innovation context as sustaining and disruptive innovations. The sustaining innovations signal the evolutionary improvements in existing and already valued products or services and the disruptive innovations create a completely new market for the new product or service (Christensen & Overdorf 2004, 544; cf. Kim & Mauborgne). The features of sustaining and disruptive innovations introduced by Christensen indicate the degree of novelty, which Tidd et al. (2003, 11) designate as radical and incremental. Incremental innovation and continuous innovation indicate a gradual change in existing products, services, processes, or whichever subject is under change (Ibid. 14). Radical innovation indicates the discontinuity of change, which promotes commercially successful discoveries that are new to the world (Ibid. 18).

The principles of innovations, the do's, don't's, and conditions, are explored by Drucker (1993). These principles represent the core of the discipline and indicate what should be done, what should not be done, and the prevailing conditions that should be taken note of when aiming at creating successful innovations. (Drucker 1993, 134)

The first thing that should to be done, or has to be done, in innovations begins with analyzing the opportunities, which generate systematic and purposeful innovations (Ibid. 134). The opportunity analysis means an examination of different innovative sources: the unexpected success, unexpected failure, or an unexpected external event; the incongruity, which indicates examining how things actually are and how they should be; the process need indicating the innovative opportunity; the changes in the industry structure, or market structure; demographics; perception changes signaling mood and meaning; and new scientific and non-scientific knowledge. (Ibid. 35)

The second factor in necessary means to be taken when innovating is to understand the conceptual and perceptual nature of innovations, which displays in observing, asking, and listening in the surrounding environment. Analytically pondering how to satisfy an opportunity when presented and finding the expectations, values, and needs of the potential users. Thirdly, simplicity and focus drive an innovation to be effective. The successfulness derives from simple features, otherwise the concept will not work, and also in order to avoid confusion among the adopters an innovation should be easily approachable i.e. one non-complicated thing. (Ibid. 135)

Fourth and fifth 'must do' feature concern the effectiveness of an innovation in the long run. Effective innovations begin small, because when introducing the new idea to a few people in a small and limited market it delivers time to make changes in the final product or a service increasing the adaptability of a new product or service. (Ibid. 135-136) The other factor to be addressed is targeting the innovation in a leadership position from the beginning. There is no telling if an innovation will eventually be successful, but if an innovation does not have the leadership desire then it most likely is not innovative enough. (Ibid. 136) The fourth and fifth principles indicate 'crossing the chasm' (Moore 2000), more specifically moving from the early adopter market to the mainstream markets and managing the innovation through product or service leadership, operational excellence, and customer intimacy (Moore 2005, 224), thus gaining success.

The issues to be avoided in an innovation creation process are making too complicated and diverse solutions and focusing on future potential. Firstly, the final solution is supposed to be handled by ordinary people, therefore attempting to create something too clever will not create a successful outcome. Secondly, if the idea is too diverse, too disintegrated, too shattered, and too many things are attempted to be completed at the same time then the focus disappears and ideas get sidetracked from the original purpose and they become scattered and they never become innovations, but remain as ideas. Thirdly, if an innovation is aimed for future and not the present it will not work. The life cycle of computers so far provides a fine example, because computers definitely have shown emerging maturity, but the initial use of computers was created for the calculating needs of the early 1970's. This shows the long-range impact of innovations. (Drucker 1993, 136-137)

The conditions affecting innovations, as presented by Drucker (1993, 138-139), signal that above all innovation is work; it needs to build on its own strengths, and the effect it creates in the environment. Innovation requires knowledge and ingenuity, but as the innovation becomes hard, focused, and purposeful work and begins to demand diligence, persistence, and commitment, then no amount of knowledge or ingenuity are enough if the work is lacking. Building on the innovations strengths means finding and establishing the comprehensive 'fit' that indicates the correct balance in the organizational, operational, and temperamental aspects. If the necessary effort is non-

existing, then achieving the correct 'fit' is impossible. Finally, innovation has to be market driven, because innovations change people, their behavior and how they work and produce, therefore certain closeness has to be included and prevail throughout the innovation process. (Ibid. 138-139) Sandberg (2005, 82) also states that innovations need to be developed to meet market needs in order to achieve success.

The above-mentioned principles of successful innovations by Drucker mirror the competitive advantage and strategic function of innovations. Innovations are a source of competitive advantage (see, for example, Tidd et al. 2003, 6; Storey & Salaman 2005, vii), which was already portrayed by Schumpeter (1954) in his work "Capitalism, Socialism, and Democracy". There he states that the competition derived from the new commodity, the new technology, the new source of supply, and the new type of organization commands the cost and quality advantage, which emerges at the foundations of existing companies (Ibid. 84). It is the entrepreneurial function, which reshapes the patterns of production by exploiting an innovation. This includes a technological possibility that has not been tried before in order to produce a new commodity, or producing an old one with a new method (Ibid. 132).

Stewart and Fenn (2006, 173) explain that there is no motivation to innovate without strategy. Porter (1985, 1) places competition at the core of the success or failure of companies, in which competition is determined by the appropriate activities of a firm, such as innovations, which contribute to the firm's performance. The three strategies for achieving competitive advantage include cost leadership, differentiation, and focus (Ibid. xvi). Competitive strategy means finding a favorable competitive position within an industry, which is profitable and sustainable against the forces determining the competitiveness of an industry (Ibid. 1). The five competitive forces: the threat of new entrants, the bargaining power of suppliers, the bargaining power of buyers, the threat of substitute products or services, and the rivalry among existing firms; identified by Porter (Ibid. 4-7) enable the identification of critical competitive factors and strategic innovations. Porter (2004) also discusses the strategic fit influencing competitive advantage. The strategic fit indicates consistency between overall strategy and functions, reinforcing activities, and optimization of effort (Ibid. 122). The strategic fit among operational activities reduces costs or increases differentiation (Ibid. 124), although innovations enable firms to lower costs and enhance differentiation (Porter 1985, 20).

The competitive advantage factor of innovations among with the key elements of innovations identified in academic literature indicates that innovations essentially aim creating success for the innovating organization, which emphasizes the added value of innovations for the innovator. Next the diffusion of innovations is discussed, which holds key significance in combining BPR and innovations into a viable definition of process innovation.

2.2.2 Adopting innovations

Robertson (1971, 32) identifies diffusion as the adoption of new products and services over time by consumers within a social system as encouraged by marketing activities. In Robertson's definition adoption refers to commitment to use the new product continuously, which involves the progression of becoming aware of a product or a service to final acceptance. Adoption itself does not explain diffusion because adoption is reviewed as an individual occurrence and diffusion is viewed as a social phenomenon. New products and services indicate the tangible form of innovations that manifest themselves in continuous to discontinuous forms. According to Robertson (1971) the time factor in innovation diffusion is an essential fundamental element. The early adopters of the tangible innovation are distinguished from the later adopters by the time aspect. The consumers adopting the new innovation can be characterized as individuals, families to larger populations of cities and ecological systems. The social system in the diffusion process indicates the limits within which the diffusion occurs in. This means the communication among the members of the social system within set boundaries that determine the scope of the social system, which can be an entire market segment or only a single family. Finally the diffusion process is influenced with specific marketing activities that enhances communication within a certain social system and increases the rate of adoption. Successful diffusion is dependent on viral communication of relevant product information and matching the product attributes with the characteristics of specific social systems and individual consumers.

Rogers (1983, 10) defines the main elements of innovation diffusion as a process where an innovation is communicated through specific channels over time among the members of a social system. Rogers' definition is clearly similar to Robertson's (1971) diffusion process; however, it is more concentrated on innovation attributes that characterize innovations than tangible products and services. Rogers distinguishes innovation in the diffusion context as new idea, practice, or an object (Ibid. 11). Individuals, or certain adoption unit perceives the 'newness' of the tangible product or a service as innovation, although it should be remembered that the aspect of delivering added value or benefit to the innovator is vital (Ibid. 13). The attributes of innovations: relative advantage, compatibility, complexity, trialability, and observability, which are widely used in innovation literature (see, for example, Tidd et al. 2003, 271-272; Ehigie & McAndrew 2005; Völlink, Meertens & Midden 2002; He, Duan, Fu & Li 2006), have a great effect on the diffusing innovations (Rogers 1983, 15-16), therefore these attributes are discussed in detail later in this section. A major aspect of diffusion is communicating the innovation to others who have no previous knowledge of it. The communication channel may differ depending on the situation and the similarities and differences of the transmitting and receiving parties, but the fundamental issue is

transferring knowledge to others about an innovation (Ibid. 17-19). The time aspect in innovation diffusion is important (Ibid. 20), because it is included in the innovation decision process, which determines the adopter categories and the rate of adoption. This means the process where the innovation is first learned and become aware of, an attitude is formed, a decision on adoption or rejection is made, the innovation is implemented, and finally reinforcement is retrieved for the made decision. The decision process creates adopter categories, which in turn indicate the rate of adoption for the innovation (Ibid. 20-23). The members within a social system cooperate to reach a collective goal by solving a common problem. The shared objective is the key factor binding the social system together. The structure of the social system, the established norms, the authority figures, and the decisions made and their consequences affect the innovation diffusion; therefore the social system is recognized as an important part of the diffusion process.

The relative advantage of an innovation indicates the degree of improvement from the idea being substituted perceived by the potential adopters. Economic profitability, low initial cost, a decrease in discomfort, and the immediacy of the reward are the sub dimensions by which relative advantage of an innovation is measured (Ibid. 217). Perception is the key element in determining all of the innovation attributes, because it is the perceptions that influence the behavior of the potential adopters (Ibid. 212). Rogers generalizes that the perceived relative advantage increases the rate of innovation adoption (Ibid. 218).

The existing values, past experiences, and needs of potential adopters need to be taken into account in innovation diffusion (Ibid. 223), because a positively compatible new idea introduced into the existing environment has an increasing affect on the rate of adoption (Ibid. 226). This means that the more compatible the new idea is, the easier it is for the potential adopters to accept and implement.

The complexity of the innovation refers to the difficulty of understanding it, accepting it, and implementing it (Ibid. 230). The complexity aspect of an innovation affect greatly the rate of adoption, because the harder it is for the potential adopter to make use of it, the lower the adoption rate for the innovation becomes. According to Rogers' research, innovations need to strive for simplicity in order to receive a greater adoption rate.

The trialability attribute refers to practical experimentation of an innovation with on a limited basis. The trialability factor decreases uncertainty among the potential adopters and the possibility for experimenting with an innovation increases the adoption rate. Trialability is seen as more relevant for earlier adopters, although it decreases uncertainty among the later adopters as well. (Ibid. 231)

Greater degree of observability of an innovation influences the adoption rate positively. Observability indicates the ease of obtaining information from the innovation

and communicating it to others, thus reducing uncertainty among the members of a social system. (Ibid. 232)

The five attributes of innovation (relative advantage, compatibility, complexity, trialability, and observability) indicate the adoption of innovations, which are used in this research to determine the implementation criteria of the constructed solutions to the reverse logistics problems. More precisely the analysis of the constructive solution in a practical setting is established through the innovation attributes due to the fact that a full implementation is conducted after the constructions are presented and the supervisory team identifies the desired functions.

2.3 Process innovation in practice

Now that the underlying concepts of processes, BPR, and innovation are introduced the focus shifts back to process innovations. First, process innovation approach is discussed in relation with two BPR approaches in order to provide a more comprehensive view on the matter. Secondly, the competitive advantage and strategic aspects of process innovations are explored, where notions of process innovation literature and BPR literature are considered and the practical implications of process innovations are explored. Finally, process innovation in logistics is reviewed because logistical implications offer an easy transition to reverse logistics processes discussed in chapter 3 and because logistics concepts are important for understanding the redesign of any process (Persson 1995, 15).

2.3.1 Process innovation approach

Process innovation as a concept is very complex because it involves several interrelated aspects, such as process view on business, reengineering, and innovation. Especially the relationship between process innovation and BPR requires careful reviewing. Because the two are alike, it is important to distinguish the one conclusive aspect separating the two: the concept of innovation. When innovation is determining the nature of change it includes the same aspects of change as BPR in addition with providing added value to the innovator through innovation diffusion.

Edquist (2005, 182) defines process innovation as such:

> *"Process innovations are new ways of producing goods and services. They may be technological or organizational."*

Edquist's definition is similar to the one Tidd et al. (2003) provided, introduced in section 2.1. That is exactly what process innovation is, changing processes in an

innovative way to produce a desired added value to both the customer and the innovator. Process innovation aspects are compared with BPR in order to determine the similarities and differences between the two concepts. The required steps in process innovation and in BPR signify the applicability of the two concepts and the implementation of process innovation and BPR in practice. The process innovation approach, introduced by Davenport (1993, 25), is compared with BPR approaches by Davenport and Short (1990, 14) and Johansson et al. (1993, 85) in order to determine the essential features in implementing process innovation in practice. After reviewing the approaches the steps of the process innovation approach are reviewed and key development activities are identified.

Figure 1 illustrates the approach to process innovation.

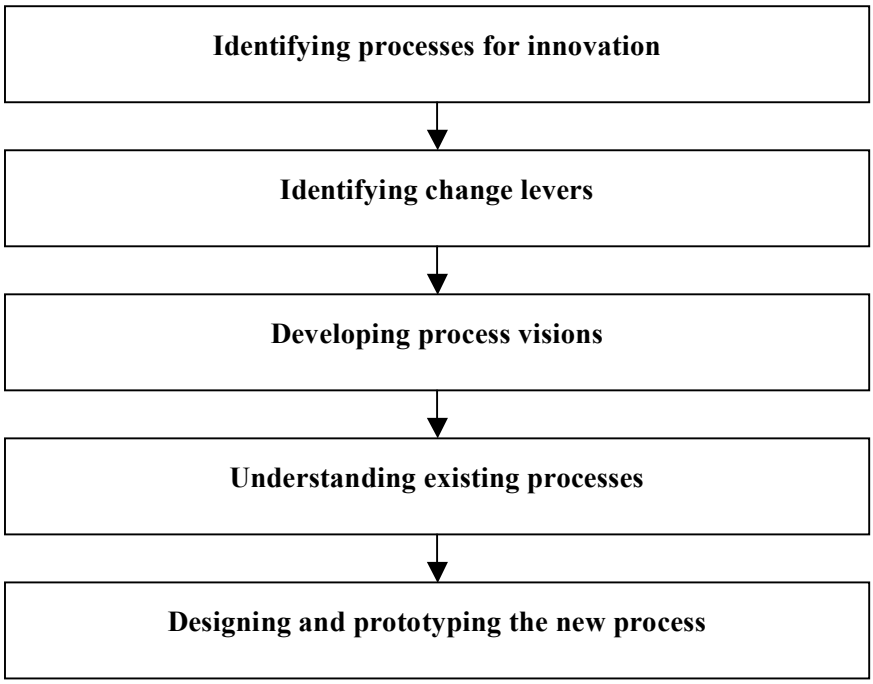

Figure 1 A high-level approach to process innovation (Davenport 1993, 25)

Davenport (1993, 26) explains that the approach assumes that an infrastructure for process innovation is established and the project team is selected and trained. Each step includes key development activities, which will be discussed in detail after comparing the approach with BRP approaches.

Davenport and Short (1990, 14) introduced the following approach to BPR.

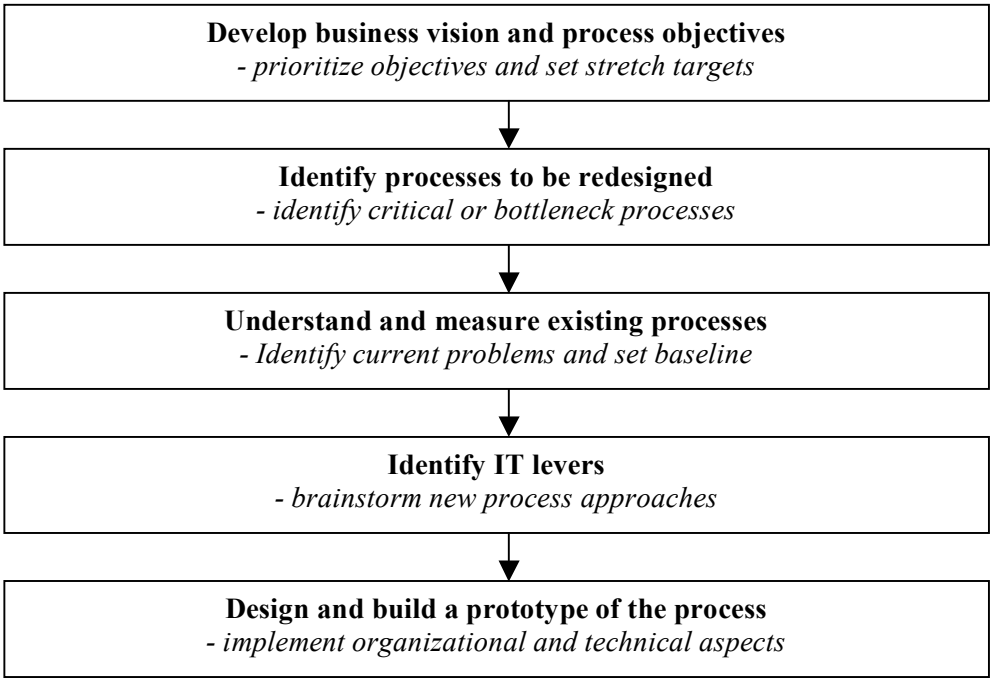

Figure 2 Five steps in process redesign (modified from, Davenport & Short 1990, 14, italics added)

The approach by Davenport and Short (1990) is intended to process redesign with the use of IT, although it does not exclude viewing the approach also from holistic process change perspective.

Finally, Johansson et al. (1993, 85) use a three-step approach:

- Phase 1 – Discover: Creating a strategic vision for dominance or renewed competitiveness and determining process change enabling to achieve the strategy.
- Phase 2 – Redesign: Acquiring details, planning, and engineering the reengineering process.
- Phase 3 – Realize: The redesign is implemented to affect the strategy.

The discovery phase indicates the examining the business intended to identify the opportunities and scale for BPR. The redesign phase indicates the skills and management abilities possessed are essential and characterize the design of the process. The redesign phase means mobilizing the redesign effort, communicating the vision, acting accordingly, measuring the outcome, and sustaining the performance. (Johansson et al. 1993, 86-100)

All three approaches, whether indicating BPR or process innovation, signify process change, which is the underlying factor. Depending on the sequence of activities performed, which are not dependent on the approach but on the practical situation (Davenport 1993, 25), process change needs recognizing the existing processes and

analyzing them thoroughly and identifying the change features, a clear aspiration of the new process functioning has to exist, the factors affecting and enabling the change have to identified, and finally, the new process is to be implemented in its redesigned form.

The comparison of the process innovation approach to two BPR approaches was made to illustrate the close relations of the concepts. The close relations enable a more thorough understanding of the strategic elements when the process change is discussed from practical viewpoint in the section 2.3.2.

In order to provide a comprehensive outlook on process innovation the approach is to be explored in detail. First, identifying processes for innovation, signals that the process needs to be defined as broadly as possible, especially when considering radical process change. When the definition of the process is broad and the fewer processes there are to be identified, it indicates limitations in understanding, measuring and changing the process, however, a greater possibility for innovation exists. (Davenport 1993, 28) There are four criteria guiding process selection in this stage: the centrality in executing the firm's business strategy, health of the process, qualification, and manageable process scope (Davenport 1993, 32). The identification and selection of the processes for innovation is an important requirement for process change (Ibid. 35).

IT, information, and human resource and organizational issues are the key change enablers of process innovation (Ibid. 113). IT is considered to be an important feature in process change by several authors (see, for example, Martinsons 1995, 256; Hammer 1990, 104; Davenport & Short 1990, 12). According to Davenport (1993, 50) IT and the information it provides are a powerful tool in pursuing innovation through process redesign. Information enabler acts as a supporting tool and it provides focus for operational and managerial processes (Ibid. 72). Human resource and organizational enablers affect the work structure, motivation, and process performance, which make it an important aspect in enabling process innovation (Ibid. 113). IT and the human resource and organizational enablers can also constrain process innovation by viewing existing IT systems as constraints and negatively affecting the work structure and motivation within the organization (Ibid. 63-65, 106).

Evaluating organizational strategy, collecting external inputs into process design and performance, and translating the assessed information to specified process objective and attributes determine the creation of process visions. Process innovation affects the strategy of the organization and strategy in turn determines the forthcoming process changes and their success measures. (Ibid. 134) The strategic elements of process change are discussed through practical implications in the next section.

Before designing a new process it is vital to understand the existing process (Ibid 137). Essential for process-oriented approach is to understand existing processes. Process flowcharts are one technique to model processes in an innovation initiative and flowcharts are used extensively in this study and described in detail in chapter 5.

Finally, the new process design phase incorporates the information received from the previous stages and begins to contemplate the design alternatives. The feasibility, risk, and benefit from the alternative choices are studied and the preferred new design is selected for implementation. This is followed by a prototype and an exit plan preparing for sudden or unexpected changes in the environment. Lastly, the new process is implemented.

Figure 3 summarizes the process innovation approach by presenting the steps of the approach including the key development activities dependent on each stage.

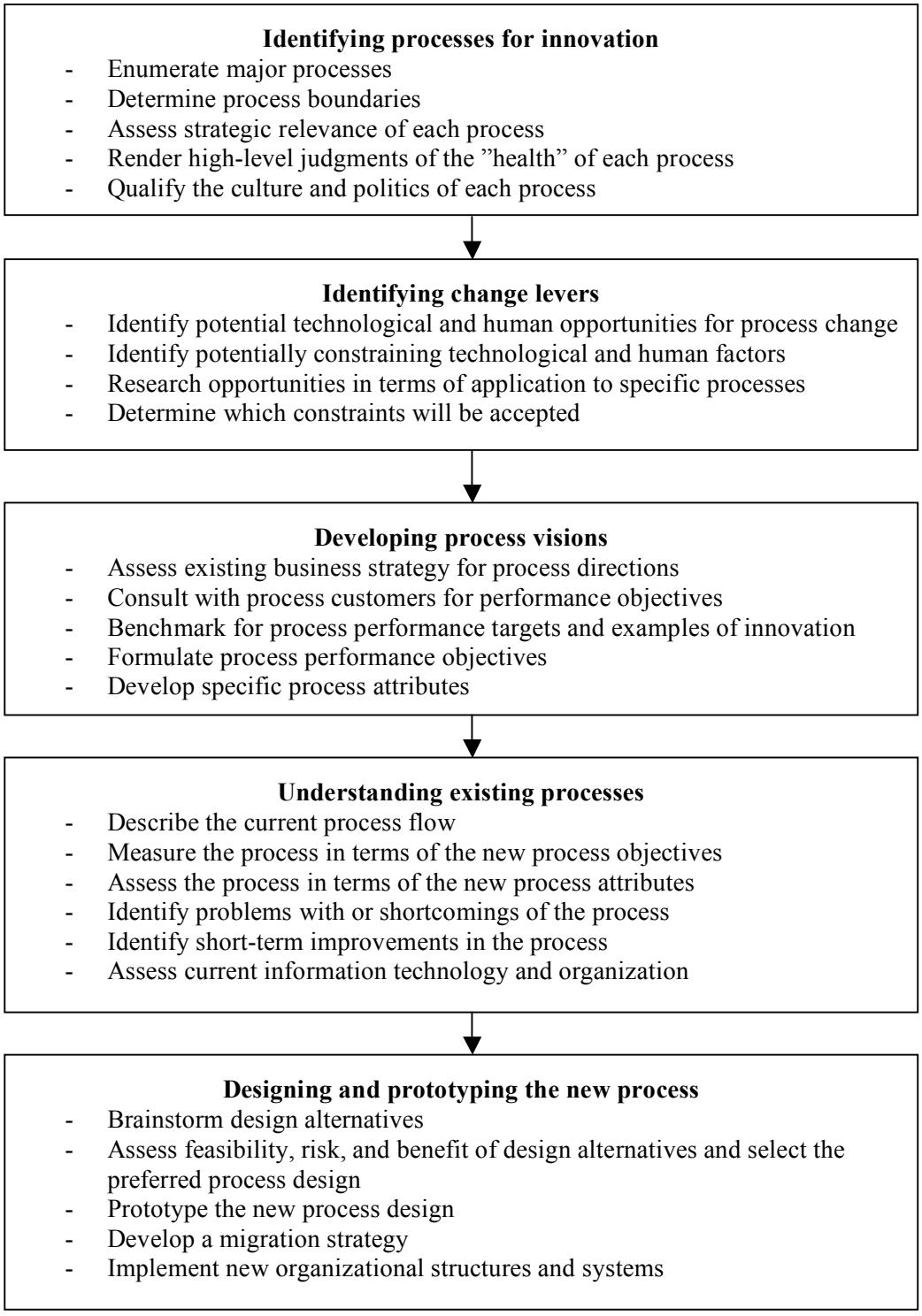

Figure 3 A high-level approach to process innovation and key development activities (modified from, Davenport 1993, 25)[1]

[1] Figure 3 is modified from Davenport's figure of high-level approach to process innovation (Davenport 1993, 25) and it includes the key development activities presented on pages 27, 48, 120, 139, and 154.

Al-Mashari and Zairi (2000, 27) identified the essential components in changing business processes: strategies and goals setting, feasibility analysis of a BPR (process change) project, process analysis and visioning, top management commitment and sponsorship, understanding of customer requirements and performance measurement, integration with TQM and benchmarking, recognition of IT capabilities, cross-functional teams and communication, prototyping and process mapping techniques, and organizational change to reengineering management systems and organization. The process change essentials presented by Al-Mashari ad Zairi are equally applicable to process innovation, the same exact things are required.

Process innovation and BPR are often used as synonyms, which is understandable due to the similarities of the two concepts. Both are considered to be radical process change methods that create something new and valuable to the customer and require the same commitment and resources from the company using either of the methods in practice. The key difference between BPR approach and process innovation approach to process change is that after implementing the new process the focus in process innovation concentrates on both customer added value and organizational added value. Process innovation, however, incorporates the features of innovation with the process change, which indicates that the innovativeness determines the radicalness of the process change. The innovation diffusion attributes, relative advantage, compatibility, complexity, trialability, and observability, guide in formulating the perspective on the innovative features of the process change. The process innovation approach along with the key development activities provide a structured view on the practical implications of strategy and competitive advantage presented in the following section.

2.3.2 Successful process innovation and practical implications

According to Tidd et al. (2003, 6) process innovation is a vital element in the strategic role of an organization. The intensifying competitive pressure has to be matched with innovative products and processes (Cobbenhagen 2000, 3). Therefore performing business activities better than competition creates a powerful source of competitive advantage, which also goes for offering faster, cheaper, and higher quality services (Tidd 2003, 6). This section focuses on exploring the practical implications of process innovation and their impact on strategy and competitive advantage. Process change in logistics is investigated in order to further frame the process innovation towards a specific reverse logistics functions in Finnish pharmaceutical wholesale industry.

Companies reengineer because of a gap between actual and desired results in process performance (Shin & Jemella 2002, 352). The desired results of process outputs have to be connected with the strategy of the company. Tying business process change with the

company's strategy ensures successful implementation of the changed process (Wu 2002, 322). Strategy is the most necessary form and a foundation for innovation and a source for competitive advantage (Stewart & Fenn 2006, 173).

The nature of innovation was discussed in section 2.2, where the nuances of novelty of change, disruptiveness of change, and attributes for innovation adoption were explored. When viewing innovativeness in process change from a strategic viewpoint it can be noted that innovation, a profitable exploitation of ideas (Stewart & Fenn 2006, 173), is valued to create and sustain competitive advantage and it enables quantum leaps and value-added growth sustaining long-term competitiveness (Soosay & Hyland 2004, 41). The rewards of strategically oriented innovations are profit and long-term sustainability (Stewart & Fenn 2006, 173). Value-added growth, long-term competitiveness and sustainability, and profit are the features that innovation brings to process change.

In reshaping business organizations Wu (2002, 313) considers BPR as an important method for achieving performance improvement in breakthrough capacity. By approaching process change from BPR perspective O'Neill and Sohal (1998, 838-839) state that competitive pressure and the need to cut costs are the most significant triggers for initiating BPR activities. As discussed, BPR is a method for managing change while making dramatic gains in business performance possible (Shin & Jemella 2002, 351). O'Neill and Sohal (1998, 832), who associate BPR with radical operational change, researched BPR in Australian firms. According to the research BPR is viewed as best practice catch-up rather than radical redesign, which is due to the perception of process change action in general among Australian firms (Ibid. 848). However, the prevailing consensus among researchers is toward disruptive process reengineering, rather than incremental improvement. Gersick (1991 33) explains that radical change among individuals and groups are the factors by which revolutionary change in larger systems ultimately depends on.

> *"Revolutionary change in large systems ultimately depends on comparably radical change among individuals and groups; conversely, individuals and groups attempting to make radical changes must be affected by the deep structures of the systems in which they are embedded." (Ibid. 33)*

The research by O'Neill and Sohal (1998, 860-862) revealed that strategic alignment, senior management commitment, bottom-up redesign, the enabling role of information technology, and contemplating the relationship between BPR and TQM were the criteria for BPR success. The three most common implementation problems for BPR projects were that the project was larger than initially expected, the information system infrastructure was unable to support the BPR project, and finally, because the project was seen as time consuming (Ibid. 849-850). The factors leading to BPR success and

the obstacles in implementing BPR identified by O'Neill and Sohal (1998, 860-862) can be transferred to process innovations as well, because when contemplating process change through disruptive thinking and radical measures the same rules apply. For example, the role of IT is crucial in process innovations as well as in BPR. IT can reduce the time required for a process innovation and increase its success (Davenport 1993, 197); IT is a powerful enabler in process change (Wu 2002, 314).

Process innovation requires cross-functional and cross-organizational change (Davenport 1993, 8). Process restructuring provides concrete possibilities when business processes are spread across organizational boundaries that serve to deliver value to customers, which means articulating the larger business network containing the critical business processes and adopting a more holistic approach to redesign (Short & Venkatraman 1992, 19). Linkages involving shared processes between supplier and customer value chains are important source of competitive advantage (Clark & Hammond 1997, 248-249).

Process innovation spans the traditional organizational boundaries (Davenport 1993, 173). Khazanchi, Lewis and Boyer (2007, 871-872) summarize the tensions in structuring an organization for innovation, identified by Dougherty (1996), as managing the flexibility-control aspect of innovations. Khazanchi et al. (2007, 871-872) continue by explaining that flexibility enables creativity, empowerment and change, and control provides discipline. Organizational flexibility to adapt to changing market needs and the ability to develop innovative cross-functional processes is associated with success (Zhang & Cao 2002, 146).

A research by Damanpour and Gopalakrishnan (2001, 45-46), which investigates the similarities and differences of product and process innovations, states that product innovations are adopted with greater rate and speed compared to process innovations and the adoption of product innovations is positively associated with the adoption of process innovations, therefore the competitiveness of a firm over time depends on the ability to adopt both product and process innovations. Although, the rate for adopting process innovations is lower than in product innovations within an organization (Damanpour and Gopalakrishnan Ibid. 55). Rouvinen's (2002, 577-578) research about the characteristics of product and process innovations on Finnish manufacturing firms suggests that process innovations are less readily protected via patents and trademarks, thus internally exploited. According to Barros (2007, 47) the objective of formalizing business process knowledge into structures, patents, or frameworks, which can be reused to facilitate process redesign and support systems development, simplify and accelerate process innovation.

Drucker (1993) explained that innovations are market driven (discussed in section 2.2.1), therefore if market demand increases in response to the favorable innovation

coordinated by the manufacturer and its supplier then the innovation has potential to be mutually profitable for both parties (Kim 2000, 580).

The future corporations have to be capable of consistent high quality, low cost output, and instant responsiveness to individual customer needs (Hewitt 1995, 18). Customer perspective in process change is important because through customers the company involved in the process change receives information on how the customers see the company, their willingness to pay for value-added services, what the customers want the company to change, how the company's processes are linked with the customers' processes, and what the company's competitors do better than the company (Shin & Jemella 2002, 356). By answering the above-mentioned questions mutual benefit from process change is possible.

Process innovation delivers competitive edge for the company (Damanpour & Gopalakrishnan 2001, 60) Producing same things more efficiently is no longer sufficient and firms have to innovate in order to stay ahead (Soosay & Hyland 2004, 41). Successfully implementing process innovation depends on conscious management of behavioral and structural change along with sensitivity to the attitudes and perceptions of the employees and tough-minded concern for results (Davenport 1993, 167). According to Zmud (1984, 737), Shin & Jemella (2002, 352) and O'Neill & Sohal (1998, 845) top management support is essential to changing business processes, including logistics processes (Fassoula 2006, 848; Aghazadeh 2004, 264). The characteristics of process innovation-oriented change that need understanding are: the overall magnitude of change required, the level of uncertainty about change outcomes, the breadth of the change across and between organizations, the required depth of penetration of individual attitudes and behaviors, and the duration of the change process (Davenport 1993, 171).

The above-mentioned factors of restructuring business processes can be found in logistics processes. Logistics is a service process and when a firm focuses its energy to think on behalf of the customer, producing an outcome surpassing customers' present expectation of superior value is referred as service innovation by Chapman, Soosay & Kandampully (2003, 646). According to Cooper and Stephan (1994, 39) process reengineering is well-suited in changing logistics processes. The process view in supply chain management is favored, because the process structure supports effective transfer and use of information (Trkman, Stemberger, Jaklic and Groznik 2007, 117). Information transfer among involved parties is a core concept of successful supply chain management, which is the same in reverse logistics chain (Ibid. 117). Croom (2001, 513) urges to focus on core competencies in logistics processes restructuring. Cooper and Stephan (1994, 39) determine that logistics is an important function for change because of gains potential in service and competitive advantage and improving effectiveness and cost cutting. Sources for competitive advantage in logistics process

change are time-to-market, time-to-customer, and flexibility (Persson 1995, 13). The supply chain process holds great strategic value (Fassoula 2006, 849).

The importance of process view on the relationships with external customers and the potential impact of reengineering on results indicate importance of supply chain redesign in reengineering initiatives (Hewitt 1994, 1). Process-oriented supply chain redesign leads to intra-enterprise and inter-enterprise operational efficiency and effectiveness, previously unobtainable to the company (Ibid. 1).

Supply chain is used to describe the sequence of processes and activities involved in the complete manufacturing and distribution cycle (Franks 2000, 152). Making processes lean increases effectiveness (Hall 2006, 18). Lean process is commonly used in logistics processes to explain the process effectiveness by maximizing the efficiency with minimal resource capabilities and time (Ibid. 18; Harrison 2001, 78-80). In order to maximize lean process potential the business must be organized around processes (Hall 2006, 19).

Franks (2000, 155) uses the term supply chain innovation to describe the change in the supply chain processes. It takes place at the design level, the kind of process to be adopted, and also at the process level, how the parts of the designed supply chain are implemented. Supply chain innovation is a competitive weapon and the innovation opportunities in supply chain processes emerge from changes in the external environment. (Ibid. 152-154) For example the promotion of innovative thinking in procurement processes for supply chain integration offers more flexibility and adaptability, commercial growth, and improved quality in product and service delivery (Khalfan & McDermott 2006, 143). Germain (1996, 117) identified the aspects of process change affecting to the logistics process innovation adoption being:

- Size of the change and environmental uncertainty predict expensive and radical innovation;
- Specialization predicts both expensive and radical innovations and low-cost and incremental innovations;
- Decentralization predicts low-cost and incremental innovations;
- Integration predicts high-cost and radical innovations;
- Innovations in logistics can improve performance.

Specialization, decentralization, and integration indicate organizational dimension in which logistics innovation occurs, and size and environmental uncertainty refer to the factors by which the innovations are conducted (Ibid. 118-119).

Principles for logistics process change are to reduce or redistribute lead times, reduce or adopt to the uncertainties, redistribute or increase frequencies, eliminate or adopt to expected pattern of demand, simplify structures, systems, and processes, differentiate, postpone, improve the information processing and the decision support systems, and strengthen the internal and external integration (Persson 1995, 13). By researching retail

shopping Boyer and Hult (2005, 36) discovered that by innovating the supply chain a company is able to strengthen itself against competitors, thus achieving competitive advantage.

2.4 Synthesis of process innovation theory

The aim of the synthesis is to provide a transparent and holistic view about process innovations by integrating the innovation theories with the process change theories. Process innovation requires the understanding of process view on business operations instead of traditional functional view. BPR theory explains the fundamentals of changing business processes and what is required from an organization to radically change the old methods of conduct in order to gain needed and desired performance improvements. Innovation theory discusses the fundamentals of creating something new, which also provides added value to the customer receiving the process output and to the innovator gaining the benefits of improved operations. The ability to develop new products and services and deliver them to customers is critical to competitive success (Davenport 1993, 221).

Above all process innovation is about change. Changing business processes is commonly viewed through BPR initiatives where the effort is to radically change how work is executed in order to improve performance and provide added value to the customer. The integration of innovation aspects with process change creates an interesting feature to reengineering business processes. In process innovations the innovativeness accentuates in the manifestation of the new process; the process is new and it is providing the added value to the customer and to the innovator. The added value from the process to the customer indicates improvements in quality, cost, service, and flexibility in the process output. The attributes of innovation determine that the innovator needs to recognize whether the changed process provides relative advantage compared to the old process and the processes of the competitors, how compatible the new process is to the operations of the company, how easy it is to adopt and operate, whether it is tested enough to feel comfortable operating with, and how easily the process and information deriving from the process can be understood and communicated? All of the factors mentioned above are relevant to process innovations, because processes can be reengineered radically and improved incrementally, but in process innovations the newly changed process indicates successfulness from both the customer and the innovator perspective.

3 REVERSE LOGISTICS IN PHARMACEUTICALS

As explained in the introduction, the thesis focuses on the reverse flow of pharmaceutical products from customers (i.e. pharmacies). More specifically the research frame includes pharmaceutical product returns excluding, though mentioned in the theoretical context, packaging returns and the disposition of returned items. However, in the reverse logistics theory all the relevant aspects of reverse logistics are covered maintaining the focus on product returns. The reverse logistics theory provides a framework for the specific process innovation investigated in this research. The change in a reverse logistics process occurs through altering the reverse flow activities in the existing process.

As the definitions presented in the introduction chapter (chapter 1) by the Council of Supply Chain Management Professionals (CSCMP) indicated reverse logistics is very deeply connected with the logistics process of supply chain management. Successful supply chain management includes managing the forward flow to maximize customer satisfaction and minimize waste and managing the reverse flow as well (Ritchie, Burnes, Whittle & Hey 2000, 227). The reverse flow activities, more specifically returns, are receiving emphasis in increasing amounts from companies (Autry, Daugherty & Richey 2001, 26). This chapter introduces reverse logistics concept beginning with its fundamental features, then exploring what are the principal disposition decisions to be made in a successful reverse flow, then discussing how the reverse logistics activities are managed, and finally reverse logistics in the Finnish pharmaceutical wholesale sector is introduced in order to have a more concrete view on reverse logistics and simultaneously set a path for the case research presented in chapter 5.

3.1 The fundamentals of reverse logistics

The reverse flow of goods, briefly mentioned in the introduction chapter of this thesis, represents a vital part of the supply chain and its management. Consequently this section focuses on providing the essence of reverse logistics activities. Reverse logistics is defined as:

> *"The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal." (Rogers & Tibben-Lembke 1998, 2)*

The definition by Rogers and Tibben-Lembke is also the formal definition used by the Reverse Logistics Executive Council (2008). Several authors have adopted the definition in the academic literature (see, Krumwiede & Sheu 2002, 326; Richey, Genchev & Daugherty 2005, 235; Rogers & Tibben-Lembke 2001, 130; Tibben-Lembke & Rogers 2002, 271; Tibben-Lembke 2002, 224; cf. Srivastava & Srivastava 2006, 530; Johnson 1998, 217).

Generally reverse logistics efforts depend on whether the reverse flow consists primarily of packaging or products (Rogers & Tibben-Lembke 1998, 6; Rogers & Tibben-Lembke 2001, 133), and whether the reverse flow is initiated by the end user or some other member in the distribution channel (Rogers & Tibben-Lembke 1998, 12; Tibben-Lembke 2002, 275). However, reverse logistics is not only reusing containers and recycling packaging materials (Rogers & Tibben-Lembke 1998, 2), but the logistical features in product returns, source reduction, recycling, materials substitution, reuse of materials, waste disposal, and refurbishment, repair, and remanufacturing of returned items are the essential components of reverse logistics (Stock 1998, 20). More specifically processing returned merchandise due to damage, seasonal inventory, restock, salvage, recalls, and excess inventory are a part of reverse logistics (Rogers & Tibben-Lembke 1998, 3; cf. Tibben-Lembke 2002, 225). For more information on reuse and recycling opportunities see Reuse and Recycling (1993) by the Council of Logistics Management. According to Finne and Kokkonen (2005, 326) the primary reasons for product returns are: withdrawing defected or dangerous items from the market, recalls for maintenance and possible product upgrades, warranty returns, replaceable products, returning unsold items to the warehouse, collecting waste and scrap, returning transportation equipment such as pallets and boxes.

Reverse logistics processes are used to collect the used, damaged, unwanted, or outdated products, or packaging and shipping materials from the customers (Rogers & Tibben-Lembke 1998, 9). The common reverse logistics activities for products are: returning the product to the supplier, reselling the item, selling via outlet, salvaging, reconditioning, refurbishing, or remanufacturing the item, reclaiming materials, recycling, donating the item to charity, and placing the item in a landfill (Rogers & Tibben-Lembke 1998, 10; Rogers & Tibben-Lembke 2001, 133). For packaging materials the activities include: reusing the packaging materials, refurbishing, reclaiming materials, recycling, salvaging, and placing the materials in a landfill (Rogers & Tibben-Lembke 1998, 10; Rogers & Tibben-Lembke 2001, 133). As for returning packaging materials back to the supplier as fast as possible is the prerequisite for their efficient usage (Finne & Kokkonen 2005, 325). Rogers and Tibben-Lembke (1998, 10) state that after performing the above-mentioned activities a product cannot be sold as new, but as a reconditioned or remanufactured one. Although this is not the case with excess product returns, for example products are returned because the

delivered amount was greater than the ordered amount, thus the returned items are in the same condition as new ones as long as no damage occurred during transport in the reverse flow. If reconditioning a returned item cannot be accomplished due to its poor condition, legal implications, or environmental restrictions, then the returned item will be disposed with the least amount of cost (Rogers & Tibben-Lembke 1998, 10).

According to Rogers and Tibben-Lembke (1998, 14-15) companies involved in reverse logistics activities have not emphasized the strategic values and variables of reverse logistics. Depending on the industry, channel position, and the type of distribution channel the size, scope, and impact of reverse logistics varies (Rogers & Tibben-Lembke 2001, 134-135). Strategic variables have a long-term impact, and managing those variables influences the viability of the firm more heavily than only providing tactical or operational responses to a problem (Rogers & Tibben-Lembke 1998, 14). Mukhopadhyay and Setaputra (2006, 716) express that reverse logistics is not seen as glamorous activity because it is associated with cost drain and not a value-adding activity to the supply chain, but an effective return policy can be used as a competitive weapon. Finne and Kokkonen (2005, 326) state that reverse logistics is an expensive operation to conduct and it can be associated with value added services. Reverse logistics has only recently gained more interest among researchers because it was not seen as an important process and therefore it is underrepresented in the academic literature (Mollenkopf, Russo and Frankel 2007, 568; Reverse Logistics… 2007, 7). The strategic elements of reverse logistics are explored throughout this chapter.

Srivastva and Srivastava (2006, 524) state that economic, regulatory and consumer pressure drive product returns fueled with heightened customer expectations, competitiveness, profitability pressures, and superior supply chain performance. Srivastava and Srivastava (2006, 525) continue by explaining that effective and cost-efficient management of product returns leads to profits, increased customer service levels, and higher customer retention. Sakki (2003, 25) explains that logistics goals are related to cost efficiency.

Stock (2001, 6-10) identified seven issues, the seven deadly sins of reverse logistics, which represent the key problems requiring solving in order to gain success from the reverse logistics operations. The seven deadly sins are:

1. Not recognizing that reverse logistics can be a factor in creating competitive advantage;
2. Believing that once products are delivered, the firm's responsibilities end;
3. Failure to match internal and external systems and processes in e-commerce and the product returns aspect of reverse logistics;
4. Assuming that part-time effort is sufficient to deal with reverse logistics activities;

5. Believing that order cycle times for product returns can be longer and more variable than those for new items being sold or distributed;
6. Assuming that product returns and packaging recycling and reuse will take care of themselves if given enough time;
7. Thinking that returns are relatively unimportant in terms of costs, asset valuation and potential revenues.

Allocating sufficient resources to the reverse logistics operations, understanding and mapping the process, educating parties involved in the reverse activities and creating partnerships to ensure optimal results, making sure economies of scale make the efforts viable, and measuring the process are the ways to overcome the deadly sins (Stock 2001, 11).

Rogers and Tibben-Lembke (1998, 33) identified the barriers to reverse logistics activities in their research being: the importance of reverse logistics relative to other issues, company policies, lack of systems in place to support it, competitive issues, management inattention, financial resources, personnel resources, and legal issues. The barriers to reverse logistics by Rogers and Tibben-Lembke (1998) possess similar characteristics as the deadly sins by Stock (2001). The unifying factors are that if the reverse logistics operations are not seen as a beneficial activity for the company the potential of the operations are not recognized by management and the process will be treated as a secondary function and doing only what is necessary. Thus no competitive advantage is seen in the reverse operations. Without recognizing the competitive potential no proper systems are placed to support it and no additional resources are issued to support and improve the activities.

Rogers and Tibben-Lembke (1998, 188) indicate reverse logistics being a part of product life cycle (PLC) management concept, where a product moves through introduction, growth, maturity, and decline phases. More specifically firms provide appropriate logistics and marketing support in accordance with PLC phase (Ibid. 188). The close connection between reverse logistics and PLC is explored by Tibben-Lembke (2002, 230), who explains that as sales increase so do returns and the same with decline. In PLC the main task of reverse logistics is to recapture as much value as possible in a retail environment (Tibben-Lembke & Rogers 2002, 280).

Standardization of processes is an important reverse logistics effort, because by more simple return policies and more effective procedures improve the reverse logistics efforts (Rogers & Tibben-Lembke 1998, 202). Richey et al. (2005, 233-236) indicate that the reverse logistics flow differs from the traditional outbound activities due to which it requires additional resources and reverse logistics efforts are made more effective and efficient through appropriate resource commitment in innovative approaches in handling returns, which improve performance and gain competitive advantage. In operational level Tibben-Lembke and Rogers (2002, 276) state that

separating forward and reverse logistics from one another allows independence in conducting the logistics operations, although developing and operating a reverse logistics system apart from the traditional logistics system results in increased costs (Huge Brodin 1997, 117). In many cases the reverse logistics flow needs to be designed apart from the forward flow in order to develop the proper solutions the product returns require with included information flow and control routines (Finne & Kokkonen 2005, 324).

Richey et al. (2005, 236) speak on behalf of innovative solutions regarding reverse logistics operations, as innovative solutions create competitive advantage by creating more responsive organizations, which in turn creates flexibility. Flexibility improves reverse logistics performance (Ibid. 242-243). Reverse logistics is a process spanning the boundaries of a company between its business units or between firms (Rogers & Tibben-Lembke 1998, 191; Rogers & Tibben-Lembke 2001, 144). Working across boundaries increases complexity in business processes; therefore flexibility is indispensable (Rogers & Tibben-Lembke 1998, 191).

There are economic and environmental motivations for planning the reverse logistics channel driven by cost pressure and environmental restrictions (Alshamrani, Mathur & Ballou 2007, 595). This is why reverse logistics is frequently associated with decreasing the environmental impact of logistics operations. Often reverse logistics and green, or ecological logistics are considered to be the same thing, although there is a distinction between the two. Reverse logistics aims to recapture value by moving goods from their typical point of disposal and green logistics targets at minimizing the environmental impact of logistics operations (Rogers & Tibben-Lembke 1998, 102-103). Green logistics and reverse logistics are closely related to each other, however some factors, such as reducing energy consumption in logistics operations and reducing packaging are more green logistics than reverse logistics activities (Rogers & Tibben-Lembke 1998, 102; Rogers & Tibben-Lembke 2001, 130). Figure 4 illustrates the similarities and differences between reverse and green logistics.

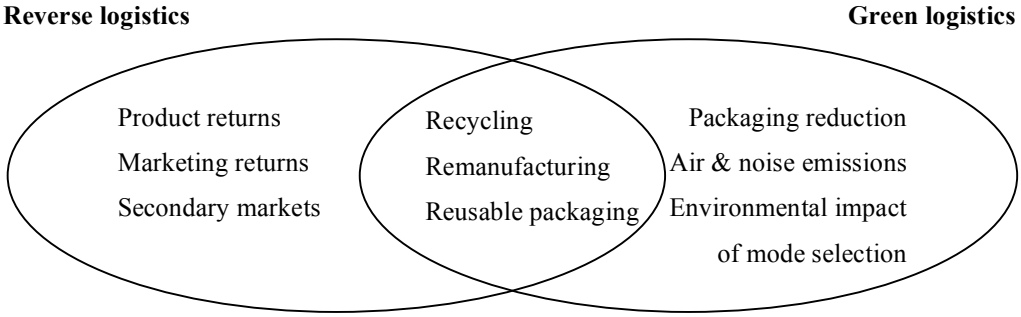

Figure 4 Comparison of reverse logistics and green logistics (modified from, Rogers & Tibben-Lembke 2001, 131)

Many companies have initiated reverse logistics activities because of the environmental factors related to logistics operations (Johnson 1998, 217). Laws and regulations concerning product returns, their packaging and disposal activities continue to gain importance in logistics decision-making (Rogers & Tibben-Lembke 1998, 101).

3.2 Disposition

Rogers and Tibben-Lembke (2001, 138) indicate that disposition of a returned item is an important function in reverse logistics. After the initial processing of the returned product is completed, a decision is made concerning the next location of the item indicating its disposition. The disposition decision is crucial for the reverse logistics success (Tibben-Lembke & Rogers 2002, 277). The returned good is returned back to the vendor, sent to a landfill, or sold in the secondary market (Rogers & Tibben-Lembke 1998, 73). Tibben-Lembke (2002, 224) indicates that disposing a returned product requires identifying the item, determining its condition, (i.e. can it be sold as new, or should it be sent back to the vendor), and deciding where the item should be sent to (e.g. recycled, landfilled, etc.).

Close-outs, buy-outs, job-outs, surplus, defective, non-defective defectives, salvage, and returns are the categories for retail products in the reverse logistics flow. Close-outs indicate the products with premium quality that are no longer decided to carry by the retailer. In buy-outs a manufacturer purchases its competitor's products from the retailers' supply. Job-out products are seasonal with first quality items such as holiday merchandise. Surplus items are excess inventory that continue to sell, which are a result of inaccurate demand forecasting. Defective items are discovered to be faulty by the retailer or the customer. Non-defective defectives are presumed to be defective by the end user or the retailer, although the item(s) are not flawed. Salvaged items refer to damaged products that cannot be sold as new, but can be sold as a secondary quality item or parts of it can be reused. Returned products usually indicate used items, which are returned and thus cannot be resold as first quality items. (Rogers & Tibben-Lembke 1998, 75-78)

Rogers and Tibben-Lembke (2001, 141) indicate that by centralizing the disposition decision-making larger volumes of returned items can be processed and information and experience gained from the disposition actions, thus increasing revenues. The product disposition channels are: return to vendor, sell as new; sell via outlet or discount; sell to secondary market; donate to charity; remanufacture or refurbish; materials reclamation, recycling, or landfill (Rogers & Tibben-Lembke 1998, 78). Products are returned back to the vendor because of defects, marketing returns, obsolescence, or overstocks (Ibid. 79).

In the case of defective goods, the retailer will be compensated and the retailer will return the product to the vendor or dispose the product according to the vendor's instructions and requests. The vendor may want the product to be returned in order to determine the defect cause and avoid the root cause in the future. Also the vendor may wish to evaluate the number of non-defective defectives from the returns. Re-shelving and reselling the product as new depends on the product. Returns are also wanted back because of brand protection and preventing items to enter another disposition channel Additionally wanting returns back is a method to avoid re-returns, where an item sold through an outlet store is returned through the regular reverse logistics channel for full compensation. In some cases the vendor automatically compensates the retailer and no physical return is accepted, however the retailer may need to dispose the item according to the instructions and requests of the vendor. Not accepting returns is a method to cut costs. Marketing returns are an incentive or a service offered to retailers to stock a certain product, thus in the case of unsold items the vendor or manufacturer allow returns or collects the items from the retailer. (Rogers & Tibben-Lembke 1998, 79-81) In order to avoid inventory obsolescence vendors may be motivated to aid retailers by replacing the old inventory with new items (Rogers & Tibben-Lembke 1998, 79; Rogers & Tibben-Lembke 2001, 138). Consignment is similar to inventory obsolescence, but in consignment cases the vendor or manufacturer owns the product even in retailers' warehouse and is responsible for removing the excess inventory from the retailers. (Rogers & Tibben Lembke 1998, 79-80)

When a product is returned unused and unopened the retailer may sell the product as new, although repackaging may be required, however, marketing a returned is difficult when brand quality is considered (Rogers & Tibben-Lembke 1998, 81; Tibben-Lembke 2002, 280-281). There are legal restrictions concerning some returns sold as new (Rogers & Tibben-Lembke 1998, 81), for example the restrictions and requirements of pharmaceutical returns are explored in the section 3.4. Selling returned products or excess inventory through an outlet it provides several disposition advantages, such as control over products by knowing where the products are sold and value can be captured from sales, also outlet sales improve brand protection (Ibid. 82). Selling a product to a secondary market occurs when an unsold product cannot be placed in the reverse chain or be sold through an outlet (Ibid. 83). A fully functional product, disregarding possible cosmetic damage, the item can be donated to charity. No money is received, but possible tax advantages can be gained (Ibid. 84). Depending on the product and the reason it entered the reverse chain, the item can be refurbished or remanufactured instead of recycling or landfill placement. Repairing an item can be more cost effective than substituting it with a new product and in any case even refurbished or remanufactured product can be sold through an outlet in order to receive value from it (Ibid. 84-85). When it is not possible to sell a product to the primary market, the

secondary market, or donate it to charity, then disposing the product is the only option. Of course disposing an item can be a vital option for returned products if it is the cheapest option in comparison with the other disposition options. Reclaiming components or constituents of disposable items can offset the cost of disposition operations (Ibid. 85-86).

Rogers and Tibben-Lembke (1998, 86) state that receiving the highest possible value for the returned products, which are in accordance with legal restrictions or vendor imposed constraints, is a critical objective of a reverse logistics flow. In order to achieve the best value possible, then gatekeeping decisions controlling product entry in the reverse logistics system, collection of products and assembling them for the reverse logistics system, sortation decisions deciding actions on each product, and dispositioning the products to their desired destinations (Rogers & Tibben-Lembke 1998, 87). Sortation and gatekeeping can be considered to be the most important activities in the reverse logistics system due to the respective revenue maximizing and cost reduction capabilities (Rogers & Tibben-Lembke 1998, 88). Gatekeeping and other reverse logistics management activities are discussed in detail in the next section.

3.3 Reverse logistics management

Now that the characteristics of reverse logistics and product disposition are introduced, the focus shifts to managing the reverse logistics activities. The reverse product flow management is important as it provides significant strategic advantage (Tibben-Lembke 2002, 223). Lieckens and Vandaele (2007, 395) state that controlling the time, quantity and quality of supply is much more difficult in the reverse flow than in the regular forward flow. Therefore estimation of returns is essential in establishing an effective and efficient reverse logistics network (Srivastava & Srivastava 2006, 525).

Rogers and Tibben-Lembke (1998, 37) identified the key reverse logistics management activities being: gatekeeping, compacting disposition cycle time, reverse logistics information systems, centralized return centers, the elements of zero returns policy, remanufacturing and refurbishment of returned goods, asset recovery, negotiation, financial management, and outsourcing.

Gatekeeping indicates the efforts in screening of return requests and defective and unwarranted returns at the entry point into the reverse flow (Rogers & Tibben-Lembke 1998, 38; Mollenkopf et al. 2007, 578). Gatekeeping determines the level of leniency in the firm's returns policy. Liberal return policy is a marketing tool to bring in customers, although a liberal policy can encourage abuse by customers (Mukhopahyay & Setaputra 2006, 716; Rogers & Tibben-Lembke 1998, 39) and lead to competitive disadvantage (Rogers & Tibben-Lembke 2001, 137). Although in some instances competitive

pressure forces firms to liberalize their return policies (O'Connell 2007, 30). Rogers and Tibben-Lembke (2001, 146) state that gatekeeping enables a reduction in return rates and it limits the quantities in the reverse flow. Successful gatekeeping is a critical factor in manageable and profitable reverse logistics (Rogers & Tibben-Lembke 1998, 38), and failure in gatekeeping creates friction between the suppliers and the customers and can also lead to losses in revenue (Rogers & Tibben-Lembke 1998, 41). Mastering the reverse logistics process is directly linked with proficient gatekeeping, which leads to reducing cycle times related to decisions, movement, and processing of returned goods (Ibid. 42).

Compacting disposition cycle time refers to effective and efficient action regarding returned products. In many occasions it is not clear whether the returned good is defective, reusable, refurbishable, or needed to be sent to a landfill. Making decisions and performing according to those decisions efficiently enables compacting the disposition of returned items. Because the reverse logistics efforts are seen as less important as the forward flow, therefore sufficient resources are not allocated in performing the activities in the reverse flow and many firms see that there is no reward in taking the responsibility and making a timely decision of the product disposition. (Rogers & Tibben-Lembke 1998, 42)

Information systems in reverse logistics refer to simplifying operations through IT solutions, which indicates automatization of processes. The automatization of reverse logistics processes is extremely challenging because of the number of exceptions in them, therefore the system has to be flexible in order to be successful (Rogers & Tibben-Lembke 1998, 42; Rogers & Tibben-Lembke 2001, 144). The reverse logistics information system has to be unanimous with the manual return process, for example it should support existing color-coding for effective and efficient returns processing and tracking the product throughout the supply chain (Rogers & Tibben-Lembke 1998, 44-45). By understanding why items are returned and how they are to be disposed is essential for adept returns transaction processing, which leads to improved cash flow management throughout the reverse flow (e.g. obtaining credit from returned products quickly) (Rogers & Tibben-Lembke 1998, 47).

Centralized return centers indicate a centralized system in which all products in the reverse logistics pipeline are brought to a central facility, where the products are sorted, processed, and finally disposed accordingly (Rogers & Tibben-Lembke 1998, 50). The idea behind a central system is to create largest possible volumes in the reverse flow in order to receive higher revenues from the returns (Rogers & Tibben-Lembke 1998, 50; Tibben-Lembke 2002, 224). In a decentralized system all reverse logistics decisions are made at the retail locations (Rogers & Tibben-Lembke 1998, 88). Centralized return centers are an important part of reverse logistics management strategy, because the optimal location and capacity of facilities and product flows between them indicate

efficiency in the reverse chain (Rogers & Tibben-Lembke 1998, 51; Lieckens & Vandaele 2007, 395). Rogers and Tibben-Lembke (1998, 52-59) identified that in centralized return centers consistency in the return process reduces errors and improves quality, less space is required by customers for return warehousing, savings in labor are achieved, but transportation and handling costs increase. However simultaneously, disposition time is reduced and revenues improved through increased returns processing, customer service improves, disposition time reduces because customers returns larger batches in faster cycles due to the ease of operations, profitability of operations increase, the return activities become more visible and thus quality problems can be communicated further faster, forward and reverse operations need to be managed carefully because usually forward flow receives much more attention and mix-ups can happen, and finally accounting system concerning returns has to interact with the existing IT system. The typical centralized return center benefits being: simplified store procedures, improved supplier relationships, better returns, inventory control, improved inventory turns, reduced administrative costs, reduced store level costs, reduced shrinkage, refocus on retailer core competencies, reduced landfill, improved management information (Rogers & Tibben-Lembke 1998, 60).

In zero return policy no product returns are permitted to enter the reverse channel, which can result in notably lower costs when properly executed (Rogers & Tibben-Lembke 1998, 60-61). Instead of allowing returns, a firm can provide the downstream entity a return allowance and develop a guiding framework for acceptable disposition of the product (Rogers & Tibben-Lembke 1998, 60-61). Zero return policy can act as a stabilizing act in return rates, which promotes planning and fiscal health of the organization (Rogers & Tibben-Lembke 1998, 61). There is a considerable problem concerning zero return policy called ‘2%/6%’ problem (Rogers & Tibben-Lembke 1998, 63). In zero returns the supplier can set a 6% automatic credit for the retailer and issue that the return rate should not exceed the 6% because nothing above it will be credited. The retailer will be happy with this arrangement especially if the rate of return is 2% instead of six and the retailer is still receiving credit from 6%. Although when the issued return rate for crediting is 2% and the actual return rate would be 6%, then the retailer will not be happy. In order for zero returns to work successfully the involved parties need to understand the true costs of both parties. (Rogers & Tibben-Lembke 1998, 63)

The categories for remanufacturing and refurbishment are: repair, refurbishing, remanufacturing, cannibalization, and recycling. Repair, refurbishment, and remanufacturing indicate recognition and upgrading of the returned product where the improvement level rises towards remanufacturing. Cannibalization indicates recovering a restricted set of reusable parts from used products, and recycling means reusing materials from other products. (Rogers & Tibben-Lembke 1998, 64)

According to Rogers and Tibben-Lembke (1998, 66) asset recovery indicates maximizing returns to the owner, while minimizing costs and liabilities associated with disposition through the classification and disposition of returned goods, surplus, obsolete, scrap, waste and excess material products, and other assets. Recovering the economic and also ecological value as much as possible, thus reducing the waste quantity is the objective of asset recovery function because it affects the profitability of an organization (Rogers & Tibben-Lembke 1998, 66).

Negotiation in reverse logistics refers to the price offered to customers for the service and often the real value of returned materials is not understood properly, thus well-executed negotiation can provide significant benefits from the reverse logistics operations. Financial management is among the key determinants in finalizing the structure of the reverse logistics system and it heavily influences the selection of the method by which the returned product is disposed. Finally, outsourcing is a viable option for reverse logistics activities, because many companies generally outsource logistics operations. (Rogers & Tibben-Lembke 1998, 68-70)

Managing reverse logistics is a challenging activity due to the various exceptions related to the reverse flow. Mollenkopf et al. (2007, 585-586) explain that external factors influencing returns should be monitored and responded to by managers, where legal, regulatory, and environmental factors hold great importance. Also, the strategic and operational activities affect the effectiveness of returns management, and finally, it is important for managers to integrate the reverse logistics activities with supply chain management. Rogers and Tibben-Lembke (1998, 187) indicate that firms are beginning to realize the strategic importance of reverse logistics activities and to reduce the cost of reverse logistics operations in the future calls for improved gatekeeping technology, partial returns credit, earlier disposition decisions, faster processing and shorter cycle times, and better data management. Reducing the volume of products in the reverse flow is the easiest way to reduce reverse logistics cost by preventing products from entering the reverse chain and swiftly disposing the products already within the reverse chain (Ibid. 187). Of course it has to be noted that companies automatically aim at reducing the number of errors in their traditional operations, thus minimizing the error-prone returns, therefore the volume of reverse logistics does not reach the volumes of traditional logistics (Fernández 2004, 71).

3.4 Reverse logistics in the Finnish pharmaceutical wholesale sector

The sections above presented the fundamental features of reverse logistics including the management of reverse logistics process and the important disposal activity concerning returned items. This section contributes an insight on reverse logistics activities in the

Finnish pharmaceutical wholesale sector, which aims to provide the underlying characteristics of the Finnish pharmaceutical wholesale environment concerning reverse logistics activities. According to Sakki (1999, 34) particularly experienced logistics occurs in the pharmaceutical sector.

When considering the Finnish pharmaceutical wholesale sector, there are two issues that cannot be avoided, one related to the goods being transported and one related to the environment. Pharmaceutical products possess great requirements for warehousing and transporting them and the laws and regulations extend to the reverse flow as well. Lääkelaki – the Medicines Act and Decree (10.4.1987/395) enacted by the Finnish Parliament in 1987 and the Parliament continues to govern it with the National Agency for Medicines. The act is upheld and kept up to date by Finlex. As for the environment, the geographical size of the market demands goods to be transported to and collected from great distances with the same amount of cost as for shorter distances (Sakki 2003, 28). This is regulated by the Medical Act and Decree (5: 37a §), which indicates that the price of medicine must be the same for all pharmacies and their subsidiaries. Both factors will be discussed in this section.

The Finnish Medicines Act and Decree (5: 32 §) states that pharmaceutical wholesaling is possible only by a license granted by the National Agency and it entails receiving and forwarding medicinal items, acquiring and holding medicinal products for distributing them to pharmacies and other healthcare units operating under a proper license, and exporting medicinal products. In order for pharmaceutical wholesalers to follow and act upon the Medicines Act and Decree the good distribution practice for Pharmaceutical wholesalers (Lääketukkukaupan hyvät toimintatavat) aids in the wholesaling operations in detail. The good distribution practice is governed by the European Commission Directive 2001/83/EC 84.

The good distribution practice states that in order to assure the intended effect of the drugs, safety and quality in every stage of the distribution channel and remove the items from sale not meeting the criteria are governed by the quality assurance of the pharmaceutical wholesalers. The quality assurance system also governs the appropriate warehousing and transportation of pharmaceutical products. (Lääketukkukaupan hyvät toimintatavat 2007, 3)

The pharmaceutical goods need to be warehoused and transported in accordance with set parameters concerning light, temperature, humidity and other required external factors (Lääketukkukaupan hyvät toimintatavat 2007, 6). Only by complying with the established rules on proper handling and transportation of medicinal products can the required absolute quality be assured. The reverse flow is also regulated by the good distribution practice stating also the product returns must be executed without delay in order to ensure the correct temperature requirements and find possible product defects (Lääketukkukaupan hyvät toimintatavat 2007, 7). The returned items must be kept apart

from the active stock in order to inspect the goods thoroughly and determine the proper destination for the returns (Ibid. 7).

Ritchie et al. (2000) investigated reverse logistics function in pharmaceuticals in United Kingdom's National Health Service (NHS) and concentrated on Manchester Royal Infirmary (MRI) Pharmacy. The availability of a particular drug in a pharmacy influences greatly the end user, because prolonged illness and even loss of life can ensue from non-availability. This philosophy results in managing inventory on Just-in-Case mentality rather than Just-in-Time, which leads to excess stock (Ritchie et al. 2000, 228). With regards to excess stock, medicinal products have a limited shelf life, which leads to returns and waste (Ibid. 228). It is especially an issue with expensive pharmaceuticals (Ibid. 228). The research by Ritchie et al. (2000, 228-229) indicated that when the pharmaceutical reverse logistics in concerned the reverse operations have to be conducted in a timely and cost-effective manner.

Mollenkopf et al. (2007) researched the returns management process in supply chain strategy, where five different firms having a different logistics position in the Italian market were investigated one of them being a pharmaceutical distributor Pharmco (Pseudonym used). Initially Pharmco is not in favor of returns because of safety and legal issues (Ibid. 575), which applies in the Finnish market as well. As Rogers and Tibben-Lembke (1998) explained in the section 3.3 that reverse logistics can act as a tool for replacing old inventory with new up-to-date goods the same applies to Pharmco. Replacing out-of-date products with new items is an integral component of Pharmco's strategic approach to reverse logistics, with the overall objective being reducing the total number of returns (Mollenkopf 2007, 578). The study by Mollenkopf et al. (2007, 585) shows that the firms, which are highly integrated with strategic and operational procedures in place and have a strong supply chain orientation appear to react or pro-act better to the changing environment concerning returns management.

The reverse logistics features and the special characteristics of the Finnish pharmaceutical sector relating to reverse logistics activities were discussed, which provide the second important theoretical aspect along with process innovation to this thesis. More specifically the reverse logistics theory aims to function as a subset to process innovation by being the process to be changed. Chapter 5 introduces the constructive research results and draws conclusions on how the current process should be modified in order to gain the desired benefits. Prior to exploring the modification possibilities the methodology of the thesis is discussed to provide a comprehensive outlook on how the research is conducted and necessary data gathered.

4 METHODOLOGY

In this chapter the research itself and its methods are discussed in detail. Ghauri, Grønhaug and Kristianslund (1995, 83) indicate that the methods of research refer to the systematic, focused and organized collection of data, obtaining information from it and solving the research problems. The details of research approach, data collection, data analysis, and trustworthiness of the research are explored in this chapter. The research itself is qualitative by nature, which is most clearly identified in the data collection and data analysis sections of the study.

The research approach introduces the study of reverse logistics process innovation explaining the project outline and the objectives of the research describing the methods used in the research and how they are being applied in both theoretical and practical settings. The data collection section dives deeper into the research by presenting the phases of the project; here the theoretical and empirical data collection activities are clarified. The data analysis section elucidates the essence of the usage of the data towards this research and explores the constructive approach (see e.g. Kasanen, Lukka & Siitonen 1993; Lukka & Kasanen 1995; Lukka 2006; Lukka 2003; Lukka 2000) towards creating remodeled reverse logistics processes. Finally, the trustworthiness of the research is explicated in order to verify the quality of the entire academic work.

4.1 Research approach

The research approach utilized in this study is called constructive research, which indicates solving the problem through construction of models, diagrams, plans, organizations, etc. in order to produce solutions to explicit obstacles (Kasanen, Lukka & Siitonen 1993, 243-244). Lukka (2003, 83) defines constructive research approach in the following manner:

> *"The constructive research approach is a research procedure for producing innovative constructions, intended to solve problems faced in the real world and, by that means, to make a contribution to the theory of the discipline in which it is applied."*

The constructive approach relies on a pragmatic notion of truth, meaning 'what works is true' (Lukka 1999, 141; Lukka 2000, 116; Lukka 2003, 85; 2006, 113)[2]. The constructive approach parallels the following methodological approaches: conceptual, nomothetical, action-oriented and decision-oriented, which are defined by Neilimo and

[2] Original source applied by Lukka (1999, 2000, 2003, 2006): James, W. (1955) *Pragmatism and Four Essays from the Meaning of Truth*. The New American Library.

Näsi (1980, 31-35). Briefly defined the conceptual approach creates knowledge through reasoning. The nomothetical research approach has a causal explanatory model and the research findings are stated in the form of general laws. The decision-oriented approach concentrates on analytical modeling research, which is similar to the nomothetical approach except the nature is normative, thus results of the research are meant, for example, aid management in the operational aspects within a firm. Action-oriented approach brings the human factor into the analysis where understanding the researched subjects receives high emphasis. Along with the identified approaches constructive research incorporates an approach, which is by nature normative and empirical (Kasanen et al. 1993, 255). The Figure 5 illustrates the position of the constructive research approach among the research approaches discussed above. The circle describes the close relation with the surrounding research approaches.

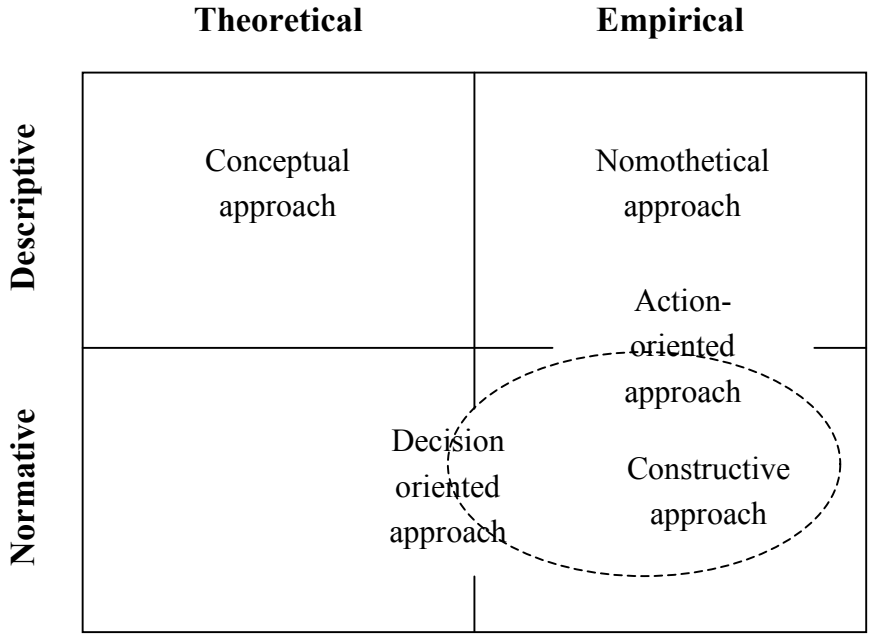

Figure 5 The position of the constructive research approach (adapted from, Kasanen et al. 1993, 257)

This research is conducted through qualitative research methods as it was briefly explained in the introductory section of this chapter. Hirsjärvi, Remes & Sajavaara (2000, 152) explain that the starting point in qualitative research is the illustration of real life and the studying of the target is executed as holistically as possible. The qualitative research findings do not materialize through quantification procedures, as stated by Ghauri et al. (1995, 83).

The qualitative method of research suits extremely well into the constructive research approach, because the constructive research is a form of conducting field research parallel to ethnographic, grounded theory, theory illustration, theory testing and action

research, with the notion to draw theoretical conclusions based on the empirical data (Lukka 2000, 114). Ethnography, grounded theory and action research, for instance, are commonly connected with the qualitative method (Malhotra & Birks 2007, 161-171; Hirsjärvi et al. 2000, 154). For example, action research, also concerned in providing practical solutions (Reason & Bradbury 2001, 1), is mentioned in the field of logistics research (see, for example, Kotzab, Seuring, Müller & Reiner 2005). However, constructive research has gained ground in logistics studies appearing in Turku School of Economics and Business Administration publication about case study research in logistics (Ojala & Hilmola 2003, 83-101).

Kaplan (1998, 90) introduced the term 'innovation action research' indicating the development and refinement of theory of newly discovered management practices, which are believed to be applicable in general. Although Kaplan's innovation action research is closely related to the constructive research approach there is a clear distinction between the two. The innovation action research takes the ideas and constructions from practice and diffuses them under academic facilitation, but the constructive empirical research is not included within Kaplan's approach (Lukka 2000, 119). Labro and Tuomela (2003, 413) state that innovation action research can only be done after the constructive research process. Constructive approach also is close to the case study approach (see, for example, Yin 2003, 13), which investigates a contemporary phenomenon in real life context where the boundaries between context and phenomenon are not clearly evident.

The core element of successful construction is innovation (Kasanen et al. 1993, 246-247), which is included in the research phases. Kasanen et al. (1993, 246) identify the constructive approach as dividing the research into distinctive stages in order to create successful construction:

1. Find a practically relevant problem, which also has research potential.
2. Obtain a general and comprehensive understanding of the topic.
3. Innovate, i.e., construct a solution idea.
4. Demonstrate that the solution works.
5. Show the theoretical connections and the research contribution of the solution concept.
6. Examine the scope of applicability of the solution.

The constructive research approach has later been identified to have seven steps (see Lukka 2000; 2003; 2006), which compose the framework for empirical constructions. The stages of successful construction by Kasanen et al. (1993) are incorporated within the seven steps of constructive research approach. The seven steps of constructive research process are according to Lukka (2006, 114-121) Lukka (2003, 86-91) and Lukka (2000, 116-120):

1. Find a practically relevant problem, which also has potential for theoretical contribution. The topic should pay attention to the practical relevance and the theoretical contribution of the study. In this research the theory concerning process innovation is paradoxical because the main criteria of innovation are disregarded in many occasions. Reverse logistics theory is gaining more and more interest in academic literature; however, the issue of pharmaceutical reverse logistics is not extensively researched. Finally, the practical portion of this research requires a heavy input towards solving the problem concerning the streamlining of the current reverse logistics process.
2. Examine the potential for long-term research co-operation with the target organization(s). The parties connected to the research need to commit to the project, otherwise the project will never lead to a true implementation phase. The researcher should also become a member of the project team in order to gain mutual devotion towards the project. In this research both above mentioned elements occurred.
3. Obtain deep understanding of the topic area both practically and theoretically. In this section the conceptualization of the problem becomes visible through explicit and implicit notions deriving from the field study. Through communication and clear understanding on prior theory enable viable construction(s) to be made and later theoretical and practical contribution analysis can be drawn. More specifically a major influence in this step is conducting the data collection, which will be analyzed more thoroughly in the section 4.2.
4. Innovate a solution idea and develop a problem solving construction, which also has potential for theoretical contribution. This step is somewhat self-explanatory, except the actual construction requires a great deal of effort through collaborative teamwork. The aim is to create a problem-solving construction that also creates new theoretical contribution, which can be time-consuming. Chapter 5 presents the constructions of this research in detail.
5. Implement the solution and test how it works. Typically this step indicates the actual implementation of the new construction in real-life situation. A preliminary test where the construction, for example a new process, is used in the setting it was intended for. In this research, being a preliminary investigation towards process streamlining, this step is modified to suit the project needs. This means, that by providing the constructions for the company through presentation of the process variations, the project supervisor team is able to draw their own conclusions from the construction elements and decide which elements are most useful and will be implemented.
6. Ponder the scope of applicability of the solution. In this step of the constructive research approach process the researcher and the project organization need to

reflect on the learning they have gone through. An analysis from the process itself and from the presentation or the implementation of the final construction is created. Also a discussion addressing the transferability of the construction to other organizations and what were the criteria for success or failure. In this research the Company A directors were asked about the learning the company had gone through during the project and the applicability of the constructions is discussed in the conclusion chapter (chapter 6).

7. Identify and analyze the theoretical contribution. This step is perhaps the most critical from an academic viewpoint, because here the researcher needs to be able to explicate the theoretical contribution of the entire project and reflect the new data to the existing theoretical framework. In this step as in step six the researcher has to distance him/herself from the project in order to provide truly comprehensive analysis. There are two potential theoretical contributions available in the constructive research approach: The novelty of the construction itself, and the positive relations behind the construction, where the refinement of existing theory, its testing, or its illustration act as the theoretical donation. The theoretical contribution is explored in the conclusion chapter by examining the new theory created in the course of the research and through constructing new reverse logistics processes and positioning the created constructions to the existing theory.

Although the order of the steps can vary depending on the situation, the importance of innovation determines the successfulness of the construction (Kasanen et al. 1993, 261). It is because if there is no innovative solution available, the fundamental meaning for continuing the study diminishes significantly (Lukka 2000, 117-118). Figure 6 illustrates the elements of the constructive research approach, where it can be seen that the approach is divided into two fundamental features. First, the practical solution has to be relevant towards the problem in case and must provide feasible solution to the problem. Secondly, the constructive method obliges theoretical connection to the study, meaning a connection to existing theoretical data and the contribution through the constructive research.

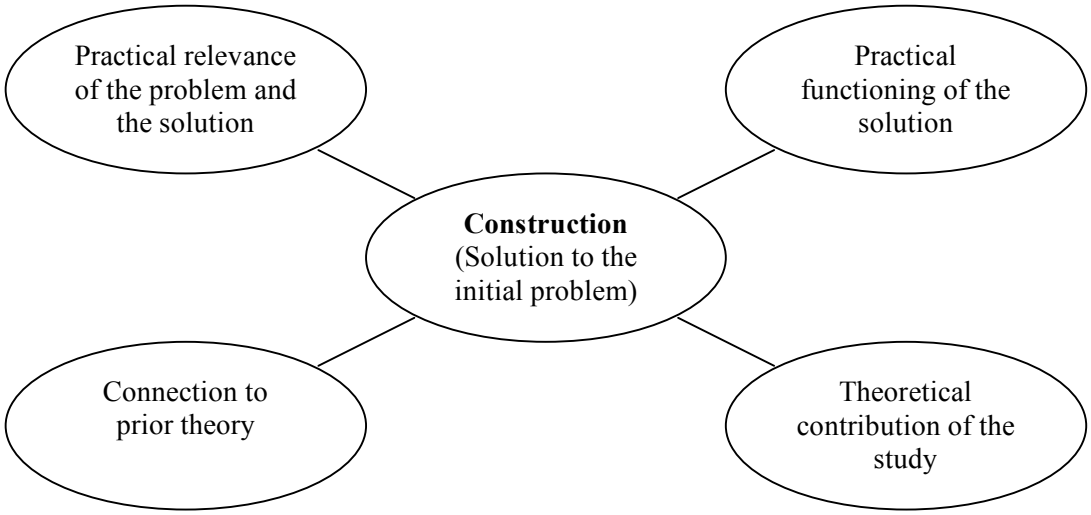

Figure 6 The central elements of the constructive research approach (adapted from, Lukka 2006, 113; Lukka 2003, 85; Kasanen et al. 1993, 246)

According to Lukka (2000, 114) the fundamental features of the constructive research approach require that it: focuses on real-world problems felt relevant to be solved in practice; produces an innovative construction meant to solve the initial managerial problem; includes an implementation attempt of the developed construction and thereby a test for its practical applicability; implies a very close involvement and co-operation between the researcher and practitioners in a team-like manner, in which experiential learning is expected to take place; is explicitly linked to prior theoretical knowledge; and pays particular attention to reflecting the empirical findings back to theory.

Ideally constructive research project solves a concrete problem by implementing a new construction, which includes significant theoretical and practical contribution. This research aims at exactly this; providing connection to the existing theory and new theoretical elements, and practical relevance and functioning of the constructed solution. The range of constructions span from simple technical models to complex designs of management systems, which include indications of approaching and operating new technical and socio-technical activities within the organization. (Ibid. 2000, 114-115)

To summarize the research approach section it can be stated that the project follows the constructive methodology process. The topic itself provides a relevant problem with a theoretical contribution; there exists a connection by the company and the researcher towards the successful completion of the project; a sufficient theoretical and empirical data is gathered; constructions are drawn; the construction implementation is conducted through a group discussion, where the project supervision group discusses the practical possibilities of the constructions and draws conclusions on the innovative aspects of the constructions; theoretical connections are made; and finally everything is concluded to provide new theoretical information on process innovation in reverse logistics. The

constructive research approach aims to narrow the chasm between managerial practice and research, which is the benefit of the constructive approach (Lukka 2000, 123). Next the focus turns to the qualitative elements within the constructive methodology as the data collection is introduced.

4.2 Data collection

The data for this particular constructive research is collected through qualitative methods. By applying ethnographical methods (see, for example, Flick 2002, 146) the research gains depth through gaining insights of the state of the affairs in Company A and also the explicit and implicit problems (Lukka 2000, 117). A group discussion is used in the latter phase of the research, when presenting the constructions to the project supervision group, in order to find out the Company A's opinion towards the innovative features of the constructions. This provides the theoretical connection and adds to the theoretical contribution when addressing process innovation in reverse logistics.

The categorization of the empirical data collection is executed in two parts. The basis for empirical data collection was formed through reviewing academic literature consisting mainly of theory on innovation, its adoption, business process reengineering, reverse logistics, constituents of Finnish pharmaceutical legislation concerning pharmaceutical logistics, and finally methodological elements. The theory assessed in this research holds a key significance in the study because the results of the constructive research are connected to the existing data and new theoretical contributions are illustrated upon investigation results. Without a proper theoretical contribution the analysis and the conclusions on the constructive research cannot be thoroughly made. Therefore the structure of the constructive approach relies heavily on the existing theoretical evidence, and an exhaustive detail towards the theory collection is applied.

The empirical data collection entails the researcher's penetration to the target organization in order to gain a full comprehension on the business functions connected to the reverse logistics processes as well as the overall business operations. This phase is conducted, as previously mentioned, through ethnographical methods. The third part of the data collection involves a group discussion, which involves a presentation of the research and the constructions made to the project supervision group. The goal for the group discussion is to find out the relevant features that Company A wishes to incorporate and what are the aspects that the target company finds innovative and how? Both of the empirical data collection phases are conducted through a direct approach, indicating a type of qualitative research where the overview of the project is explained to the respondents (Malhotra & Birks 2007, 181).

The empirical data collection, as stated above, is done in two phases. First, the ethnographical approach is discussed. From the researcher's point of view the project of Company A's reverse logistics process streamlining involves studying not only the reverse logistics process, but also the entire business function incorporating the processes to be altered.

Ethnography indicates a research where observation and participation are incorporated to one another along with other procedures. The concern is on what people are doing, rather than what are they thinking (Silverman 1985, 96). Atkinson and Hammersley (1998, 110-111) identify the features of ethnographic research being the following: in ethnographic research there is an emphasis on exploring a particular social phenomenon's nature, not only test hypothesis about them; data is not coded while collecting it, indicating work with unstructured data; detailed exploration of small number of cases at one time; and the data analysis requires explicit interpretation. Malhotra and Birks (2007, 161) base ethnographic research upon the participatory observing customs, habits and differences of people in everyday situations. Through the typical ethnographic methods of observation, interviews and archive analysis the researcher begins penetrating into the organizational realm gaining insights on the topic of investigation.

When viewing the first phase of the empirical data collection in practical terms the selection of interviewees was somewhat simple due to the fact that all of the operative divisions connected to the reverse logistics process were identified, chosen and dates were set in order to gain a swift and structured view on the organization. Altogether twelve organizational elements are connected to the reverse logistics process and meetings with the department heads and experienced employees were scheduled consisting of face-to-face interviews and observatory elements. The discussions were structured around three questions, which also follow the genre of the research questions. Hammersley and Atkinson (1991, 113) indicate that the reflexivity of the ethnographic interview signals the unstructured nature of questioning even though the researcher usually has a questioning outline to follow. The outline of the discussions followed the general procedure in the ethnographic interviews distinguished by Spradley[3]. This indicates specifically requesting and scheduling the interview, explaining the research and asking questions where the interviewees are able to organize their knowledge on the issue (Flick 2002, 91).

The questions in this research are based on Pettigrew's (1997) notion on processual analysis and they follow the formula of what is done, why is it done the way it is, and how would the current state be changed? This pattern of structuring the ethnographic

[3] Original source: Spradley, J. P. (1979) *The Ethnographic Interview*. Holt, Rinehart and Winston: New York, NY.

interview (Flick 2002, 90) enables mapping the entire organizational profile through the particular organizational view and gradually focusing on the reverse logistics processes and their change features. The questions concerning processual analysis in the constructive approach of this research are found in the Appendix 1. The discussions were conducted in Finnish, because it is the operating language of the Company A.

The different interactions with the different divisions of Company A are presented in Table 3. The table shows the different parties connected to the current process, the dates of the interviews, the number of interviewees upon each interaction, and the overall topic of the meeting.

Table 3 Interviewed departments at Company A and customer interviews

Department	Date	Number of Interviewees	Topic of meeting
Returns Department	22-25.1.2008	2	Overall view on returns
Customer Service	24.1.2008	2	Customer service dept. view on returns
	23.1.2008		Mapping possible IT solutions for the returns process
IT Department	7.2.2008	2	Construction of IT solutions
Transportation	5.2.2008	2	Transportation planning & driver's view on returns
Good Distribution Practice / Quality	5.2.2008	1	Legal & quality issues
Materials Handling	6.2.2008	1	Purchasing & communication between parties involved in returns
Disposal	11.2.2008	1	Disposal process
Accounting	11.2.2008	1	Monetary transactions concerning returns
Customer Relationship Management	12.2.2008	1	Customer relations concerning returns
Supplier Relationship Management	13.2.2008	2	Supplier contracts & guidelines concerning returns
Customer X	21.2.2008	3	Customer view on return operations
Customer Y	21.2.2008	3	Customer view on return operations
Customer Service Management	21.2.2008	1	Customer view on return operations Company A perspective
Logistics Director (project owner)	22.2.2008	1	Returns process as a part of overall logistics operations
Project Coordinator: Logistics operations development	15.1.2008 - 29.4.2008	1	Mentor
Total		24	

The Returns Department is the main operational unit responsible of handling the incoming returns by receiving, checking, processing and warehousing or disposing the goods and recording all stages of the manual process in the ERP (Enterprise Resource Planning) system. The Customer Service Department is the information exchange center between Company A and their customers. The IT Department is responsible for ensuring the fluent functioning and development of the existing IT services, such as the ERP system and the Web Portal service, also the development of new IT solutions is included in their tasks. The Transportation operations control the inbound and outbound movement of the goods between Company A and the customers and in some cases with the suppliers as well. The transport operations include the transport management and the

administration of the terminal operations. The role of the Quality / Good Distribution Practice Department is to ensure the safe and controlled handling of the pharmaceutical goods throughout the supply chain from Company A's part. This includes assuring that the legal and qualitative standards are met. The Materials Handling acts as a communicator between the suppliers and Company A, which involves for example purchasing operations and information exchange concerning various return policies and regulations. The Disposal Department is responsible of collecting all disposable goods and processing them accordingly. The Accounting Department, when focused on the returns operations, is the main enforcer of the invoicing on the operational level, however, more importantly keeping track of the monetary flows results in vital information concerning decision-making. Customer Relationship Management is in charge of the Customer Service Department and its development, where as Customer Service Management indicates the operational level of the relationship management. The Supplier Relationship Management administers the contract relationships between Company A and the suppliers. Finally, the logistics operations and decisions related to it fall under the Logistics Department. A more detailed description of the interviews relating to the returns process is discussed in chapter 5, where the practical functioning and theory relatedness of the constructions is explained.

Upon the interviews, observations and meetings the different elements of importance were identified and the actual constructions towards solving the problem of streamlining the reverse logistics process were established. The data collected through the ethnographic methods included the information received during the interview process, including carefully taken notes and reflections by the moderator (i.e. the interviewer) and the interviewee, the overall operational features while observing various operational elements and secondary data through documents, statistics and diagrams received or produced during the ethnographical process.

The second phase in the empirical data collection was conducted through a group discussion, which was held during the final presentation of the construction options. This venue was selected due to its excellent representation of Company A managers, who have been involved with the project as the project supervision group and they are the ones who make the decisions regarding the direction and investments in the reverse logistics process.

Simply explained group discussion means a qualitative data collection technique where the researcher along with several respondents gets together to discuss a certain topic (Ghauri et al. 1995, 87). The collection of data while presenting the final constructions to the project supervision group is convenient procedure to gather quality information from the respondents. Malhotra and Birks (2007, 182) characterize this type of small group discussion conducted by a moderator a focus group. The group discussion offers several advantages in gathering qualitative data including synergy

benefits, snowballing, stimulation, security, spontaneity, serendipity, specialization, scientific scrutiny and structure.

Placing key people in a group responsible of coordinating the project and making decisions regarding the practical implementations of the project constructions benefit from the above-mentioned advantages, as does the entire research. A wider range of information, insight and ideas can be realized flexibly triggered by natural discussion, moderator's input, or an individual comment resulting in a fruitful discussion fueling itself. Because the all of the groups in this research were composed of staff members representing different business units in Company A the structure and content of the discussions met with the above-mentioned advantages. The group discussions are presented in Table 4. In a small group discussion an opportunity arises for proposing and debating ideas and feelings spontaneously regarding the topic in a secure manner, this includes subjects that unexpectedly present themselves. Although the group discussion incorporates several advantages it has also disadvantages, which cannot be overlooked. Moderating the group discussion is difficult and can usher messy and misleading results (Ibid. 2007, 187-188), therefore the group discussion was approached with extreme caution.

Table 4 Group meetings at Company A during the research procedure

Group meetings	Date	No. of members	Topic of meeting
Project group meeting (full)	15.1.2008	12	Kick-off
	25.2.2008	12	Project follow up + summary of interviews
Project development team	27-29.2.2008	5	Creation of constructions
	3.3.2008	5	Summary on construction ideas
	20.3.2008	4	Final report on IT construction
	3.4.2008	3	Financial calculations
Project supervision group	31.1.2008	5	First control phase - decision on project timeline & introduction on current state
	25.2.2008	5	Project follow up + summary of interviews
	7.3.2008	2	Project follow up
	29.4.2008	4	Returns project final presentation

The full project group included members from each interviewed department, so the Company A was well represented during the start and follow-up of the project throughout the research process. The project development team included the project

manager, two members from the IT Department, one from the Accounting Department, one from the Returns Department and the researcher. The strong presence of the IT Department is explained further in chapter 5, but shortly the IT constructions hold key significance the practical constructions concerning the project. The project supervision group included the Logistics Director, the Sales and Marketing Director responsible of supplier relationship management, the Director of Customer Relations and the Accounting Director of Company A and of course the researcher. In the Table 4 the number of members column excludes the researcher.

The role of the researcher in the full project group meetings was to summarize the held interviews to the entire group and explain the conclusions drawn from the discussions. In the project development team the researcher's role was to maintain the discussion within the limits of the research scope and provide his expertise from theoretical and practical background in the discussion. In the meetings with the project supervision group the researcher acted as a co-presenter of the findings gathered in the project and in the final presentation interviewed the directors about the realistic realization of the constructed processes.

The groups included in the project hold different functions towards aiding the successful completion of the study. The full project team was used when the project was introduced and the key parties identified. After the ethnographical data collection, also recognized as the first phase in the empirical data collection, the interviews and their results were presented to the entire group. The follow-up phase was an opportunity for the participated members to reflect on the research findings and learn from the information gathered. The project supervision group has the demanding task to make decisions based on the gathered information during the project and naturally contemplate the research findings after the project. The supervision group also discusses the implementation of the constructions in practice and the innovation diffusion concerning the different constructions determining the concrete applicability of the constructions and the theoretical contribution of the findings. All of the group meetings provided a much needed control and direction to the project through the practical experience possessed by the group members. Also a healthy conversation was instigated during the group meetings, which enabled a more thorough understanding among the group members.

The final presentation of the process constructions to the project supervision group was to replace the practical implementation of the processes with a discussion on which constructions and their elements would be realistically realizable and secondly reflect on the project by discussing Company A's learning from it. The constructive elements were presented to the supervision group and during each constituent the managers commented on the research findings and at the end specific questions were asked to avoid confusion. The discussion was directed by asking which processes or their

components did the project supervision group find realistically realizable and why? The latter question concerned the reflection on the learning from the project. The questions are enclosed in Appendix 2. Due to the limited time span offered for the final presentation the discussion ended before all aspects were fully explored, therefore the concluding remarks from the project supervision group were gathered applying an e-mail correspondence.

The following sections describe data analysis and trustworthiness within the research and they also include more information on data collection. Data analysis section explains the coding of the data and the qualitative analysis, following the trustworthiness section discusses the data recording in more detail.

4.3 Data analysis

The data analysis consists of assembling the data collected from the various sources, reducing, or organizing and structuring the data, displaying the reduced data, and finally verifying the data (Malhotra & Birks 2007, 232). By analyzing the collected data thoroughly more concrete conclusions can be drawn. A proper analysis does not only contribute to the constructions created during the research, but perhaps more importantly the theoretical contribution from the research is dependent on the exhaustive analysis of the data.

The data assembly stage implies the gathering of data from diverse sources, which already were mentioned in the data collection section (see section 4.2). The key element in this section focuses in the organizing and structuring the collected data into an easily analyzable form. Coding the data enables breaking the qualitative data into structured manageable pieces (Ibid. 2007, 240). In the first phase of empirical data collection the system of thematic coding is used (see, for example, Flick 2002, 185-190; Eskola & Suoranta 1998, 175-182), where the data is structured according to themes signaling the current state of the process and the desired incremental and radical changes. Displaying data refers to presenting the coded and organized data in such form that the relevant information can be modified into practical constructions. The practical relevance and functioning, along with the theoretical connection and contribution is dependent on the clear thematic coding of the gathered data. Finally, the data verification, which involves finding alternative explanations of the interpretations (Malhotra & Birks 2007, 247), is closely related with the trustworthiness of the research discussed the following section (4.4).

Categorizing the collected data into themes enables the selection of features, which provide insight to the research questions (Eskola & Suoranta 1998, 175). The procedure is called thematic coding or thematization that indicates seeing general variables

underlying many specific factors (Miles & Huberman 1994,131-133). The objective in analyzing the data in themes is the ability to select the central issues contributing to the solution. This requires a strong interrelation between theory and empirical data (Eskola & Suoranta 1998, 176), which correlates well with the constructive approach because the relation between practice and theory is important. Thematization is a suitable analysis method when resolving a practical problem (Ibid. 1998, 179), such as a constructive research.

The empirical data collection and analysis in this research is connected to three steps in the constructive research approach, which are presented in Table 5. The table illustrates the phase of the research approach and the data collection and data analysis methods according to the phase in the constructive research approach. The themes derived from the empirical research are also presented with the notion of the objective of the research indicating the overall goal of the particular research step and its analysis.

Table 5 The division of the empirical research steps into themes

Phase of research approach	**Method of data collection**	**Method of data analysis**	**Themes**	**Objective**
Obtain deep understanding of the topic area both practically and theoretically (Step 3)	Ethnographic & theory research	Thematic coding	Current process; Incremental changes; Radical changes	Learn the process and its relation within the supply chain operations both practically and theoretically
Innovate a solution idea and develop a problem solving construction (Step 4)	Ethnographic	Thematic coding	IT solutions; Zero returns; Centralization of operations	Construct new processes that provide desired benefits
Implement the solution and test how it works (Step 5)	Group discussion	Thematic coding	IT solutions; Zero returns; Centralization of operations	Find practical implementation criteria for constructions, which indicate the realistic realization of the constructive solutions including the elements of innovation diffusion

When reviewing the Table 5 in more detail by individual research steps, it can be seen that in the step of obtaining understanding of the practical and theoretical features

of the research topic the thematization reveals three distinctive areas: the current process, incremental changes, and radical changes. It is according to these themes that the constructions are based upon.

As the step four of innovating a constructive solution began, the most relevant themes from the departmental interviews emerged as well. The changes desired whether incremental or radical revolved around the improvement and development of the existing IT solutions, zero return policy with different nuances was also a much-discussed topic and finally the briefly explored topic of operation centralization. These three were set as themes while constructing the solutions for streamlining and simplifying the reverse logistics operations.

The group discussion analysis was also conducted through the above-mentioned themes of IT solution improvements, zero returns, and centralization of operations. It also added a reflective question concerning the learning Company A experienced from the project, which enables examining the scope and applicability of the constructions. The presentation of the constructions to the supervisor group the different constructions were introduced through the themes of IT improvements, zero return policy, and centralization features, which were then discussed and explored by the supervisor group including the researcher. The purpose of the discussion was to determine the realistic realization of the presented construction, meaning the practical applicability of the new process features.

Structuring the gathered data into themes enables an easy access to analyzing the information. The practical functioning of thematic coding connects and contributes to the constructive research approach extremely well. This is because through collecting a diverse set of data in order to obtain deep understanding of the researched topic is simple to handle. Most importantly the key characteristics of the constructive research approach on the practical relevance and functioning of the construction and the theoretical connection and contribution are supported by thematic data analysis.

After the thematization of the collected data the gathered information was connected with existing theory in order to meet the research step objectives presented in Table 5. In step 3, obtaining understanding of the theoretical and practical elements of the topic, the identified obstacles and improvement ideas were introduced to the project development team that began creating the process constructions based on the collected information. In step 4 the objective was to create the process constructions that would meet the desired benefits imposed in the beginning of the project and include the demands and suggestions derived from the departmental interviews in step 3. The created constructions were presented to the project supervision group to find out which of the process constructions or their constituents would be realistically realized (step 5).

4.4 Trustworthiness of the research

This section of the report focuses on the trustworthiness of the entire research. For research to have an impact on knowledge, either by adding to it or by solving a problem, it has to assure credibility on the inquiry, thus enabling applicability and inspectability by its intended audience (Erlandson, Harris, Skipper & Allen 1993, 28). Any valid inquiry must demonstrate truth-value, provide a basis for applying it, and allow judgments to be made of its aspect (Ibid. 1993, 29). The validity of the research is measured through notions of credibility, transferability, dependability and confirmability introduced by Lincoln and Guba (1985), which indicate the measure of trustworthiness (Erlandson et al. 1993, 29). The steps of the research are analyzed through the four above-mentioned factors, which indicate the validity measurements of the constructive approach.

Trustworthiness indicates the notion, which persuades audiences to pay attention to the research and to its findings. Conventionally truth-value, applicability, consistency and neutrality have been investigated to find answers to the research trustworthiness issue. Briefly described the above-mentioned listing indicates the following: truth value – the confidence establishment of truth in the research findings; applicability – the applicability rate of research findings in other contexts; consistency – the repetition and replication of the research and its findings; neutrality – the degree of the research findings are determined by the respondents and conditions of the research, not the biases, motivations, interests, or perspectives. (Lincoln & Guba 1985, 290)

Conventionally internal validity, external validity, reliability and objectivity are the established and accepted criteria for creating the trustworthiness in the research (Ibid. 1985, 290). Internal validity refers to establishing a causal relationship where certain conditions are shown to lead other conditions. The generalization of the research findings indicates external validity. Reliability is connected to successful repetition and replication of the research operations including the findings. (Yin 2003, 34) Objectivity is constructed from collective judgments by multiple observers agreeing on a phenomenon and from using a methodology that does not alter the data creating a bend in the responses (Lincoln & Guba 1985, 292-293).

The trustworthiness criteria used in this research (credibility, transferability, dependability and confirmability, mentioned above) fall under the naturalistic paradigm. The use of the naturalistic paradigm does not mean that the criteria of trustworthiness are somehow superior compared to the conventional methods, but rather the nature of the research, being a qualitative field study, implies the use of the naturalistic criteria. The naturalistic inquiry, or constructive inquiry, as preferred by Guba and Lincoln (Erlandson et al. 1993, 8), has its benefits in the implementation of the trustworthiness

criteria because the naturalistic inquiry always takes place in the field (Lincoln & Guba 1985, 11).

Credibility is the substitution to the conventionalist's internal validity. Credibility refers to enhancing the probability that the research findings are found to be credible in implementing the research and to have the research findings be approved by the constructions of the multiple realities, thus demonstrating the credibility. (Lincoln & Guba 1985, 296) This means that the credibility needs to be established with the individuals who provided the data. These individuals are the ones representing the different constructed realities, therefore a credible outcome adequately represents the areas where the realities converge and diverge.

The techniques for establishing credibility are prolonged engagement, persistent observation, triangulation, peer debriefing, negative case analysis, referential adequacy, and member checks. Prolonged engagement means that the researcher involved needs to invest a sufficient amount of time conducting the research in order to understand the culture and learn to interpret the context under study. In other words prolonged engagement provides the scope. (Lincoln & Guba 1985, 301-316; Erlandson et al. 1993, 30, 132-136) Persistent observation supplies the depth to the research (Lincoln & Guba 1985, 304) and it helps to sort out relevant factors from irrelevant ones (Erlandson et al. 1993, 137). Triangulation is the use of different data collection methods within one research (Saunders, Lewis & Thornhill 2003, 99), thus leading to credibility (Erlandson et al. 1993, 137). By exploring the researcher's biases and meanings and clarifying his / her interpretations is a part of peer debriefing, which holds a purpose for investigating various aspects of the inquiry that might otherwise remain implicit (Lincoln & Guba 1985, 308). The negative case analysis is seen as an important tool in establishing credibility and it indicates a process of altering recently understood hypothesis. This means revising the hypothesis until no negative cases appear, thus a cause can be announced (Ibid. 1985, 309). Referential adequacy refers to materials acquired through obtrusive and unobtrusive measures. This means measures slightly intruding with the environment such as videotaping and tape recording and on the other hand materials produced without a reference such as memos and newspapers, respectively (Erlandson 1993, 139). In establishing credibility the member check, the final technique generating credibility, is the most crucial method. It is when the collected data, interpretations, and conclusions are tested with the original respondents (Lincoln & Guba 1985, 314).

Determining credibility can be established through several techniques as described above. Prolonging the engagement with the participatory organization the researcher is able to create credibility for the research, which was established in this study by the researcher remaining in contact with Company A during the research and after the project phase including the research was completed. The interviews, especially when studying the departmental unique nuances, incorporate the technique of persistent

observation. Through interviewing, observing, and participating into the reverse logistics process the perspective did not limit to the process being studied, but an overall view to the organization was created, thus establishing depth in the research.

By interviewing every department connected to the reverse logistics process, and not only the Returns Department, provides a variety of differing sources and alternate views on the issue. This signifies research material triangulation, which means combining data collected from several interviews. During the interviews the gathered secondary data including Company A documentation and statistics signified another data collection method, which provided perspective to the situation and signaled a unified view regardless of departmental opinions. Peer debriefing was also utilized in the research and it was mainly conducted through the group meetings, which took place regularly throughout the research. The secondary data produced by the interviewees during the departmental discussions are incorporated in the referential adequacy, although the main referential measures are the notes, recordings and transcriptions produced during the empirical research.

During the first phase of empirical research, meaning the departmental discussions on the reverse logistics process, recordings or transcriptions were not produced due to the inconsistent manner of ethnographic research. This means that the interviews included touring the facilities and observing the operations and actions of different reverse logistics process phases. The participatory observing stretched to several hours and included many disturbing factors such as background noises and movement, therefore recording the interviews in the first phase of empirical data collection was quite impossible and it was disregarded in the very beginning of the research by the researcher. Video recording would have provided the flexibility of recording all necessary elements during the departmental discussions. However, using a video camera might impose restrictions in the subjects to provide all the data due to its unconventional nature, which is why video recording was also disregarded. The second phase of the empirical data collection, the group discussion, was recorded and transcribed. Careful research notes were taken in both empirical data collection phases by the researcher and the notes were always typed on a computer after the interview. Because the interviews were conducted in Finnish, an outsider independent party prepared the translation of quotes. The referential adequacy includes the research limitations from the part of adequate data collection. Only two customer interviews were made in order to gain understanding on the customer perspective concerning the reverse logistics process and its improvement. A larger amount of customer interviews would have provided a significantly more reliable picture on the customer perspective; however, the time limitations and the data gathered provided the desired preliminary view as planned at the starting phase of the research.

Member checks, indicating the presentation of collected data, interpretations and conclusions, were conducted in every group meeting during the research. It was seen as mandatory and extremely valid by Company A and the researcher that the subjects included in the research follow the progress of the project and are provided with the opportunity to reflect and contribute to the research during the creation of the constructive solutions. In order to establish credibility everything, from the researcher's perspective, concretely reasonable measure was taken to create a credible research. There are several factors that would improve the credibility of the research, which could have been accomplished with more thorough research planning. However, the initiation of the research occurred so rapidly that a more structured and planned research was not a possibility within the timeframe of this research.

Establishing transferability differs from external validity a great deal. When establishing external validity the conventionalist researcher is expected to create relatively accurate statements about the external validity. By comparison, when establishing transferability the working hypotheses can only be linked along with the description of the context and time in which they were found to hold. The task of a naturalist researcher is to provide the database that makes judgment on transferability possible for potential appliers, not to provide an index on transferability. (Lincoln & Guba 1985, 316)

As explained above, transferability refers to the applicability of the research findings and conclusions to other contexts. The purpose of transferability is included in this thesis, because it the researcher's task to present the findings in an understandable form and formulate conclusions in a manner that provides notions of applicability for the reader. The aim is to describe every detail of the research procedure and the theoretical and empirical nuances incorporated with the constructive solutions to the research problem so the readers and evaluators are able to determine the applicability for them selves, not only trusting in the researcher's views on applicability.

Reliability is a precondition of validity (Erlandson et al. 1993, 34), therefore dependability is a precondition for credibility (Lincoln & Guba 1985, 316) that refers to the consistency, predictability, stability, or accuracy of the research. The establishment of reliability is dependent on replication of the study and its elements with the same instruments, same subjects and similar conditions leading to similar results. Dependability incorporates the stability of the reliability aspects adding variance trackability of the observed instability. Dependability audit is used to communicate the aspects of dependability of the research, which indicates an audit trail incorporating documentation, such as interview notes, critical incidents and the research process description. (Erlandson et al. 1993, 34)

Dependability refers to the consistency of the research, more precisely to the replication of the research and its findings. When the research is repeated with the same

instruments, in the same conditions and the same research subjects, the findings should be the same thus indicating dependability. Because the research included all the departments included in the reverse logistics process and Company A had a predetermined focus to streamline and simplify the returns process, therefore, the research findings should resonate if the study would be repeated. It is the external conditions of legislation and contractual agreements that restrain the entire industry. If the legislative conditions and the holistic views on returns handling by suppliers would change, then perhaps the research findings and conclusions would have more simple constructions. However, the dependability cannot be based on the assumption of 'what if', because that would actually change the external conditions and would not affect the dependability of this research.

When establishing confirmability the endeavor is not to ensure contamination free observations, but to trust the data constructions, assertions, facts, etc. and track them to their sources. As dependability was determined through an audit, similarly confirmability audit is used to establish confirmability. The conclusions, interpretations, and recommendations should be traced to their sources and their level of support determined. Confirmability refers to the neutrality of the research, meaning that the research findings are dependent on the subjects, not the researcher (Lincoln & Guba 1985, 290). The researcher was deeply involved in the research project and was a team member creating the constructions in Company A. This creates a small conflict between the research approach and the confirmability of the research, because the researcher's input was relevant due to the experience in the topic. According to the constructive research approach the researcher is supposed to be a part of the development team, but the neutrality of the research suffers slightly. However, the question is whether the findings would be different if another researcher would conduct an identical research? Again the answer is two-folded. On one hand, the researcher does have a strong influence in the constructions made, but the actual research findings are not confined to the researcher, which are the basis for the constructive solutions. As in dependability, a close examination of the research documentation, an audit, reveals the level of confirmability of the research.

The phases of the constructive research are important to review through the notions of trustworthiness. The phases of the constructive research process are illustrated in the Figure 7, where the research procedure is divided into three categories: the prepatory phase, the fieldwork phase and the theorizing phase.

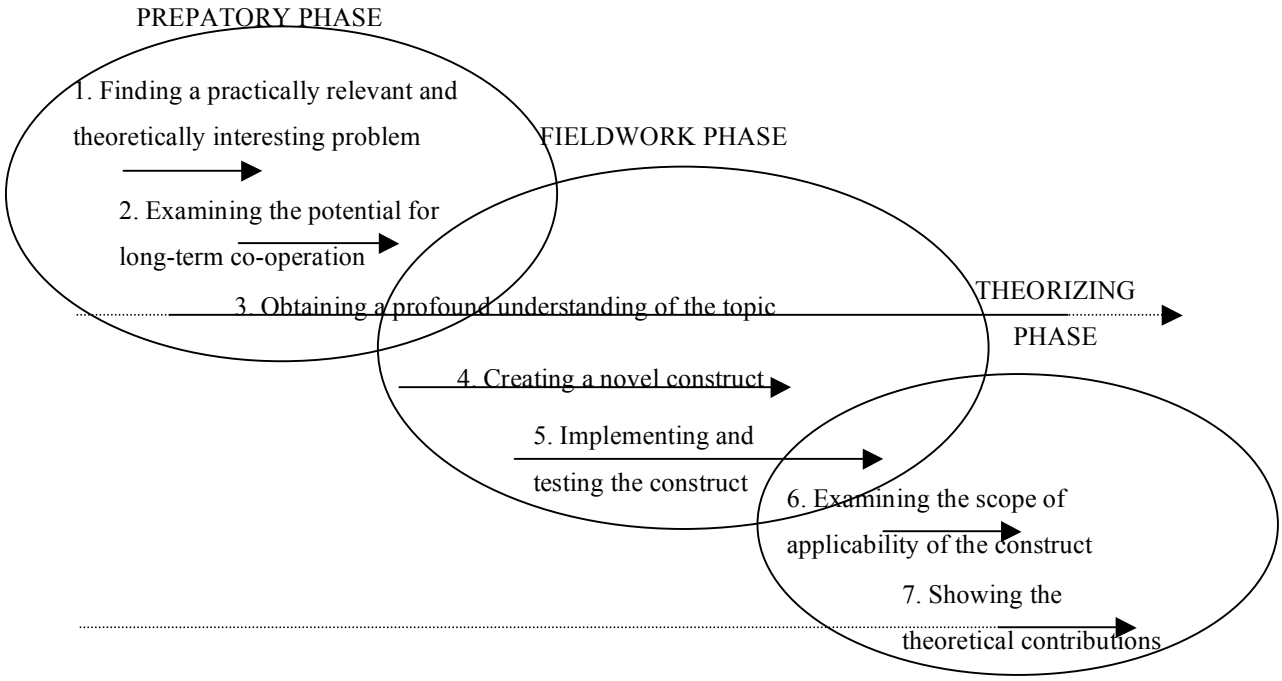

Figure 7 The phases of the constructive research approach (adapted from, Labro & Tuomela 2003, 416)

In the Figure 7 the third step of obtaining a profound understanding of the topic continues throughout the research process. The dotted line in the third step indicates the feature of the theoretical data collection is likely to start before the actual research. The dotted line in the seventh step signifies the consideration of theoretical linkages during the entire research process. According to Labro and Tuomela (2003, 415) steps 3, 4 and 5 are related to ensuring internal validity and step 6 is related to external validity. When observing the constructive research phases from the naturalistic trustworthiness view-point the conclusions resonates with the conclusions of Labro and Tuomela, because obtaining a profound understanding of the topic and creating and implementing a construct definitely include features from the credibility criteria of trustworthiness. Also step 6, examining the applicability of the solution, is directly related to the transferability criteria. The dependability and confirmability criteria are difficult to fix to any specific step in the constructive approach, because they need to be observed through the entire research.

Although the constructive research approach has been implemented in diverse studies (see, for example, Chua 1995; Degraeve et al. 2003; Kasurinen 2002; Malmi 1997; Puolamäki 2004; Seal et al. 1999) there is a lack of general recognition and acceptance of methodological foundations. The constructive research approach is

considered as an emerging methodological concept, but it is still an unestablished one (Lukka 2000, 125; Lukka 2003, 99).

Erlandson et al. (1993, 35) conclude the trustworthiness criteria by stating that there cannot be external validity without internal validity, the same applies to relationship between transferability and credibility; more precisely transferability will not be if there is a lack of credibility. Credibility can be formed if dependability is ensured, which is comparable to created validity through affirmed reliability. Finally, confirmability cannot provide anything greater than the value it confirmed.

To synthesize the trustworthiness section of the report the entire methodology of the research is to be reviewed. Firstly, the research follows the constructive research approach procedure very carefully step by step. Secondly, the data collection and data analysis are conducted through following established theoretical guidelines with extreme care to ensure undisputed evidence on new information providing the practical and theoretical contribution to the field of reverse logistics. Finally, the criteria of trustworthiness are determined and through them the quality of the research is diagnosed. Now that the research procedure and guidelines are discussed the focus turns to the empirical portion of the research where the constructive solutions are created.

5 CASE – COMPANY A: STREAMLINING REVERSE LOGISTICS PROCESS IN CUSTOMER RETURNS

The previous chapters presented the theoretical aspects of process innovation and reverse logistics. Also the industry specific factors were briefly introduced covering legislative and regulatory issues. The methodology chapter presented the research conduct and the trustworthiness of the research. This chapter discusses the actual construction, i.e. the how the particular process was changed in order to meet the desired benefits.

The introduction explained that the case company (Company A) is a Finnish pharmaceutical wholesaler and chapter 3 examined the legislative obligations of operating as a wholesaler of medicinal items in Finland and in the EU. The legal and regulatory factors are extremely important to ensure the quality of the items, thus the operations need to be operated and controlled with the utmost caution and yet achieve the greatest possible efficiency and effectiveness resulting in profits.

Chapter 2 presented Davenport's (1993) theory on process innovation and this paper aimed to mold a holistic view on process innovation by tying with business process reengineering theories and reviewing notions of innovation. Davenport's approach to process innovation is used as a guideline to the reverse logistics process change in Company A. The steps are: identifying processes for innovation, identifying change levers, developing process visions, understanding existing processes, and designing and prototyping the new process.

First, the determinants of the current process, or processes, to be changed are explored. The factors leading up to choosing the process for change, the desired expectations from change effort, and mapping and understanding the current process are examined in this section. Each department connected with the reverse logistics operations was interviewed, as explained in the methodology chapter, in order to receive a comprehensive view on the current state and gather the change possibilities and desired change elements.

Secondly, the actual process innovation takes place. The designing and prototyping the new reverse logistics process is discussed in detail. The process constructions are presented, which are the result of combining theoretical knowledge, research outcome, and expert know-how. The reverse logistics operations consist of nine processes, which were under investigation and set for process innovation. Each construction is presented in the second section 5.2. The chapter provides a comprehensive view on the process construction procedure and produces managerial implications explaining the possibilities on achieving the desired outcomes through placing effort on the key functions in the constructions.

5.1 Determinants of current reverse logistics process

The background factors for this project are derived from the Company A's desires to streamline and simplify their current reverse logistics operations. The current reverse logistics process, including the return and compensation activities, is complicated due to: ownership of the items, reasons leading to returns and compensation, differences in contracts between manufacturers and Company A, handling of product defects, etc. This results to confusion in the reverse activities and forcing to rely on memory related and person related operations in conducting reverse logistics in Company A, which in turn slows down the entire process, the throughput time of compensations increase, profits are lost and unnecessary amounts of resources are used.

Company A identified the obstacles described above prior to the research procedure, thus a clear picture on reverse logistics operations and especially their nuances were vague. The aim of the project was to comprehensively map out the existing reverse logistics process from customers to the wholesaler (Company A) and develop the reverse logistics process in order to gain the desired streamlining and simplification benefits. The main focus was on creating unified internal and external operations models and outlining the IT possibilities in achieving more efficient and effective reverse logistics operations.

In order to fundamentally outline the existing reverse logistics processes in Company A, the progress is paced in accordance with process innovation approach. Reflecting the process mapping and later the development of the new processes with the Davenport's process innovation approach steps can the elements be identified more easily. In this section the steps receiving the highest attention are: identifying process(es) for innovation, understanding the existing process(es), and identifying change levers. Although, the process innovation approach steps are not covered in exactly the same order as Davenport suggests, the selected order aids in comprehending the nuances of the practical process innovation in Company A.

5.1.1 Identifying processes for innovation

Identifying processes for innovation in accordance with this particular project has three angles that lead to selecting the reverse logistics process. The first and the most influential aspect was Company A's intuition in its own reverse logistics process, secondly, the researcher's interest in the topic, and finally, as the research begun, statistics stated that attention in the reverse operations are required in order to meet the desired efficiency and effectiveness from the reverse operations.

The pharmaceutical supply chain begins with the manufacturer of pharmaceutical goods from where the goods flow downwards to pre-wholesalers, who forward the goods to wholesalers. The pre-wholesalers are able to provide goods directly to pharmacies and such, but mainly wholesalers are responsible for these activities. Wholesalers divide the pharmaceutical flow to hospitals, veterinaries, pharmacies, and other parties, such as private physicians, who require pharmaceutical items in their selection. Figure 8 presents the pharmaceutical supply chain.

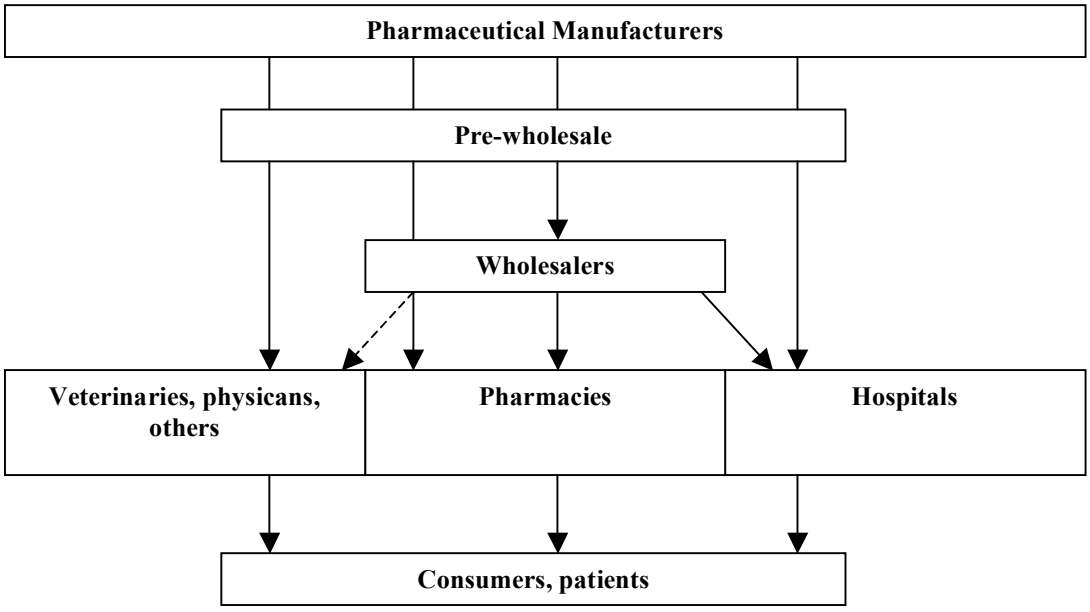

Figure 8 The pharmaceutical supply chain

The Figure 8 describes the forward flow of operations, where Company A positions as the wholesaler and main target customers are pharmacies and hospitals located in Finland. Presenting the forward supply chain provides a comprehensive view on the pharmaceutical logistics, although the reverse logistics operations are the focus in this thesis. Company A's reverse supply chain is illustrated in Figure 9.

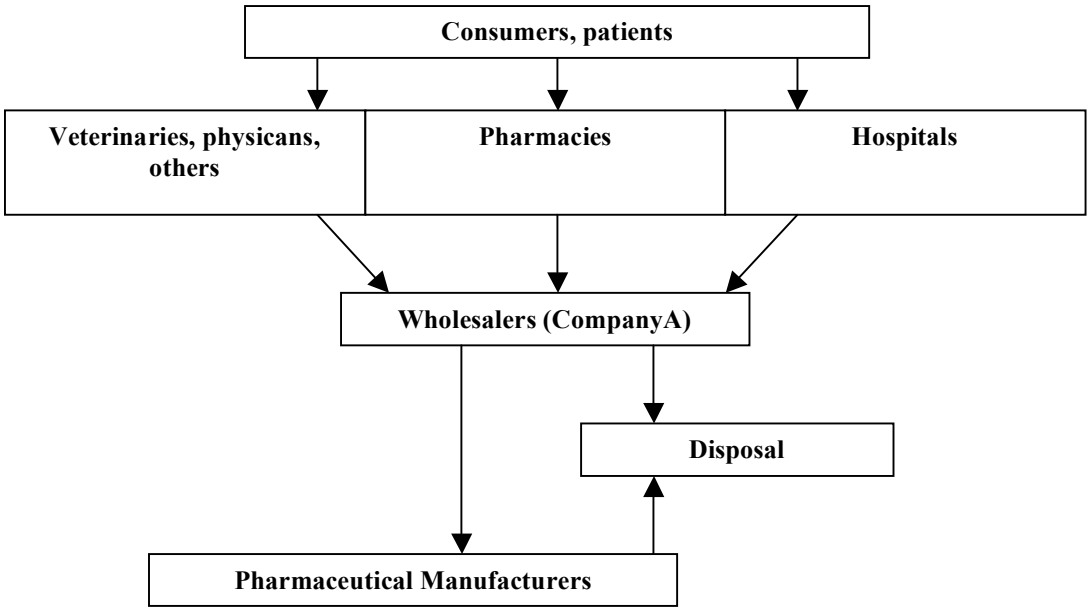

Figure 9 Reverse logistics chain

Figure 9 demonstrates a rough illustration of the reverse flow of pharmaceutical items, where Company A positions itself as a wholesaler. This thesis researches the different processes derived from the reverse flow presented above.

When concerning the statistical evidence on customer returns, which are the main reverse logistics activities framed within the research paradigm. Table 6 presents the return amounts derived from customer returns in 2007 to Company A. The table is divided into current and non-current returns and percent return amounts are calculated in accordance to current and non-current returns individually and also in accordance to the total return rate. Amount column indicates the total number of customer return transactions per return reason. % - Current column and % - Non-current column signify the percentage of specific return reason in both current and non-current returns separately. % - Total column denotes the percentage of return reason transaction in the total amount of returns.

Table 6 Company A return amounts in 2007

Year 2007

Return / Compensation reason

Current customer returns	Amount	% - Current	% - Total
Customer order mistake	20507	25%	14%
Short best before period item	5930	7%	4%
Seller's mistake	4078	5%	3%
Product found before compensation	6191	7%	4%
Other	154	0%	0%
Picking error, wrong amount	35892	43%	25%
Picking error, wrong product	10825	13%	7%
Current total	83577	100%	

Non-current customer returns	Amount	% - Non-current	% - Total
Selling permit cancelled / expired	18452	29%	13%
Out of date product	17949	29%	12%
Return with supplier's / principal's permission	16181	26%	11%
Broken in transport	2300	4%	2%
Other	177	0%	0%
Faulty product	2951	5%	2%
Product reclamation	4822	8%	3%
Non-current total	62832	100%	

TOTAL	**146409**	**100%**

As the Table 6 illustrates the customer order mistake and picking errors are the primary return reasons in current items and selling permit cancelled or expired, out of date product, and returning with the supplier's or principal's permission are the primary non-current return reasons. Even though wrong amount delivered due to picking error is the paramount reason in returning products and together with wrong product delivered due to picking error constitute as the dominant reason for returns, picking errors are framed outside the actual research and less attention is focused on solving picking errors and the focus is on improving the reverse logistics operations. The return processes derived from picking errors are mapped and process constructions are created in order to streamline these processes. Only the solutions concern the reverse logistics opportunities, hence the problem is not attacked at its source in picking, but at the repercussion stage.

The total amount of customer returned items is nearing 150 000 transactions per year, therefore concentrating on improving reverse operations is important also in statistical sense. Naturally the main attention in the research focuses on the largest return reasons, in order to diminish them significantly, or make the process more profitable for Company A. Customer order mistake with 20 507 return transactions is the greatest return reason framed within the research and it indicates a return activity where Company A is taking care of the handling of the returned item. The large number

of customer order mistake returns indicate directly a liberal return policy on Company A's part, because even returns that do not possess a high level of need of returning are being returned and compensations are issued.

As for the other major return reasons selling permit cancelled or expired included 18 452 transactions in 2007, out of date product 17 949, and returning with the supplier's or principal's permission 16 181 return transactions. Selling permit becoming expired or cancelled indicates the selling permit of the supplier. Due to numerous mergers and acquisitions, changing packaging, changing labeling, changing consistency, changing anything that does not comply with the issued permit leads to acquiring a new permit. Therefore, the items in sale conforming to the 'old' permit need to be returned back to the vendor (i.e. wholesaler), because these items cannot be sold to consumers. Out of date products indicate items that are not sold in time and expire while in stock are to be returned due to safety reasons. Returning products with the supplier's/principal's permission signals a principal initiated conduct on how a certain batch should be handled. A certain batch may include a specific error in the packaging or in the product itself, thus the principal requests returning the entire batch. The statistics and this research consider only the returns coming from pharmacies, not products remaining in the wholesalers stock.

5.1.2 Understanding existing processes

The process flows were carefully identified and charted in order to gain understanding of the existing processes and learn what change possibilities are available for efficiency and effectiveness benefits. Altogether nine process diagrams were mapped, which are presented in Appendix 3. From the nine flow diagrams four are picking error processes delivery amounts too small and too great, and wrong product delivered resulting in the customer keeping or returning the item. The others are the sellers mistake initiated returns, customer ordering mistake returns, broken in transport returns, missing shipment compensation and returns, return of short best before period products, expired products, and product error returns.

The Company A's operations manual explains that returned shipments are to be inspected thoroughly and classified as current, non-current, and faulty products. Depending on the classification the returns processing targets are placing current items back to sale, directing non-current items to disposal or forwarded to manufacturer for inspection, and the suspicion of faulty products are handled according to preset guidelines. During the returns handling the right for reclamation, which is eight working days from receiving the order, and compensation is estimated and proper ERP inputs are computed. A current item is an error free and intact product in its original packaging

with a sufficient best before period that can be accepted backing sales or distributed forward. A non-current item indicates a damage in the product or its packaging that cannot be sold. Faulty product return indicates a suspicion by the customer or the consumer about its quality concerning for example packaging markings and the color of the item etc.

The return procedure begins with the customer, who decides to return an item due to a specific reason, except when a supplier or a manufacturer initiates the return. Company A's return procedure guidelines state that a signed standard return form has to be filled in order to receive all the information about the item and its reason for return at one occasion, thus speeding the handling process. The returns are inspected and the information on the return form is computed to the ERP system and according to accepting the return compensations are computed as well. Item numbers, order numbers, best before period, condition, quantity, and return reason are the main components to be noted from the returned item. The right for reclamation and compensation is eight days from receiving the product and additionally manufacturers have regulations concerning certain items, mainly cold storage products. Also customers and manufacturers may agree on a return, which lead to another additional information concerning returns.

In order to gain a full understanding of the existing processes the different process variations are discussed individually. First, an affair where *a picking error has occurred and the amount of goods delivered is too small* and the customer wants compensation (Appendix 3 – 1). A notification of the incident is designated to the Customer Service Department, who check if a compensation is already paid from the particular reclamation, and if not the Customer Service Department will enter the reclamation into the ERP system and informs the Returns Department. The Returns Department prints a list of open reclamations and checks the warehouse balance from the ERP system. Depending whether the warehouse balance error is the same as the reclamation suggests or there is no balance error. In the case of no balance error it indicates that the shipment is missing, which leads to another type of reverse logistics process procedure explained in detail later in this section. On the other hand, if there is an error in the warehouse balance then the Returns Department corrects it and updates the ERP system, which initiates an open action in the ERP system for the Accounting Department to conduct the proper invoicing procedures in order to provide the correct compensation to the customer.

When *too many products are delivered due to picking error* the customer has the choices to keep or return the excess items (Appendix 3 – 2). In the case of keeping the product the presumable default procedure is that the customer informs the Customer Service Department about the error and of retaining the possession of the excessively delivered item(s). The Customer Service creates a credit order in the ERP system and informs the Returns Department about the situation. The Returns Department checks the

warehouse balance and corrects it as in the previous process procedure. The ERP system is updated and an invoice is created according to the crated credit order. If the customer decides to return the excess item(s), then after informing the Customer Service, an information line is created in the ERP system in order to notify the Returns Department about the upcoming physical return. After receiving, inspection and determining the selling condition of the returned item(s), the returns are placed back in the warehouse. In many cases of excess returns no notification is received in the Customer Service and physical returns appear unannounced, in which the Returns Department conducts the process in the above-mentioned manner.

When *wrong product is delivered due to picking error and the customer keeps the item* (Appendix 3 – 3) the process is similar to the procedure of too small delivery amounts (Appendix 3 – 1), except both issues are computed in the ERP system and the Accounting Department invoices the customer on the item it keeps and compensates on the item the customer did not receive. The process is also similar if *the customer returns the wrong product delivered* (Appendix 3 – 4). After the physical return arrives the product(s) are placed in the warehouse and the customer is compensated on the goods they did not receive.

In the case of *customer ordering mistake*, *error in receiving the order*, or *short best before period item* (according to the customer) the process is more straightforward (Appendix 3 – 5). Usually no notification is received from these types of returns, but after physically receiving the goods the items are inspected and the salability of the received items is determined. The reclamation is either accepted or denied by the Returns Department. If denied, the items are returned to the customer, and if the return is viable, the customer is compensated accordingly. Depending on the condition of the goods, they can be repositioned in the warehouse or disposed accordingly.

If *the goods have been damaged in transport* (Appendix 3 – 6) the customer returns the items physically to Company A if the price of the to-be-returned items amounts to above 200€. If not, compensation is issued according to the situation analysis of the Customer Service Department, who inform the Accounting Department. If the amount of returnable items is above 200€, a physical return is demanded by Company A. The 200€ limit is derived from a delivery insurance Company A sells to its customers as an additional service. Without Company A's insurance returns due to delivery errors were not accepted, but from 1.7.2008 onwards the insurance became an integrated part of Company A's delivery service. After receiving the goods, the Returns Department determines whether the return is accepted or not. If not, the goods are returned to the customer. If the products are damaged while transportation and the reclamation is accepted the items are placed in the disposal warehouse balance in the ERP system and the goods are disposed, and compensation is issued.

The picking error processes indicated that if a warehouse balance does not show any divergence in case of missing items, it indicates that an entire shipment is missing, thus the process changes. Appendix 3 – 7 illustrates the conduct in cases of *missing shipments*. Although the process might seem complex, it reacts to situations in which point of the process the shipment is located. First, when the shipment is found immediately, compensation can be issued quickly and computations can be made accordingly. The other choices depend whether the shipment is found before or after compensation. After determining which procedure to conduct the items can be placed in the warehouse both physically and electronically and compensations can be issued.

In the case of *expired products and ended or changed selling permits* (Appendix 3 – 8) the process is fairly straightforward, because first the returns are physically received and inspected. According to the inspection by the Returns Department the reclamation is accepted or denied. In the case of accepting the return, the proper computations are conducted to set the ERP system up to date and the returned items are disposed accordingly.

The *product error* reverse logistics process (Appendix 3 – 9) is the most complex and most regulated one. This is because the medical legislation requires faulty items to be returned and inspected without delay in order to ensure product safety. The National Agency for Medicines governs the immediate handling and processing of faulty products, which means removing the faulty items from sale and informing the situation to the National Agency for Medicines. The process begins with either the customer (pharmacies, hospitals, etc.), or the consumer notices an error and returns the item as a faulty product. The Returns Department informs the Materials Handling, who contact the manufacturer about the error. The manufacturer provides instructions to either forward the item for their own investigation or dispose of the product accordingly. The information is passed back to the Returns Department who are responsible for processing the faulty product.

Finally, the *disposal* process is to be mentioned. Even though the disposal process is framed outside the research scope it is such a fundamental part of reverse logistics operations that it deserves recognition. The disposal in Company A is illustrated in Appendix 4, which explains how the disposal process is composed of concrete logistical activities and IT activities. As the disposable items are processed through the IT system then the actual disposal commences. Customers return disposable items to the regional warehouses from where the items are forwarded to the central warehouse where the items are consolidated. The Returns Department processes the disposable items to the virtual disposal warehouse in the ERP system, which is further processed by the staff member responsible of disposal. A permit has to be received from the manufacturer in order to actually dispose of a certain product. After receiving the permit the product is

sold back to the supplier and depending on their requests the goods are disposed through an outsourced party.

The processes introduced in this section connects with the elements discussed in chapter 3, starting with the underlying reason why the product enters the reverse flow. As the items are processed they move through the chain to be placed back to the active inventory or be disposed accordingly in order to gain the best value possible from the returned products. The next section identifies the changeable elements by analyzing the views of each department and two customers connected with Company A's reverse logistics process.

5.1.3 Identifying change levers

Identifying process change levers indicates the departmental views on the existing reverse logistics operations determining the nuances of the reverse logistics activities. The purpose is to combine the administrative and managerial aspects of reverse logistics with the concrete operational aspect of Company A's returns procedure. The views of each department connected with the returns procedure is discussed to provide a basis for process changes presented in the next section (5.2). The departmental perspectives to the reverse logistics operations are the key to changing and innovating the existing reverse logistics operations.

The amount of personnel engaged in the reverse operations in Company A is 16 people in returns handling, computationally one person takes care of customer relations associated with returns, and one person computationally administers the communications between Company A and the principal organization (a supplier, a manufacturer, or their representative). Computational personnel count indicates approximately one person's workload although several individuals manage the actual work. Transportation personnel is not calculated in the total reverse operations personnel count, because calculating it would be difficult and more importantly the transportation personnel account does not affect the reverse operations because personnel in transportation is required in much more greater numbers in the forward flow anyway.

The Returns Department experiences that in general the handling process requires a lot of individual computations, which in many occasions are exactly the same each time. This means conducting efforts, which could be automized within the ERP system. Receiving information from customers and from suppliers is very scattered into various sources e-mail, company newsletter, memos from Materials Handling, and notifications from Customer Service. Because of the different information sources, finding specific information is very hard to find and it consumes a lot of time.

Although, not all return-related interactions come through the Customer Service Department, it has a vital role in aiding the customers in their questions on all aspects of the delivery operations and even though the returns operations constitute only a part of the overall incoming questions they consume a lot of time in the customer service. When customers contact Customer Service on returns related issues, the questions mainly concern whether compensations have already been paid, due to which reason a certain item is being returned, which supplier enforced return requests are valid, and are certain items suitable for returns. Because information to answer the above-mentioned queries is seldom available, therefore it creates additional work and stress. According to the Customer Service Department return related calls take much longer to handle and displace the Customer Service staff member from his or her position because of information gathering from different sources.

The Director of Customer Relations and Customer Service Manager agree that the problems faced by the Customer Service and Returns Department are relevant and the obstacles consume too much time especially in the Customer Service. Still customers are not satisfied on the time compensations are paid and also determining the faulty party concerning returns creates friction between customers and Company A. According to the Director of Customer Relations, who owns the customer service process and is responsible for its quality, states that the current returns policy is too liberal indicating excessively greater return rates with loose return reasons. The role of customer service should be consultative; therefore the IT services need to be improved in order to diminish excessive human factors from handling returns.

Customers interviewed experience the Company A's return process very simple and well-functioning operation. Although the Internet application for electronically inputting return form was not used in the same extent in the pharmacies interviewed, it was viewed as uncomplicated and its potential was recognized. The customers experience that even though the returns process is straightforward and fast the compensations take too long.

Materials Handling, who are responsible for updating the prices and information of products and who are the department maintaining communications with the suppliers and manufacturers, acknowledge the confusion in receiving most recent information in the Returns Department and in Customer Service. Each supplier and manufacturer provides return-related information through different sources to Material Handling, Customer Service, Returns Department, and directly to customers. This is due to the fact that no precise method of supplying information has been decided, thus it leads to confusion and slows down the handling of returns. The effectiveness and efficiency of IT systems is the key to improving the reverse logistics operations also from Materials Handling perspective.

Although quality of operations and conducting Good Distribution Practice (GDP) and ISO quality standards perhaps sometime act against logistical efficiency and effectiveness they are along with operational excellence the most important factor in pharmaceutical wholesaling. As explained in chapter 3 the wholesaling of medicinal items is highly regulated and governed, the laws and rules have to be covered in every scenario in order to ensure product quality, its effectiveness, and above all customer safety. According to law faulty items, or suspicion of faulty items, and current returns have to be handled and accepted by the wholesaler. This is not the case in non-current returns, which are handled as a service. According to quality, a zero return policy concerning non-current items could prove to be efficient.

The reverse logistics process in Company A from transportation perspective is fairly easy to conduct, because returns are collected as new products are delivered. The amount of returns are small and random, therefore the collection and transportation of returns creates hardly any additional effort. Handling of returns as they are brought to the regional or central warehouse is very scattered and unorganized.

Accounting Department also views the existing returns process to be too liberal, because returning is too easy and too inexpensive for the customer. In order to reduce the reverse flow the customers should be encouraged to keep the excess item, perhaps selling it forward to another pharmacy. The Director of Customer Relations concurs with this ideology to encourage trade between customers to reduce unnecessary returns. When returns are justifiable then the operations should be as simple and as fast as possible in order to issue compensations swiftly to parties entitled to it. Naturally, the IT systems have to support the reverse logistics process in order to improve the operations.

The Sales and Marketing Director responsible of Supplier Relationship Management explains that in many cases returns have been banned by several suppliers, especially items requiring temperature controlled warehousing and transportation are not entitled for return according to any supplier. Reducing the amount of reclamations is the key to more effective reverse logistics policy also from supplier management perspective. In order to manage reverse operations more effectively it requires regulating and tightening the existing operations manuals.

The Logistics Director summarizes that the target in reverse operations should be to diminish the number of returns, simultaneously simplifying the procedure in order to gain effectiveness and efficiency benefits. The IT systems play an important role in achieving the desired process features. A concrete goal in the reverse logistics operations is having zero returns due to Company A's mistakes.

The departmental views on the current state and conduct of the reverse logistics process presented many vital observations that require attention for changing the customer return operations efficiently and gain the desired streamlining and simplification benefits.

5.2 Remodeling new reverse logistics process

The previous section (5.1) presented the reverse logistics process under investigation and introduced the return sub-process diagrams by discussing the existing or current reverse logistics process and how do different departments and customers view the operations. The different parties connected with the reverse logistics process were interviewed, which provided various change elements to be considered in order to modify the existing returns operations. This section presents the constructions derived from process visions developed by the project team responsible for the reverse logistics process. This section is divided into two parts in regards to Davenport's (1993) approach to process innovation steps reviewing the development of process visions and designing and prototyping the new process.

5.2.1 Developing process visions

The discussions with Company A staff members and the two customers indicated three types of change possibilities, which can be categorized into streamlining of the current process through IT solutions, instituting zero returns policy to certain returns, and centralizing operations. Figure 10 illustrates the three categories for process change.

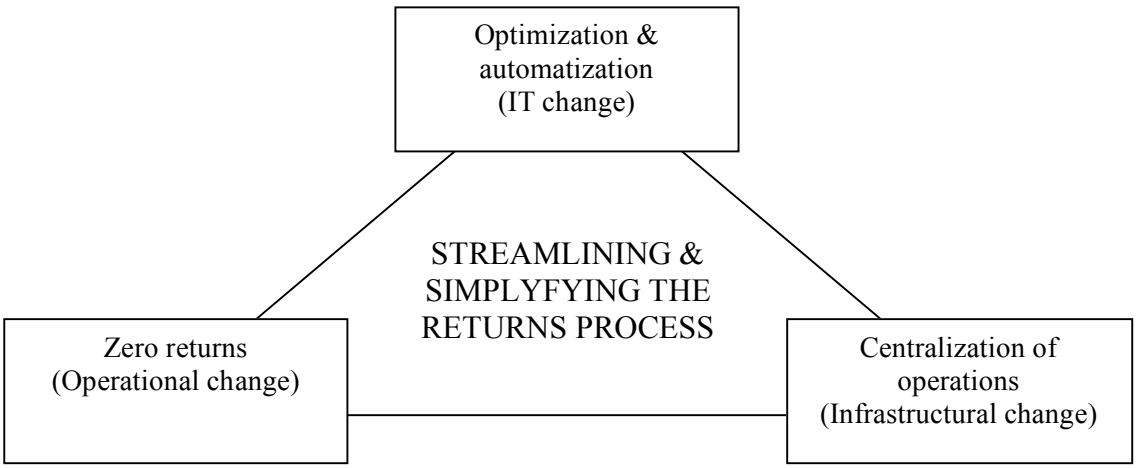

Figure 10 The categories for process change in Company A

The optimization and automatization signals IT based change in the reverse logistics process. As the Returns Department and Customer Service indicated and as it was illustrated in the process flow charts (Appendix 3: 1-9) the returns process requires several ERP computation activities, which consume a lot of time and effort. Improving the IT capabilities is the most concrete process change function for Company A and the

key change objective in the project. The customers already have an Internet based application in use, through which they are able to follow shipments, invoicing, and order small items such as color-coded bags used in returns. Determining the potential of the existing IT applications for acting as a foundation for process change was one of the primary activities Company A listed as a goal in the project plan.

Mapping the IT capabilities relies heavily on practical research elements of collaborating with the IT department in order to brainstorm solution possibilities and creating specifications for the applications. The zero return and operation centralization categories derive from the theoretical literature being an integral part of any reverse logistics process. The zero return policy indicates an operational change from the existing reverse logistics procedure and the variations of zero returns is investigated separately from the constructions presented in this section. However the zero return policy has linkages to the constructions and can be applied to the returns process as an overhead mechanism. The centralization feature also acts as a feature rather than actual construction. Centralizing operations to a certain location or locations can be classified as infrastructural change.

The project development team, introduced in the methodology section 4.2, began formulating process change elements according to the above-mentioned categories of automatization and optimization concerning IT systems, zero return policy, and centralization of operations in order to create the desired streamlining and simplification benefits. These elements are discussed in detail in this section in order to provide a comprehensive outlook on the process modification and improvement capabilities.

Concrete improvement designs concentrate on the IT solutions, because applying zero returns policy or centralizing operations in some level are theoretical as explained above, therefore optimization and automatization receive most attention in the practical setting. The problems identified by the Returns Department and the Customer Service Department concerned unnecessary re-inputting of data and confusion in receiving the information. Because the customers already have access to the Internet based application, which is for communicating information between customers and Company A, the potential of the application is not fully reached. Instead of hand-written return forms the customers could input the return form online and electronically send the information to the Returns Department. By connecting the Internet application with Company A's ERP system, the data inputted by the customer would automatically create a transaction to the ERP system, which the Returns Department staff member could either approve or cancel allowing the compensation after the item is physically received. The data inputted by the customer holds all relevant information concerning the item and its reason for return. The customer will receive information whether a specific item is eligible for return while completing the return notification in the online application. For example, in the case of temperature-controlled items that are not

accepted for return by the manufacturer, the application notifies the customer inputting about the item specification and the return request cannot be completed. When return is permitted and the customer has filled the online return form, a print is made, signed by the customer and enclosed with the physical return. The signature from the customer holds utmost importance due to legal reasons, a qualified pharmacist guarantees the quality and condition of the returnable item as it is with his or her signature. When the Returns Department physically receives the item the transaction already exists in the ERP system and it only needs to be accepted to accept compensation and information does not need to be re-inputted. In the case of current returns this allows speedier re-shelving of products and faster inventory turn, at least for returned items.

By implementing the more efficient use of the Internet application it diminishes the role of Customer Service from return-related issues, which designates less work on returns and more effort can be placed on the main activity of consulting the customers. The process phase concerning Customer Service is eliminated from the process structure, which is applicable to every sub-process function. This reorganizing aims to speed the entire process from the material flow of goods to Company A's facilities from its customers and back in the form of monetary or instrumental compensations. It also results as simpler procedure for all parties involved and therefore conducting the process activities is less expensive.

Rogers and Tibben-Lembke (1998) explained in the section 3.3 that zero return policy indicates preventing goods to enter the reverse logistics flow, but with medicinal products a total ban from returning is impossible due to legal restrictions. Current items eligible for sale and especially goods under suspicion of product failure have to be processed as quickly as possible in order to ensure product safety and quality of health care. Non-current items, however, do not require speedy handling because the destination for these items is in the disposal process. To summarize, a full-scale zero return policy cannot be applied in pharmaceutical logistics in Finland, but certain product groups are qualified for zero return policy. According to Quality / GDP non-current items hold no legal responsibility for returns; Company A offers return of non-current items and their disposal as a service, which is in fact a lucrative service with slightly over 800 000€ turnover annually with the current service pricing. Table 7 exhibits the rough financial calculations of income and expenses estimated by the project development team for investigating the profitability of the reverse logistics operations. The personnel estimations are calculated with 18 people, because two more administrative staff members were included in the estimations. This was to ensure a more realistic calculation on personnel expense with taking a slight regard to the transportation staff concerned by returns.

Table 7 Financial estimates of current and non-current return operations in 2008[4]

Expense reasons	Annual estimate	Monthly expense per person	Amount of personnel
Return & disposal of non-current products			
Disposal marginal	200 000€		
Service charge	410 000€		
Sending of product reclamations	36 000€		
Disposal expense	-170 000€		
Disposal profit	420 000€		
Personnel expense Paygroup 1	-239 400€	2 850€	7
Personnel expense Paygroup 2	-93 600€	3 900€	2
New item, no return	240 000€		
	803 000€		
Current returns (customer ordering mistakes & picking errors, 81% of transactions)			
Personnel expense Paygroup 1	-273 600€	2 850€	8
Personnel expense Paygroup 2	-46 800€	3 900€	1
	-320 400€		
TOTAL	**482 600€**		

Another major item group entitled for applying the zero return policy is temperature-controlled items. Products that require cold storage warehousing facilities and transport could be prevented from returning. Most of the suppliers and manufacturers have already issued this policy, but a unified policy would end the debate. The problem is that Company A has tracking capabilities ensuring a proper delivery of temperature-controlled item all the way to the customer's facility, but after that there is no certain way of proving proper handling and storage of these items.

In the section 3.3 the central system of reverse logistics operations and centralization concept were discussed and it was indicated that operating through central return processing center generates efficiency in the reverse flow and creates cost savings through large return volumes. In Company A's case the facility network is newly modified to provide efficiency and effectiveness in the forward distribution operations, therefore radical infrastructural changes concentrating on reverse activities are not sufficient. As in zero returns, the focus is drawn towards certain elements that benefit from centralized operations. These activities are emphasizing the role of the Returns Department in handling and processing returned items and the disposal process. As explained above in the optimization and automatization section, the goal is to diminish

[4] The financial calculations are based on 2007 / 2008 accounting period. Proceeds forcasted using figures of February and March 2008.

the role of Customer Service in returns handling and through IT solutions move the responsibilities to the Returns Department. This is also a form of centralization, where concretely operations of one department are moved under the responsibility of another. The disposal operations, as briefly explained in the section 5.1.2, are conducted at the central warehouse. However, some disposal activities occur in the other locations of Company A as well and also by customers themselves. Because the handling of non-current items including their disposal is a lucrative service, maximizing it through centralizing all disposal operations to the central warehouse's disposal division, hence increasing the incoming flow of non-current items leads to greater profits from return operations.

The optimal changes to the reverse logistics operations in order to simplify and streamline the activities were categorized to optimization and automatization initiated change, zero return initiated operational change, and centralization of operations indicating infrastructural change. The three are interlinked, although the change considering automatization and optimization through IT solutions is derived from practical setting and zero return and centralization increasingly derive from theory. The next section presents the new process constructions and discusses the improvement categories in relation with the process constructions.

5.2.2 Designing and prototyping the new process

The last step in Davenport's (1993) approach to process innovation is the design phase of the new process. The process constructions are presented in this section, which follow the visions of the project development team discussed in the previous section (5.2.1) forming around three distinctive categories of optimization and automatization through IT triggered change, operational change by applying zero return policy, and infrastructural change of centralizing operations. The process construction flowcharts are illustrated in the Appendix 5, where some elements are combined into one flowchart compared to the ones presented in Appendix 3, but all the sub-processes of the reverse logistics operations are found in the new process diagrams. First, picking errors are viewed starting with when the amount of delivered goods is too small, when the amount of delivery is too big, and when a wrong item is delivered. Secondly, mistake in either end, or a short best before period item causes the return. Thirdly, broken during transport return; then, when a shipment goes missing; and when expired selling permit or an expired product causes the return. Finally, product error process is reviewed.

Already the first process flowchart of *the amount of delivered goods is too small* (Appendix 5 – 1) indicates that the Customer Service Department is omitted from the process and more responsibility is shifted to the customer in the form of the Internet

application, which in this case operates as a communication tool and the Returns Department only needs to check the warehouse balance to confirm the error in picking or in delivery. When the Returns Department accepts the reclamation the ERP system communicates the information to the Accounting Department, which compensates the customer accordingly.

Appendix 5 – 2 illustrates the process when *too many products are delivered due to picking error and the customer has the choices of keeping or returning the excess item*. If the customer decides to keep the product the process is similar to the one of too little amount of goods as explained above. In this scenario the customer informs Company A through the Internet application, which is checked and instead of compensation an invoice is created and sent to the customer. When the customer wants to return the excess item he or she creates a return form online and attaches the printout with the return shipment. When the returned goods arrive they can easily be identified to a certain return notification with a special return number generated when the customer filled the return form. When the returned item checked to be in the condition as the customer claims being a current item, it can be placed back to active inventory and the return can be accepted in the ERP system. No longer different balance corrections and delivery compensation have to be computed into the system, because that portion of the process is automized and occurs immediately after the return is accepted. The return process is exactly the same in the case when *wrong products are delivered due to picking error and the customer can either keep or return the items* (Appendix 5 – 3). The customer chooses the correct return reason from the Internet application while inputting the return form, thus an exact transaction is generated to Company A's ERP system, from where it can be processed appropriately.

Similar procedure exists with *customer order mistake returns*, *order receiving mistake returns* (i.e. Company A's mistake), and with *short best before period* item returns than in the picking error return processes presented above (Appendix 5 – 4). The simplicity originates from the customer-inputted data using the Internet application for returns; therefore all return processes follow the same formula. Accepting the return leads to compensation and re-shelving the product, because these returns are always classified as currents returns as long as no damage occurs during transport.

The customer returns due to *damage during transportation* follows the actions of the previous processes in terms of simplicity and process phases (Appendix 5 – 5). Because broken in transport indicates a non-current item that cannot be sold as is and will most likely lead to disposal a criteria for physical returns of total price of returns being less or over 200€, which is used in the existing process also. The customer receives the information on the total price and the request for physical return while inputting the online return form. Whether the amount is less than the mentioned amount the customer assumes responsibility of disposing the item personally, and whether the amount

exceeds 200€ the return will be conducted as in the previous phases. When inspecting the returned item the Returns Department staff member either accepts the return, which leads to compensation and disposal of the item, or rejects the return as unjustified and returns the item back to the customer.

In the case of *missing shipments* the procedure is somewhat similar with the existing process (Appendix 5 – 6), because missing shipments are special occurrences and require careful adaptation to the situation. Again, the customer notifies Company A through the Internet application, thus eliminating the involvement of Customer Service in the process. Naturally, this option is viable for customers and explaining the situation through Customer Service is possible. The main objective in the new constructed process is to connect the customer and the Returns Department more efficiently and create efficiency in the beginning of the process.

When the *selling permit of a principal organization has changed or ended* it requires pulling all the items from sales, the process for returning these items is similar with out of date products (Appendix 5 – 7). When selling permit has expired or when the product itself becomes expired it signifies disposal of the returned items. The information from the suppliers, manufacturers and their representatives to reach the operational personnel at the Returns Department becomes vital for speedy execution. Otherwise, the process is comparable to the previous return processes. The returned product is connected with the online reclamation and either accepted or denied. When denied, the item is returned to the customer, and when accepted the item is placed in the disposal process and compensation is issued either in with monetary or material reimbursement.

The new constructed process of faulty product suspicion return is almost the same as the existing *faulty product* process (Appendix 5 – 8). As explained earlier in this thesis, the when a product is suspected of being faulty it includes heavy governing and protocol; therefore only minimal changes were applied to the process. As above, the customer can use the online application to make the notification and send the product to Company A's Returns Department. From there the process progresses as currently, with the improvements in automization when processing the product in the Returns Department. The main question concerning faulty items is however the communication of information to the parties who require it. An idea of a unified database of directions, instructions and orders was formed among the project development team, although building such a database requires additional planning and resources and it requires constant updating, which constrains human resources. The database would also benefit in other return instances, such as supplier-initiated drawbacks. A unified and constantly updated database available for Customer Service, the Returns Department, and to the customers enable faster communication of data concerning specific return issues leading to more efficient operations.

The new process constructions for reverse logistics operations concerning customer returns of pharmaceutical products were crafted to meet the required simplification and streamlining benefits desired by the management in Company A. The next section discusses the reflections from the project supervision group concerning the realistic realization of the process constructions.

5.3 Implications on process change

The implications on the presented process constructions concentrate on the feedback received from the group discussion with the project development group. The final presentation and group discussion involved the project manager and the researcher presenting the findings and constructions to the supervision group consisting of the Logistics Director, the Sales and Marketing Director and the Director of Customer Relations. Their feedback determines the realistic realization of the constructions and directs the course of the implementation of certain process features.

As explained, the essential purpose for developing the reverse logistics process for Company A was to delineate the existing customer return processes and elucidate the incomes and expenses derived from the operations. Additionally design the process improvements to support a simple streamlined returns handling. The presumption among the operative directors (the Director of Customer Relations, the Sales and Marketing Director, and the Logistics Director) at the first phase of data collection was that the return operations resulted in deficit in turnover due to the vast consumption of resources. The Director of Customer Relations explained that the reverse operations should be a supportive process for the forward logistics, where the number of intermediaries within and outside Company A should be minimized in order to gain efficiency and effectiveness. The reclamation period of eight working days has been conceived as free return period within eight working days and the same misconception is prevailing in Company A as well; hence the procedure has never been questioned and it has resulted in a very liberal return policy, easily abused by customers. The Sales and Marketing Director noted that it must be questioned thoroughly in which circumstances customers have the right to return. A more strict uphold of the contractual guidelines is required. The Logistics Director stated that in return operations the quality of action is pivotal. When a return is justified, the process has to be as fast and as simple as possible. IT holds a great importance in achieving effective and efficient reverse logistics operations.

When presenting the statistics, more specifically the income statement on the return activities, the profitability of the reverse operations came apparent to the project supervision group. The reverse operations were believed to cost money, not bring in

any; therefore the results were unexpected, yet positive. The Sales and Marketing Director noted that: *"the turnover is equivalent to a substantial principal contract"*, which can be translated as successful operation. The prices for return services for principal organizations, to which the statistics are based on, are issued in the beginning of 2008; therefore it is too early to say how suppliers and manufacturers will react. The service pricing was increased in order to alter the behavior of customers and the principal organizations, which would result in lower return rates. With the current service pricing the operations are very profitable, especially in non-current return handling, now that the rate of returns has remained constant.

The processing of short best before period items remains as a difficult topic. The reason is obvious, the customer says that the item has its best before period too close to ending and when returned the principal states that the item is sufficient for selling, thus the item is returned to the customer. Items have different best before periods and they have different supply cycles. In some instances the returned item batch happens to be the only one available and it has to stay in sales to ensure patient safety, thus the customer will receive the same best before item regardless of the prior return. Customers have individually set limits for the best before periods in order to ensure sales. Suppliers and manufacturers on the other hand have different stance on the product expiration period. The newer batch will not be released from the stock until the previous batch has met its sales quota, and perhaps the batch might be the only one available. Company A and any pharmaceutical wholesaler is in difficult situation due to this reason, which results as a forward-reverse distribution loop where items are returned and forwarded back and forth between customers and the wholesaler. The directors agreed that the situation is difficult and it requires negotiations openly between principals and customers. Statistically the short best before period returns constitute as 4% of total return, which does not make it as a priority case, but it not to be ignored either.

The returns due to customer ordering mistake amount to 14% of total return, which is the second largest return reason after picking error returns. The wish is to, as the Sales and Marketing Director said: *"categorically remove"* the possibility of returns under this reason. However, the problem two-sided. If Company A rejects customer order mistake returns, the customers may start charging Company A for picking error deliveries. When the amount of picking error -initiated returns is lowered to a level that is significantly lower than the amount of customer mistake returns, then the categorical removal can take place.

While explaining the function of IT capabilities in changing the return processes the investments needed and the practicality of creating the applications received attention; mainly, the amount of resources required for completing the presented applications. The view of the IT department was to utilize the potential of the existing Internet application

and not create a totally new feature, although extensive altering of the existing application would not be sufficient due to upcoming system updates. Because the Internet application already holds the return form and necessary information for completing returns, the solution is to create interactivity to the return form and improving the connectivity with the ERP system. In practical terms the development can be accomplished within budget and other resources assigned to it.

As for the construction itself, the IT based solution creates effectiveness and efficiency through centralizing operations to the Returns Department and the application provides speedier processing through the process. The Logistics Director states: *"... in situations when the customer is justified for returning then we should make it effortless for the customer, but make it effortless for us also."* This is exactly what the developed constructions aim to accomplish.

When inquired on the realistic realization of the constructions, a unanimous verdict among the directors was that the IT based automatization and process structuring were the primary construction elements capable of practical utilization. The Logistics Director stated: *"Instead of communicating information on paper… the (information) is created there (at its source) at one go, so that it is available for all parties… And when it is… effortless, simple, easy, user friendly, [then surely] customers will use it…"* The Sales and Marketing Director also pointed out that firstly, tightening the return permits will improve the reverse logistics process, and secondly, work must be done towards diminishing the volume of picking error returns in order to deny returns derived from customer mistakes.

When the reasons for selecting these particular features were questioned, the Director of Customer Relations said: *"By developing the entire process can the operations be enhanced and reduce manual labor by improving IT support."* And continued: *"At the customer's end the amount of work will not essentially increase but the accuracy of information will improve and make the [reverse] chain more efficient in later stages."* The Logistics Director agreed that the workload for customers will not significantly increase and explained: *"Manual work is diminished and the process becomes more efficient, throughput time can be measured and returns are under the system surveillance throughout the chain."* The Director of Customer Relations called for measuring the return process already in the first phase of data collection, which can be accomplished through adopting the process constructions presented, because the IT solutions provide a measuring tool for the reverse operations.

What comes to learning from the project the overall view was that the project successfully mapped the existing process and explained the various work stages and the incomes and expenses resulting from the operations. The objectives the project was set out for were met and practical solutions were presented. The following section (5.4) synthesizes the process innovation effort in Company A's reverse logistics process in

customer returns by analyzing the overview of the research through the research question and its sub questions.

5.4 Synthesis of streamlining Company A's reverse logistics process in customer returns

The research for the reverse logistics process innovation through remodeling of customer returns process for a pharmaceutical wholesaler has pursued answering the research question: *how can a pharmaceutical wholesaler change its reverse logistics process in order to gain process streamlining and simplification benefits?* As explained in the introduction chapter, the research findings can be categorized and analyzed through the research sub questions derived from the main research question. In this section the research sub questions are discussed individually in order to clarify the classification of research findings and provide a more thorough analysis by connecting the different phases of the thesis to the research sub questions.

Why a new construct for reverse logistics process is required by Company A in pharmaceutical wholesale sector? The first sub question discusses the underlying reasons why the project for finding the improvement capabilities was initiated. The first notion of requirement comes from Company A's desire to change and improve by simplifying and streamlining the return operations, which were introduced in the introduction section and referred throughout the thesis as the central motivation for Company A to embark on the project. Company A had not paid any particular attention to the reverse logistics operations prior to this project and the process was regarded as a cost drain. The customer return procedure in particular is complex and requires a lot of personnel to handle all the returns effectively, and additionally the Customer Service Department needs to devote time to seeking information they do not possess and answer questions on returns and compensations that they do not have answers to. This slows down the entire process, which accumulates the work in the Returns Department. The entire reverse logistics process is too liberal, indicating that returning products is too easy and too inexpensive for customers, thus the system can easily be abused. The introduction and the section 5.1.1 explained the principal reasons for instigating process change by identifying the process for innovation.

What are the problem sections in the current reverse logistics process in Company A? The statistical information shows that the total number of return activities is over 146 000 transactions annually and the transactions focus on a few key areas being: the returns instigated due to picking errors and returns due to customer ordering mistake for current items, and returns due to cancellation or expiration of selling permit, returns due to expired item and returns initiated by the principal organization in non-current items.

The overall amount of returns indicates the liberal nature of the returns process in Company A. One of the reasons for this is the falsely established custom of free return period of eight working days, which actually determines a right for reclamation within eight workdays. As for the problem sections in the operational context the mere handling of returned items constitute of several separate computations in the Returns Department for a single item return. The non-availability of correct information in the Returns Department and in Customer Service hinders the efficiency of the process, which results in customers complaining about the slowness of receiving compensations. Other problem factors include returns of temperature-controlled items even if the returns are prohibited by the manufacturer, and the unorganized consolidation of returned goods at Company A's facilities. The existing process and its disadvantages were examined in the sections 5.1.2 and 5.1.3, where the current process nuances were identified and the change levers identified.

What are the radical and incremental change possibilities available for streamlining the reverse logistics process in the pharmaceutical wholesale sector? Section 5.2 introduced the classification of change functions identified as automatization and optimization of operations through IT initiated change, operational change by instituting zero return policy on certain process elements, and infrastructural change through centralizing operations. The automatization and optimization concentrated on improving the interactivity between the customer and Company A by developing an interface, which allows customers to input the return information electronically and transmits the information directly to the Returns Department. The application also informs the customer if the items is eligible for return and it holds information on prevailing supplier initiated return requests. The handling process concerning the ERP system computations would be optimized to increase the handling speed of the returned items. According to the Finnish law on medicinal distribution a zero return policy cannot entirely be instituted, because current items suitable for sales and items under suspicion of being defective have to be returned and inspected thoroughly. As for infrastructural change certain elements of the reverse logistics process can be excluded from the process, thus simplifying the operations. For example, the role of Customer Service concerning returns is an additional step and activities could be fused with the Returns Department in Company A. Section 5.2.1 discussed the change possibilities in detail by explaining the development of process visions.

How the constructed process is realistically realized in order to simplify and streamline the reverse logistics operations? Section 5.2.2 presents the process constructions, which demonstrate the practical solutions for conducting the reverse logistics operations. The specs were prepared for creating the online return feature, which enable the customer to create the reclamation form through an Internet application. The electronically inputted data will create a transaction to the ERP system

and when the product physically arrives to the Returns Department the item only has to be connected with the reclamation. The ERP system programming to automize and thus decrease the amount of computations was also prepared by the development team. The IT change is connected with the centralization of operations through diminishing the role of Customer Service Department in returns handling. By creating a tool for streamlined returns procedure where the customer is responsible for inputting the reclamation form and sending it to the Returns Department, the Customer Service Department can be bypassed in the return process, hence centralizing the operations.

By exploring the realistic realization of the construction the nuances for desired streamlined and simplified reverse logistics process were highlighted. The project supervision group consisting of the Logistics Director, Sales and Marketing Director and the Director of Customer Relations determined the specific features from the constructions that possess potential for further development. The directors agreed that the IT changes presented and the centralizing the operations to the Returns Department are the changes that streamline and simplify the reverse logistics operations. Also possibly applying the zero return policy on customer order mistakes received endorsement. The constructions enable reduced manual work and greater accuracy in the reverse logistics operations in Company A.

How can a pharmaceutical wholesaler change its reverse logistics process in order to gain process streamlining and simplification benefits? Through the sub research questions reasons for process change, the main obstacles in the existing process, the process change possibilities, and the actual changes were discussed. Practical process change procedures including process innovation and BPR were identified in the theory section of the thesis along with other approaches to process reengineering. This particular research used process innovation as an approach to remodeling Company A's reverse logistics process. The operational directors supervising the project approved many of the constructed change elements, and the IT change and centralizing operations the Returns Department were selected for development project.

The next chapter (chapter 6) provides the final thoughts about the process innovation in pharmaceutical logistics wholesale sector. The conclusions examine the innovativeness of the created constructions, explore the applicability of the solutions to other organizations, scrutinize the theoretical contribution of the research and provide suggestions for future research.

6 CONCLUSION

The concluding remarks of this research focus on determining the following features: the innovativeness of the created constructions, the applicability of the research findings to other organizations or business areas, and the contribution of the research and its findings to theory. Also the future research possibilities are discussed. The innovation attributes, introduced by Rogers (1983) are used to establish the innovativeness of the created constructions. The applicability of the constructions discusses the learning, which the target organization and the researcher have gone through in this research, and the transferability of the solutions to other businesses. The theoretical contribution of the research to existing theory is analyzed by exploring the findings and the constructions presented in this thesis. Finally, the implications on future research are determined.

6.1 Innovativeness of the constructions

This section examines the innovativeness of the constructions through the innovation attributes by Rogers (1983) explicitly discussed in the section 2.2.2. The innovativeness of the process change indicates identifying the relative advantage, compatibility, complexity, trialability, and observability characteristics of the process constructions. The constructions obtain relative advantage from the existing situation, because the implementation of the solutions does not require heavy investments, or the procedure need additional resources. The constructions were shown to decrease the manual labor in the Returns Department and significantly decrease the role of Customer Service Department concerning reverse logistics operations, thus relieving discomfort. The constructed process results as faster, more optimal and cheaper than the existing procedure; therefore the constructions possess an advantage against the current returns operations.

The constructions are also compatible with the existing values and past experiences, because the solutions are formed according to the desires of managerial level and operational level personnel. Due to this needs of adopters in Company A become fulfilled, and the customers who use the created application benefit from faster processing and faster compensations. The constructed processes also are less complex to operate than the existing ones and the implementation is easy, hence the innovation adoption is increased.

The practical experimentation and the ease of obtaining information from the innovation and communicating it to others can be accomplished only after the constructions have been implemented. The trialability in this research was examined

through pondering the realistic realization of the constructions. The same implies to the observability, or the visbility of the innovation. For example, when customers are presented with the opportunity to use the constructed IT application, the ease of operations becomes apparent.

The presented process change according to BPR theory might not be radical enough, but the innovation attributes indicate innovativeness of the constructions and as the research findings indicate the new processes provide added value to the innovator, therefore the constructions can be considered as process innovations.

6.2 Applicability of the constructions

The applicability of the constructed solutions comprises of the learning the researcher and the target organization and examines the transferability of the constructions to other organizations. More specifically, the Company A's learning concentrates on the profitability of the operations and the means to improve the processes, thus gaining efficiency benefits. The researcher's learning takes the entire research into consideration, from reviewing the theory to creating the constructions in practice. The applicability of the research recognizes different business areas to which the constructions and findings can be applied.

The section 5.3 explained that Company A learned the nuances of the existing returns procedure covering the operations conducted during the reverse logistics process and the income and expenses were conceptualized. The profitability of the reverse operations was not expected by the target organization; especially the encouraging turnover from processing the non-current items, which were regarded as an excessive and expensive service provided for the customers and the suppliers. Because the IT initiated process changes and centralization of operations to the Returns Department in Company A were seen as factors that could be actually implemented, the new processes would provide more effective operations. If the volume of non-current return declines the streamlined reverse logistics process would gain cost efficiency and retain the profitability of the reverse operations. However, the new process construction is simple for the customers to access, thus it might encourage increasing the volume of returns.

The learning experienced by the researcher is perhaps more expansive due to the multifaceted nature of the study. The exploration of the academic literature incorporating aspects of process view on business, BPR, innovation, and especially process innovation explained the essence of process change in theoretical context. Reverse logistics theory described the nuances of reverse flow of goods and aided in conceptualizing the actual process change operation. Finally, the research itself,

including the gathering and analyzing data and creating practical construction to solve a specific problem, affected the researcher's learning greatly.

Although the process constructions are tied to the specific target organization (Company A) and aiming to apply them to another organization directly might not be successful, the overall concept of reverse logistics process innovation constructs can be applied to any organization willing to change their reverse logistics process indicating transferability. The pharmaceutical distribution is heavily governed are of business (Lääkelaki – The Medicines Act and Decree 10.4.1987/395) administering control in every stage of pharmaceutical supply chain. The Finnish Medicines Act and Decree is in conjunction with the European Commission Directive 2001/83/EC 84, which indicates that even though the process innovation in pharmaceutical customer returns concentrated in the Finnish market, the research and its results can be applied in the EU and in other regions following strict guidelines on pharmaceutical distribution. As explained, pharmaceutical goods require exact external conditions to ensure the safety and quality of the items. Similar restrictions are implemented in food and other perishable distributions and in selected chemical transportation and warehousing. Hence, the process constructions can be modified to apply in the above-mentioned industries as well.

6.3 Theoretical contribution and implications on future research

This research included elements of process innovation theory, reverse logistics process change and constructive research approach to solve a specific practical problem. Process innovation as a concept is not widely covered in scientific literature, especially when the elements of innovation and its adoption were integrated with the process change function. Due to the theoretical integration this research provides a more comprehensive outlook on process innovations as an established concept diverting it away from associating as a synonym to BPR.

Reverse logistics and process reengineering have not been covered extensively either, therefore combining the two theoretical concepts into a practical study contributes to the theoretical knowledge as well. This study provides a practical approach to changing reverse logistics processes, specializing in pharmaceutical product returns. The established constructions contribute not only to the pharmaceutical logistics, but also to the established reverse logistics literature by explaining the path to changing and improving reverse logistics operations. Finally, the constructive research approach has not received wide recognition, but this research is evidence of the capabilities of constructive research as an efficient approach to practical empirical studies.

Lastly, the implications for future research are explored. Beyond the scope of this research, the disposal process presents a fine research subject. Reengineering the disposal process for Company A radically or incrementally would create an interesting empirical study. Also as a continuation for this research, investigating the implementation process of the specified new constructions and their practical usage, for example measuring the time span for conducting the reverse logistics activities. Transferring the research to other business areas, such as food and other perishable distribution sectors, are included in the future research potential. More knowledge on process innovation and its practical utilization is needed as well, especially to separate the concept from BPR and other radical or incremental process change elements. The constructive research approach needs to be used in empirical studies more to gain ground as an established research methodology.

7 SUMMARY

This thesis researches reverse logistics process innovation in the Finnish pharmaceutical wholesale sector, which specifies as an innovative reverse logistics process change. The study utilizes a constructive research approach, its main purpose being creating a problem-solving construction for particular obstacles. In this case, the construction indicates reengineering processes. The case company (Company A) is a Finnish pharmaceutical wholesaler aiming to change its customer return operations by streamlining and simplifying the activities.

In order to study the innovative reverse logistics process change a research question was formed to provide an answer to creating innovative process constructions for customer returns of pharmaceutical goods. The research question: '*How can a pharmaceutical wholesaler change its reverse logistics process in order to gain process streamlining and simplification benefits?'* is divided into four sub questions presented below.

First, *why a new construct for reverse logistics process is required by Company A in pharmaceutical wholesale sector?* The view of reverse logistics operations in Company A prior to the research was that the operations are a cost drain and because the existing processes has not been mapped the development and improvement of the reverse operations is not possible. Secondly, *what are the problem sections in the current reverse logistics process in Company A?* The existing return policy is very liberal and allows great return amounts to enter Company A's reverse chain. This indicates that due to the significant return volumes the entire process is slow, thus a proper emphasis is required in conducting the operations. Thirdly, *what are the radical and incremental change possibilities available for streamlining the reverse logistics process in the pharmaceutical wholesale sector?* Three approaches to process change were identified through interviewing departments and customers connected with the existing reverse logistics process and by applying theoretical knowledge in the practical setting. The three approaches are automatization and optimization through IT changes, operational change by applying zero return policy, and infrastructural change through centralizing operations. Fourthly, *how the constructed process is realistically realized in order to simplify and streamline the reverse logistics operations?* The created process constructions were presented to the directors composing the project supervision group. The automatization and optimization of operations through developing IT applications and centralizing the handling operations to the Returns Department were seen as factors to be realistically realized in order to gain the desired simplicity and streamlining benefits.

The thesis is composed of theoretical input on processes, their change and reverse logistics operations, research design, and the analysis of the research itself. Chapter 1,

the introduction, establishes the study framework by providing an insight to the reverse logistics process innovation, explains the fundamentals of the research approach used in the study, and presents the main research question and the research sub questions.

Chapters 2 and 3 extensively explore the theory on process innovations and reverse logistics respectively. Chapter 2 explores process innovation theory by tackling the process view on business, business process reengineering theory, and elements of innovation and its adoption in order to produce a thorough concept on process innovation. Chapter 3 approaches the reverse logistics theory. The foundational elements of the reverse logistics operations and its management are examined; also the insights on the Finnish pharmaceutical legislation concerning deliveries of medicinal items are introduced.

The outlay of the research, including the information about the constructive research approach, data collection and analysis, and the trustworthiness of the research, is discussed in detail in chapter 4. The study uses a constructive research approach, which aims to solve the research problem by creating a specified construction. The data collection in this research was conducted by qualitative methods. First, departments in Company A and two customers were interviewed to gain information on the existing process. Secondly, a group discussion was held for the project supervision group. The developed process constructions were presented and the realistic realization of the new processes were determined. Credibility, transferability, dependability and confirmability establish the trustworthiness of this research, which were established in the section 4.4, indicate that this research is trustworthy.

Chapter 5 introduces the practical portion of the constructive research. The identification of the specific processes for innovation, understanding the existing processes, identifying the change levers, developing process visions, and designing and prototyping the new processes are presented. The realistic realization and the successfulness of the constructions are also presented in chapter 5. The conclusion chapter draws the research finding under the main research question and the research sub questions, and the innovativeness of the constructions and the scope of applicability and theoretical contribution is discussed also.

The constructive research on reverse logistics process innovation provided new valuable information to the case company (Company A) by mapping the existing customer returns process and redesigning new process flowcharts. The constructions were created by approaching the obstacles from three angles: IT initiated change indicating automatization and optimization of activities, operational change through applying zero return policy, and infrastructural change by centralizing operations. The elements in the created constructions derived from the theoretical knowledge presented in chapter 2 and 3, from interviewing the people involved in the reverse operations, and from working as a team member responsible of constructing the new processes. The

constructions bestowed added value to the innovator by presenting sound statistical information on the existing operations and created new streamlined and simplified process flow models for improving the customer return operations in Company A.

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APPENDICES

Appendix 1: Process analysis questions

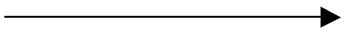
1. What is your job description in relation with the reverse logistics process? / Mikä on toimenkuvasi suhteessa palautuslogistiseen prosessiin?
2. Why is the process handled the way it is in accordance with your job description? / Miksi prosessi toteutetaan nykyisellä tavallaan suhteutettuna työnkuvaasi?
3. How could the process be changed in order to simplify and streamline the procedure? / Miten prosessia voisi mielestäsi yksinkertaistaa ja virtaviivaistaa?

Appendix 2: Questions concerning the realistic realization of the constructions

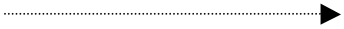
1. Which processes, or their components do you find realistically realizable? / Mitkä prosessit, tai niiden osa-alueet ovat mielestänne realistisesti toteutettavissa?
2. Why exactly these processes? / Miksi juuri nämä prosessit?
3. What has Company A learned from this project? / Mitä Yhtiö A on mielestänne oppinut tästä projektista?

Appendix 3: The current reverse flow diagrams

The flow of goods and information is represented with an arrow

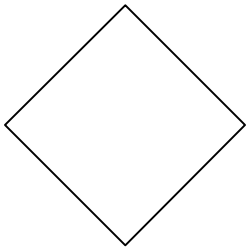


The flow of compensation (i.e. money) is represented with a dashed arrow



The operational and action steps are located in the text boxes

Decision steps are represented with tilted rectangular text boxes



Additional information are placed along the flow chart as plain text or inside a dashed text box. The location of the additional information is situated next to the relevant operation.

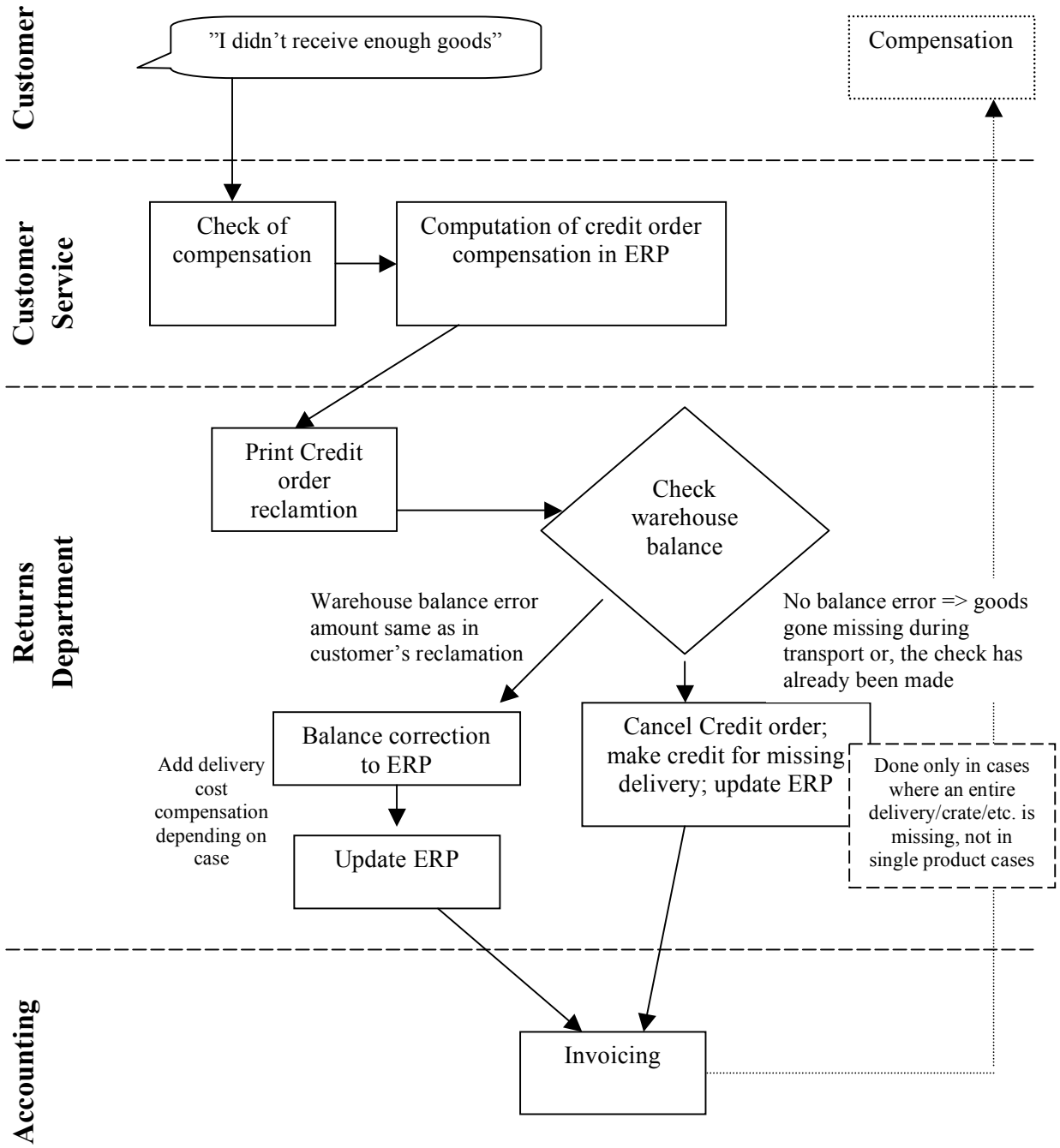
Long dashed horizontal lines represent the divide between organizations and/or organizational divisions.

The process flowcharts presented in this thesis are loosely based on the Unified Modeling Language (UML) concepts on process illustration. For more information on UML see, for example:

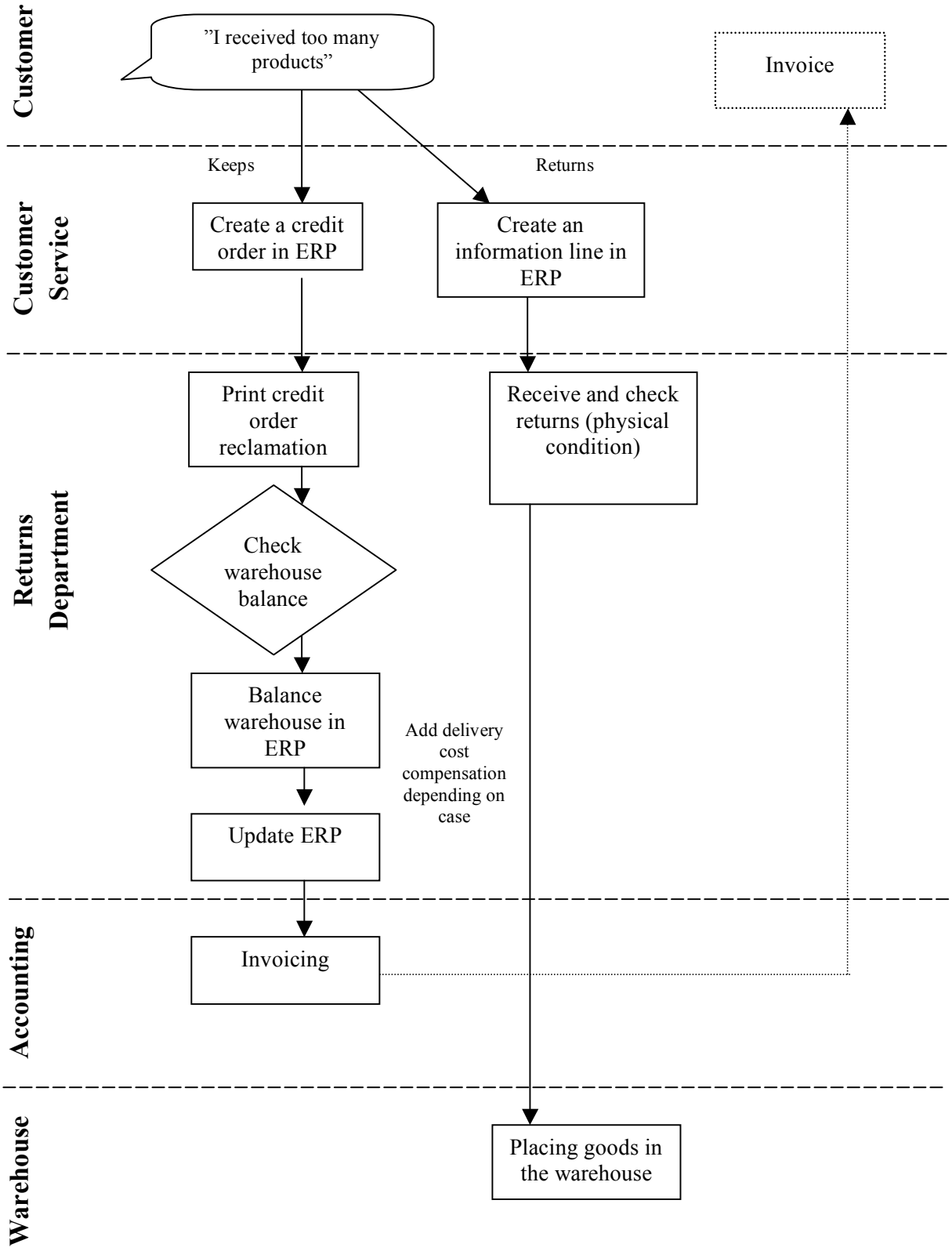
Rumbaugh, James - Jacobson, Ivar - Booch, Grady (1999) The unified modeling language reference manual. Addison Wesley Longman Inc: Reading, MA.

Siau, Keng - Halpin, Terry (2001) Unified modeling language: Systems analysis, design and development issues. Idea Group Publishing: Hershey, PA.

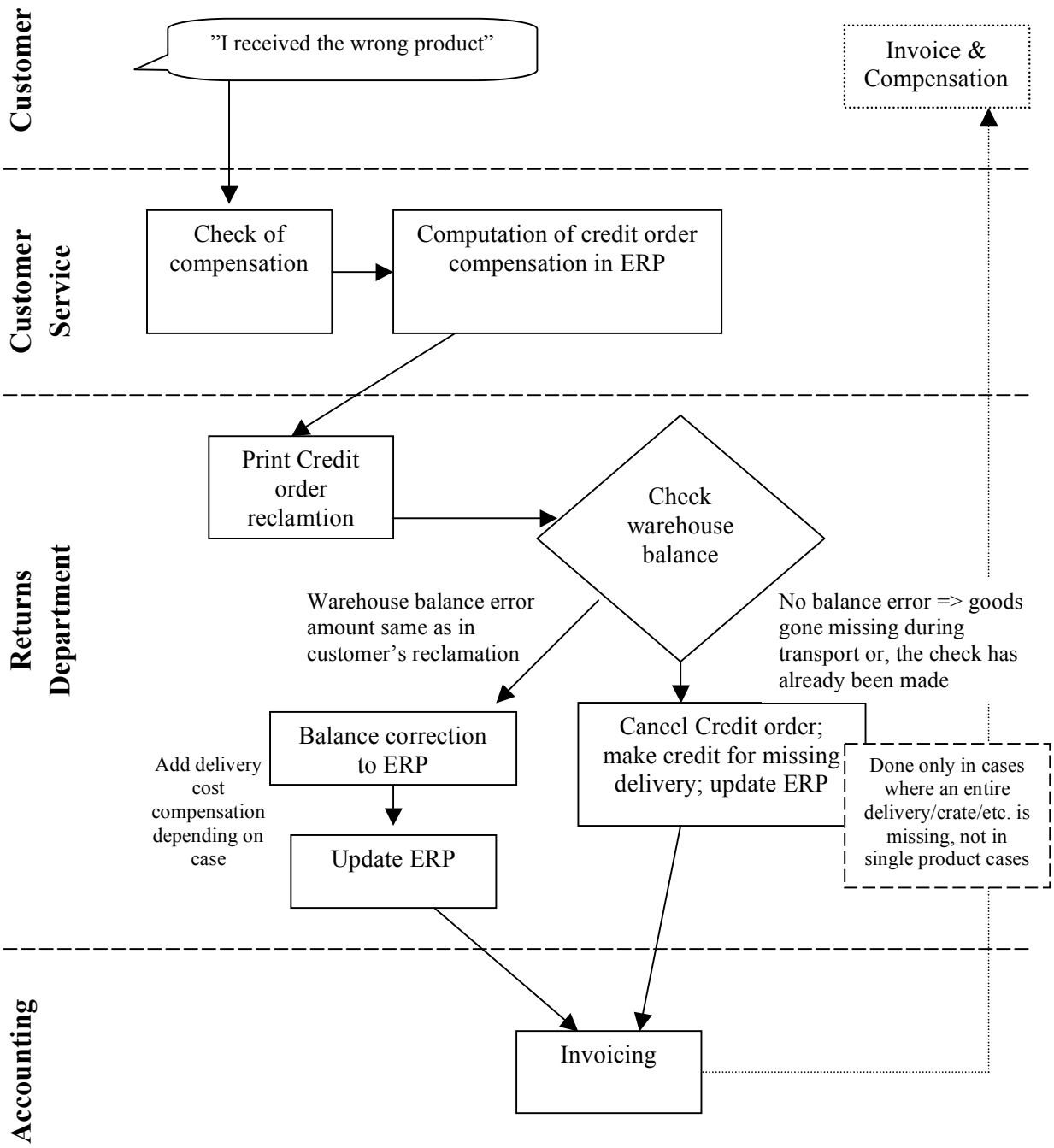
1. Return activity: Credit order reclamation, picking error – amount of delivered goods too small



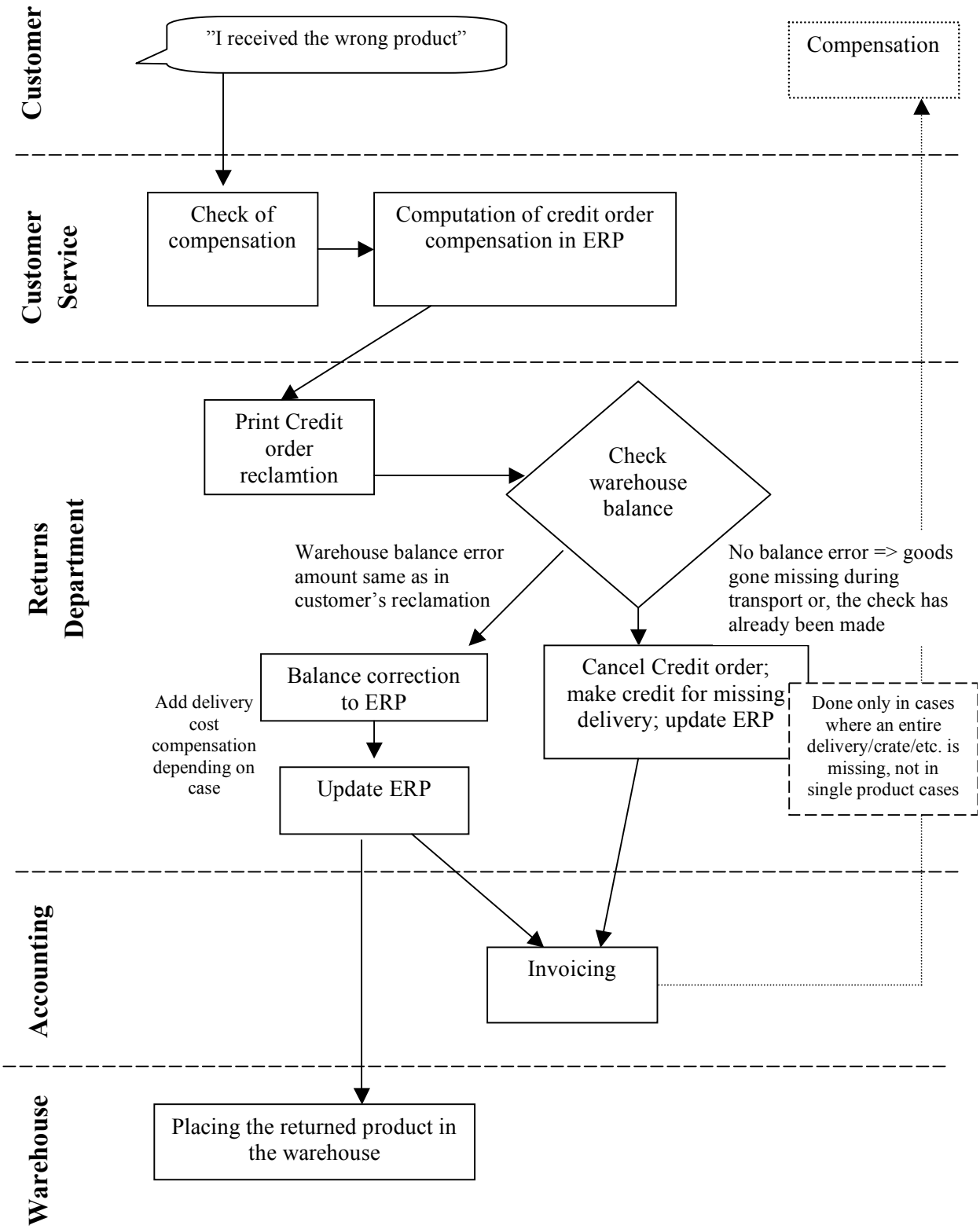
2. Return activity: Credit order reclamation, picking error – Too many products delivered



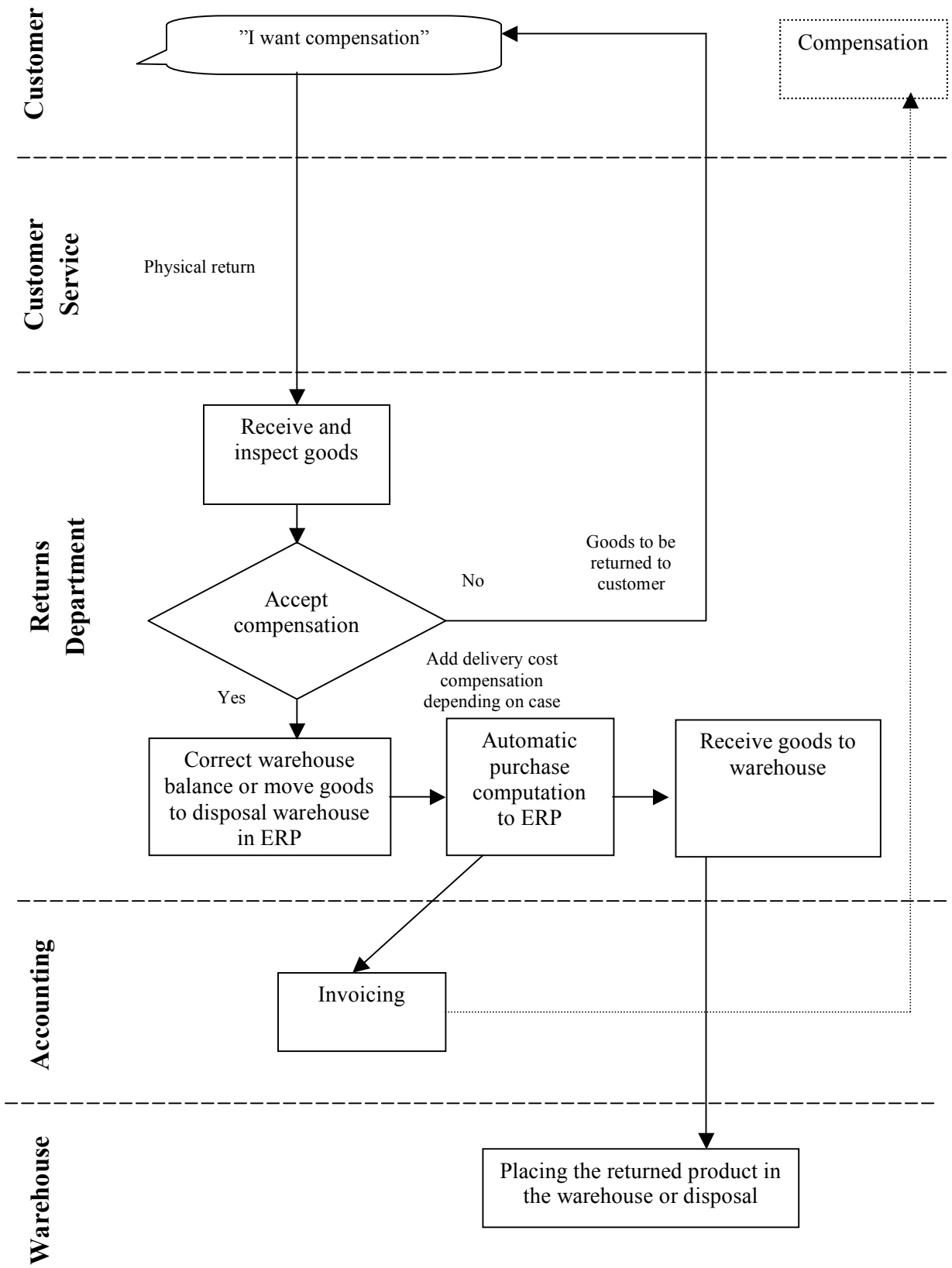
3. Return activity: Credit order reclamation, picking error – wrong product delivered, customer keeps the product



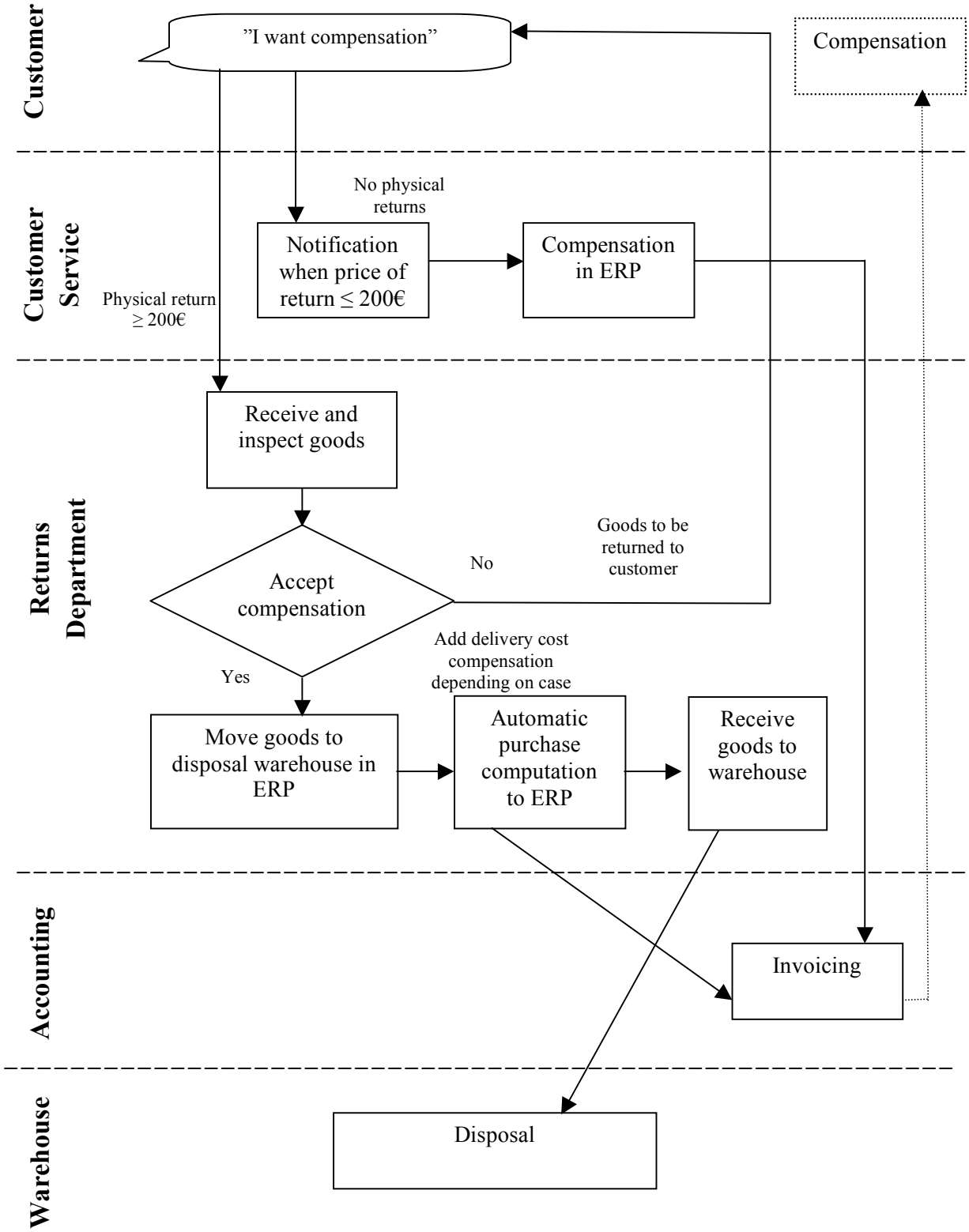
4. Return activity: Credit order reclamation, picking error – wrong product delivered, customer returns the product



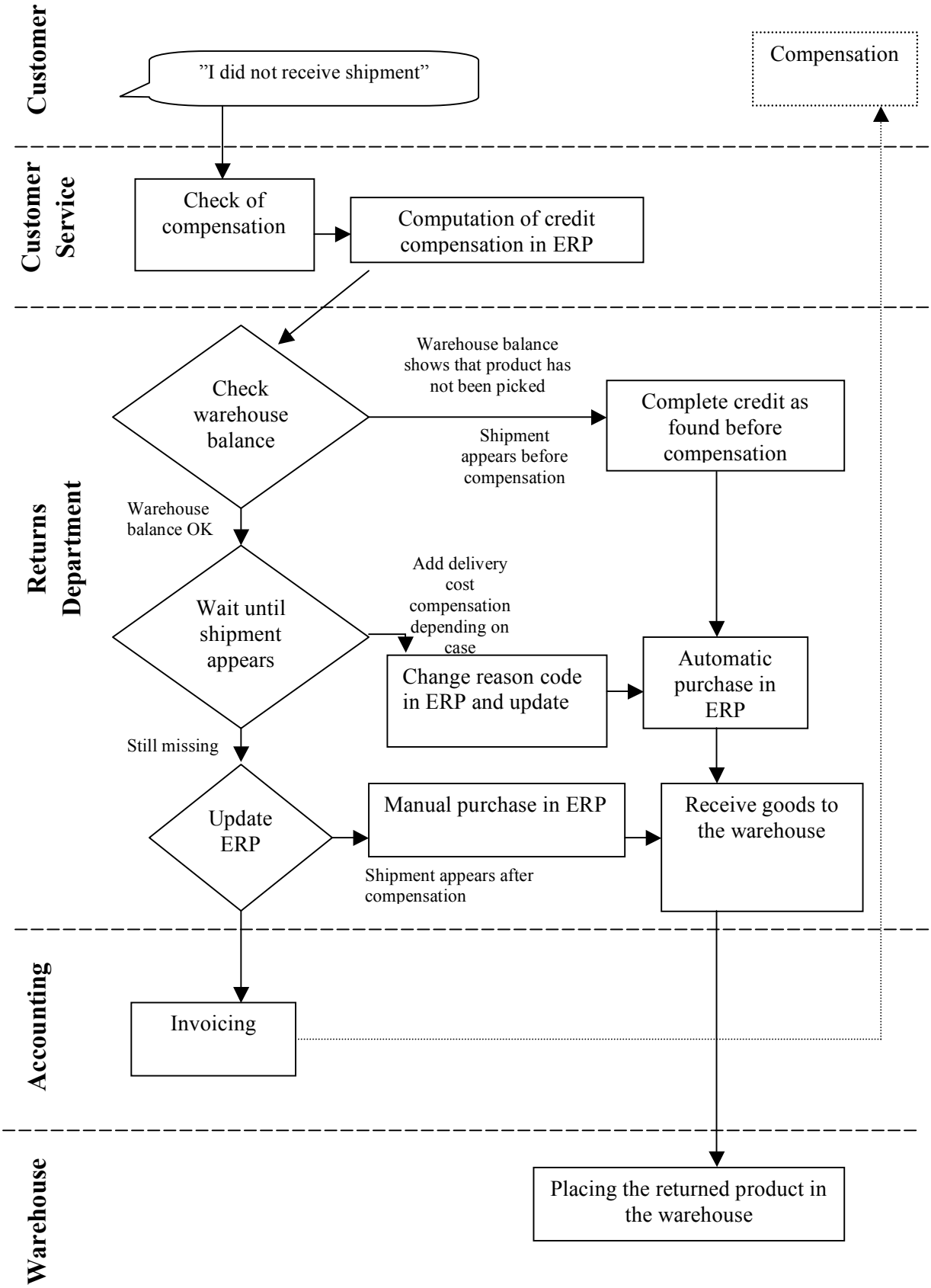
5. Return activity: Ordering mistake; Error in receiving the order; Short best before period product



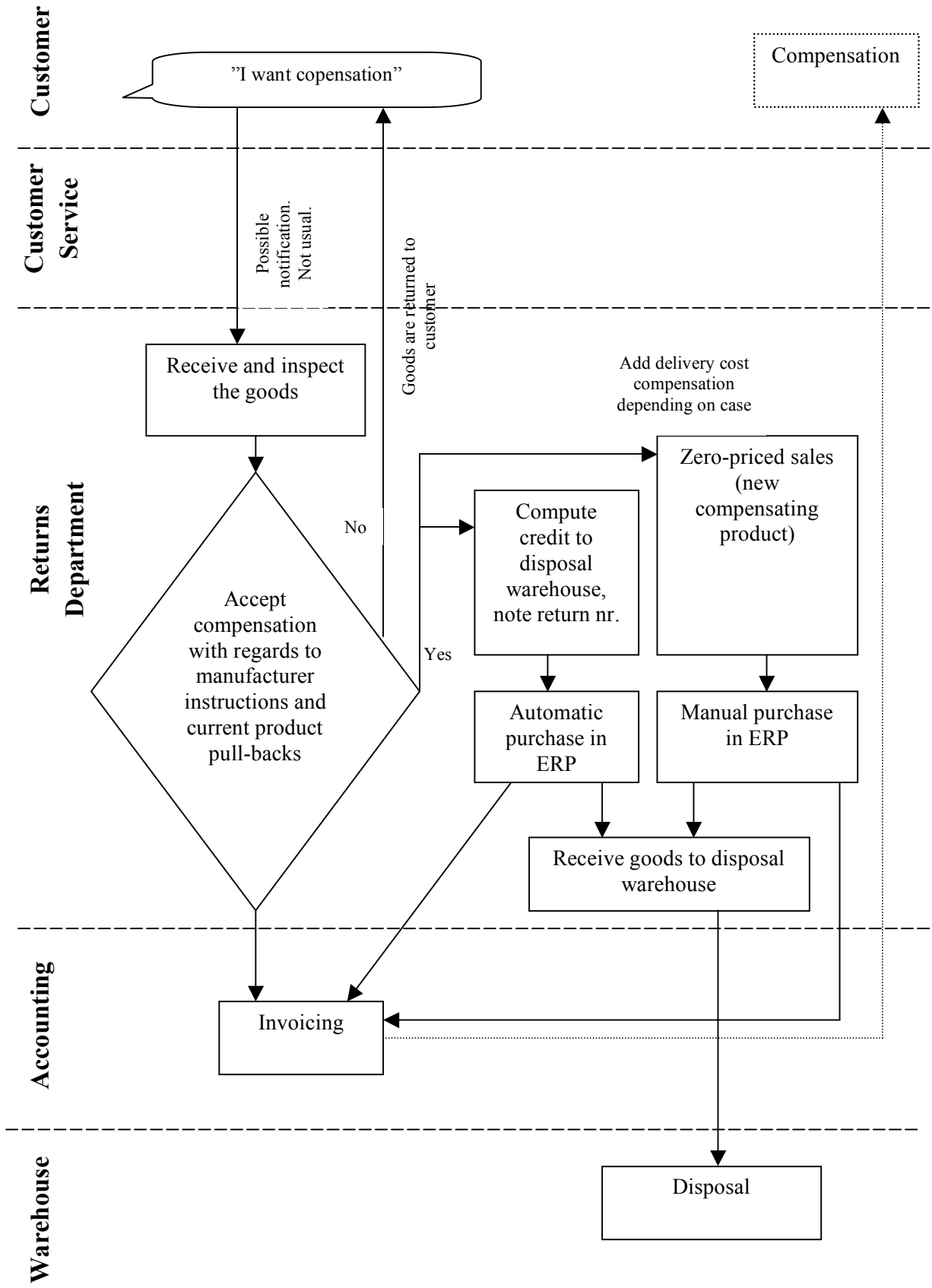
6. Return activity: Broken in transport



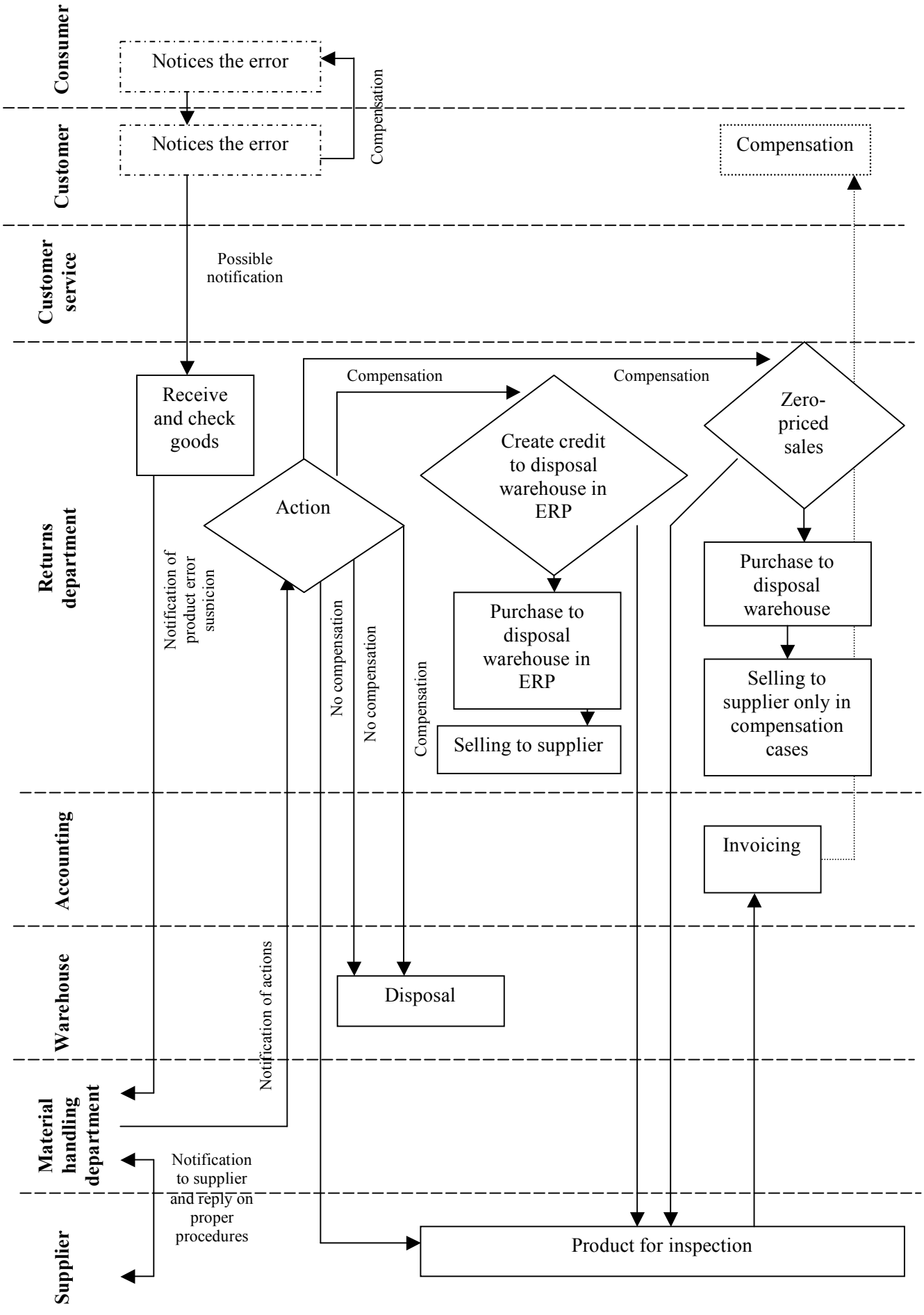
7. Return activity: Credit – Reclamation – Entire shipment missing->found before compensating->found after compensating



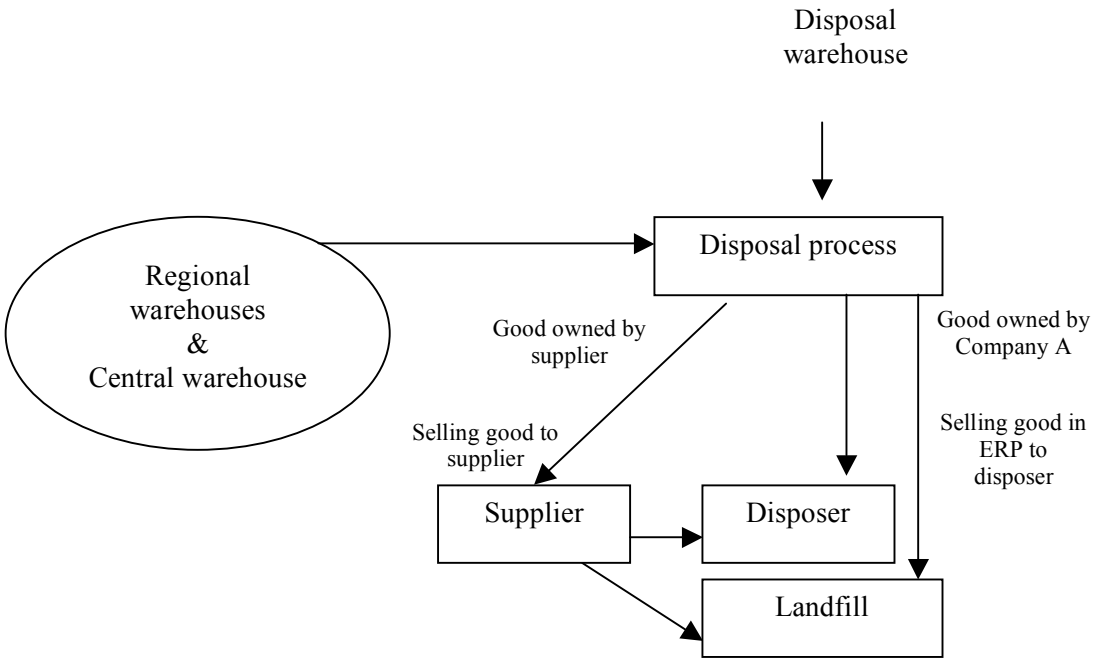
8. Return activities: Selling permission changed or ended; Product expired



9. Return activity: Product error

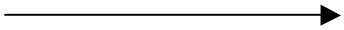


Appendix 4: The current disposal process

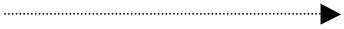


Appendix 5: The modified constructions of the reverse flow diagrams

The flow of goods and information is represented with an arrow



The flow of compensation (i.e. money) is represented with a dashed arrow



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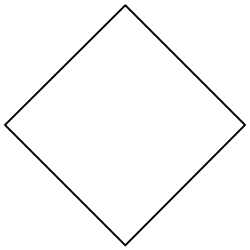
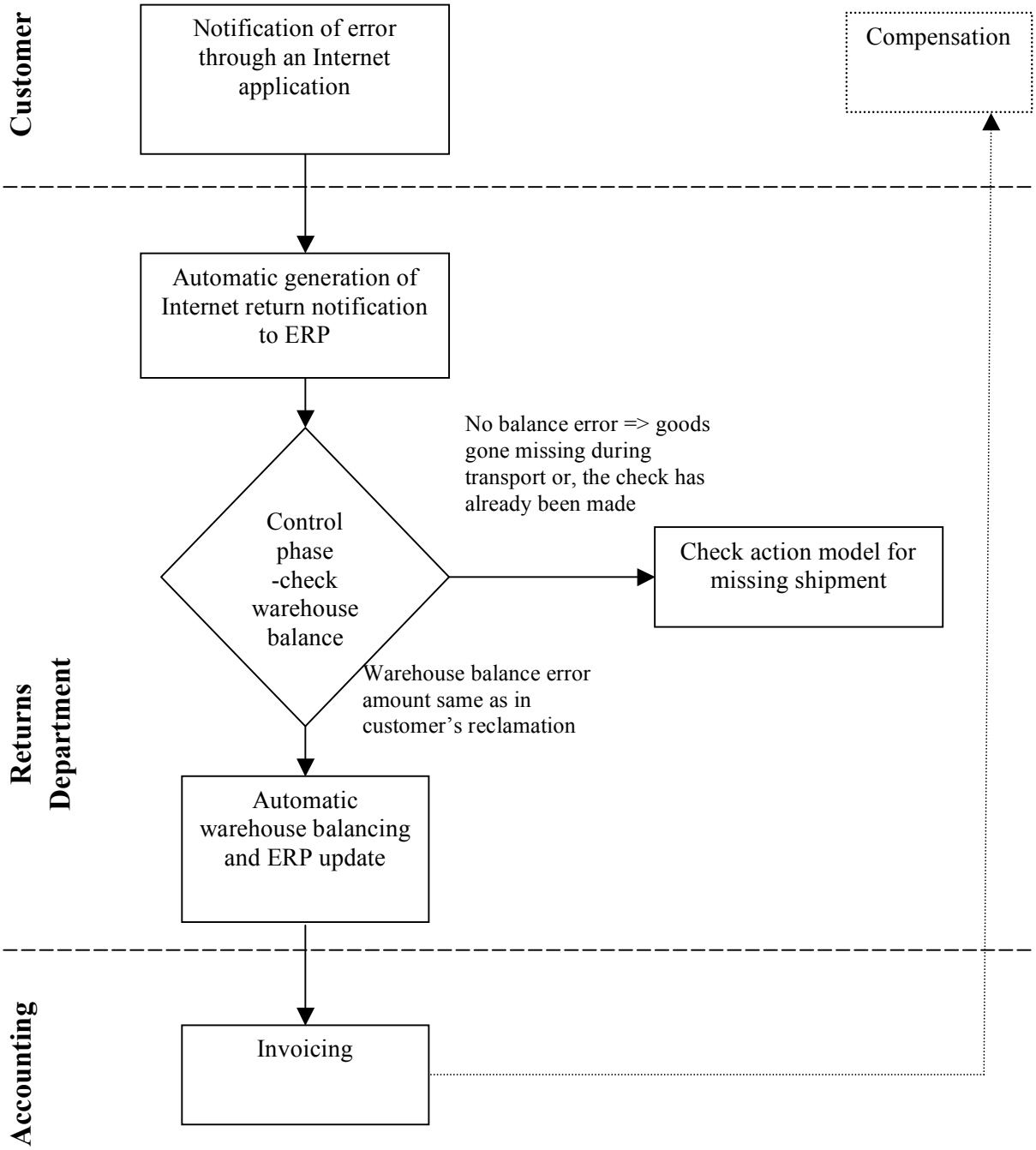


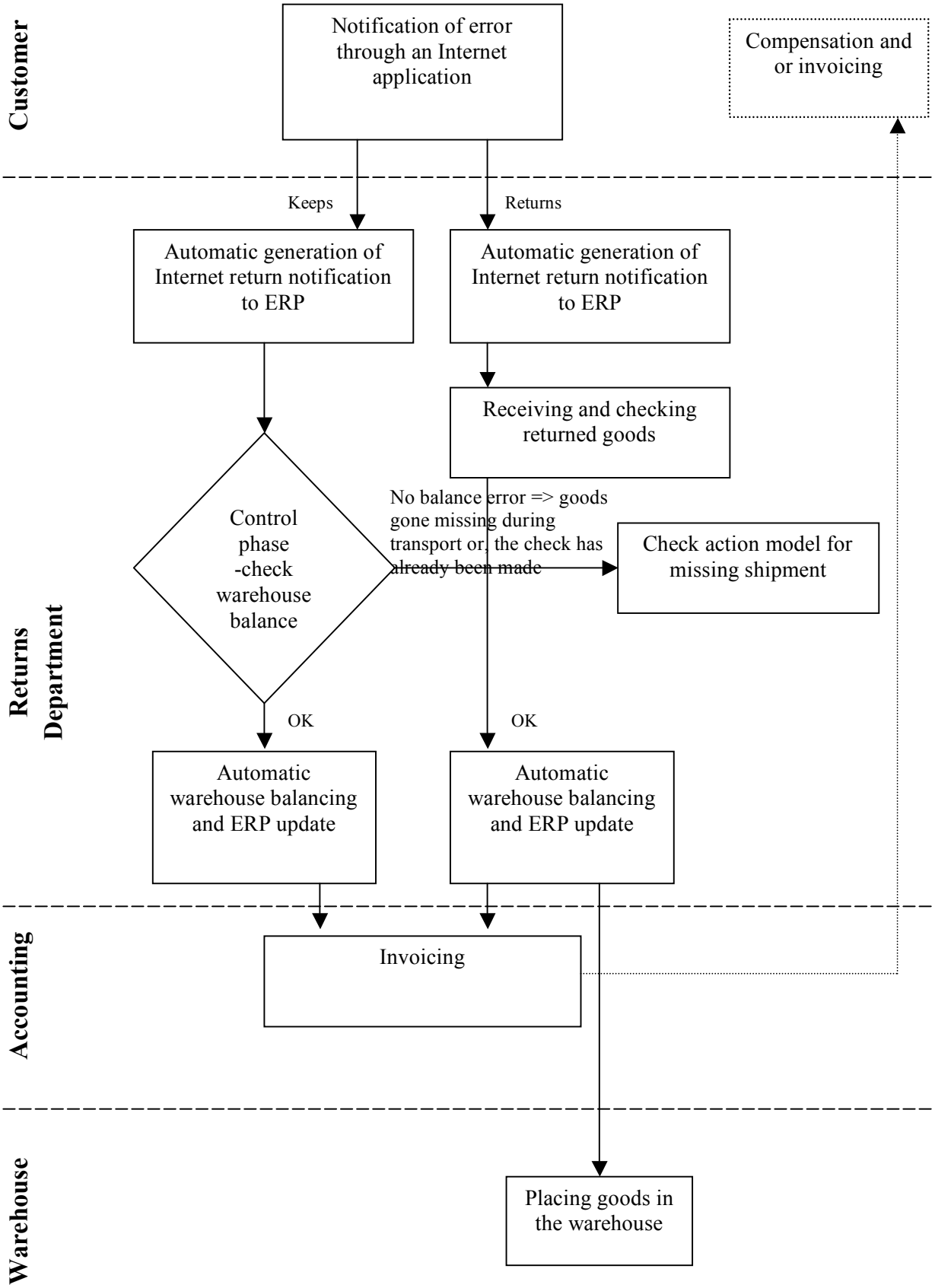
Additional information are placed along the flow chart as plain text or inside a dashed text box. The location of the additional information is situated next to the relevant operation.

Long dashed horizontal lines represent the divide between organizations and/or organizational divisions.

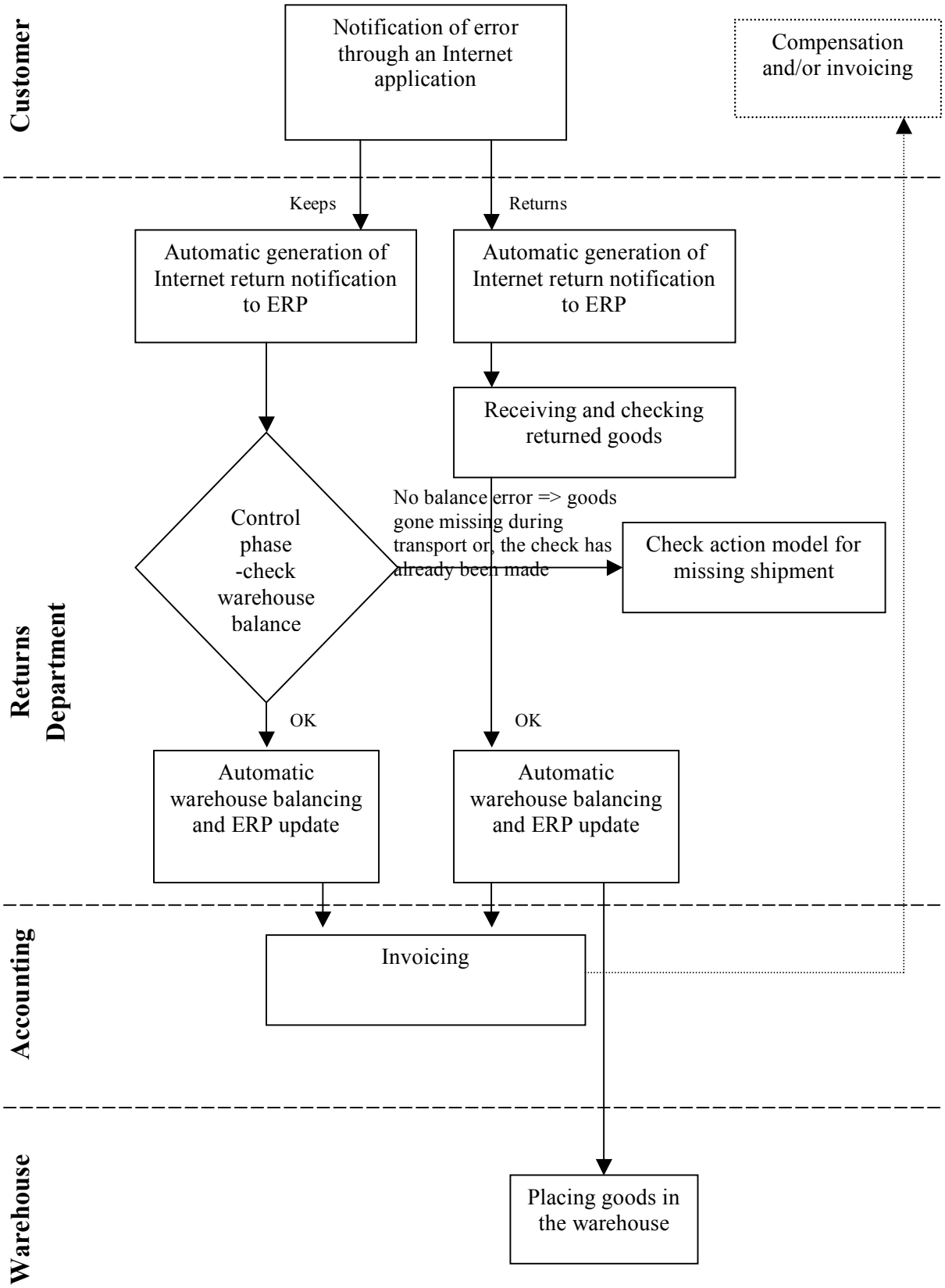
1. New return activity: Picking error – Amount of delivered goods too small



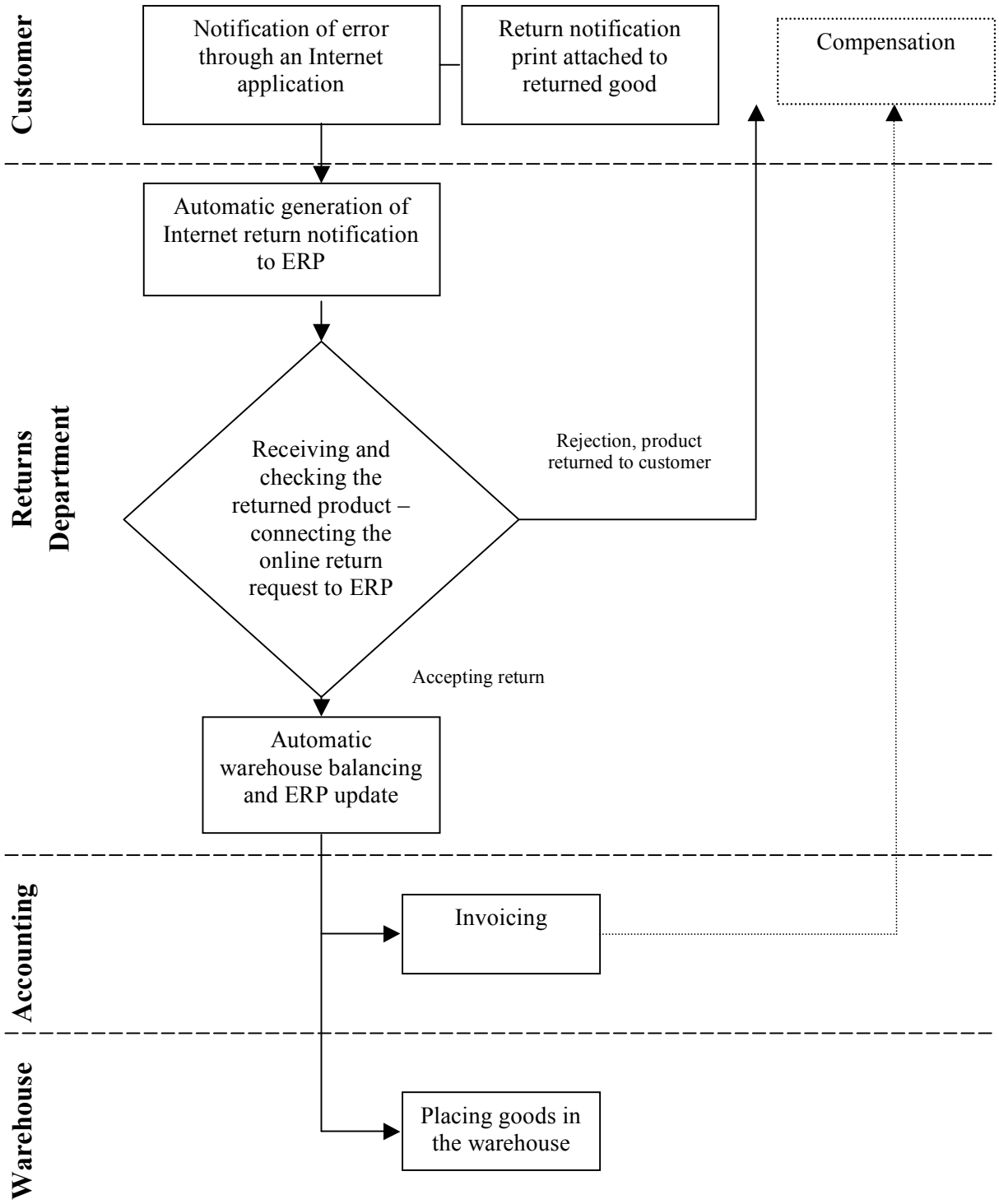
2. New return activity: Credit order reclamation, picking error – too many products delivered, customer keeps/returns the product



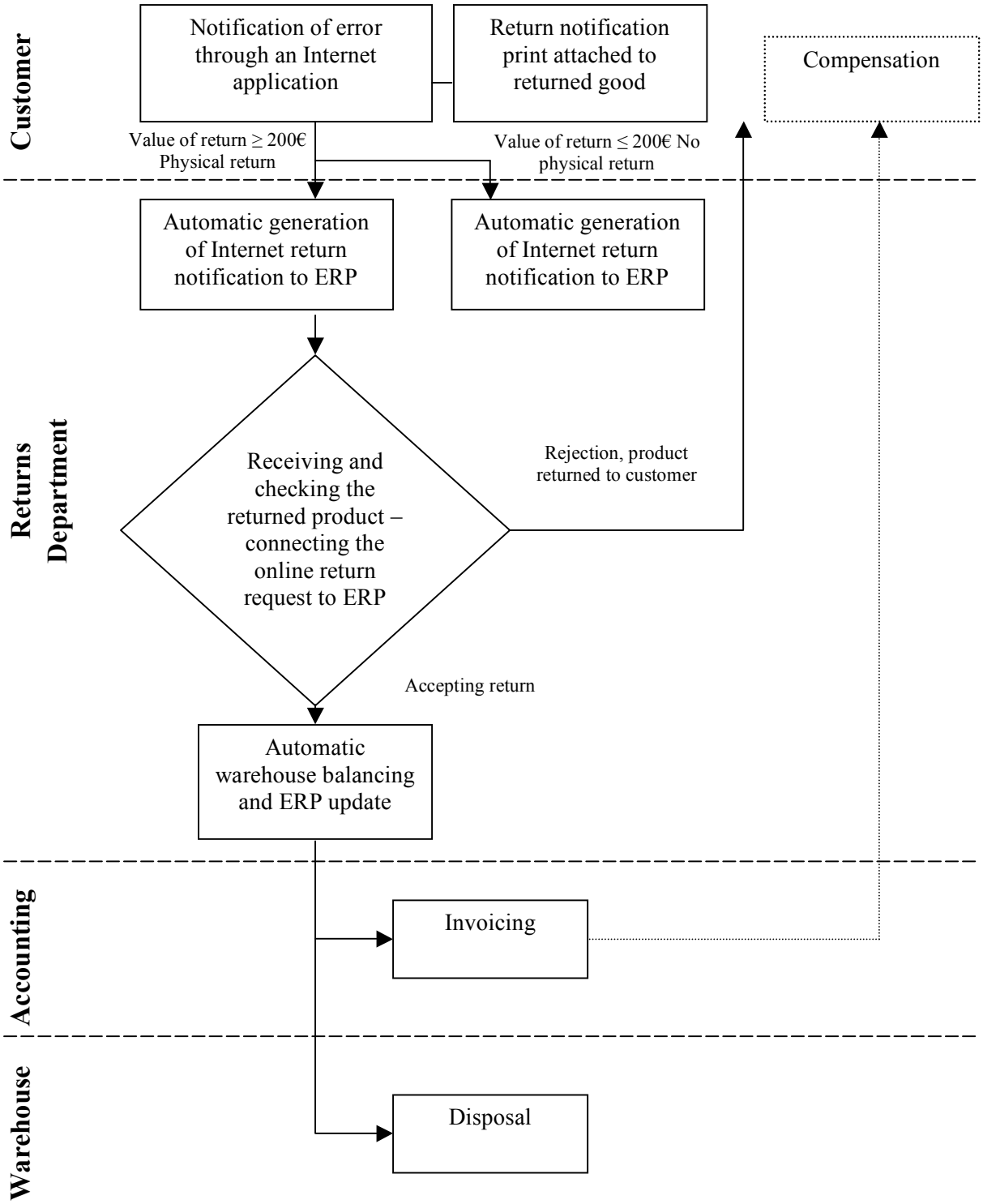
3. New return activity: Credit order reclamation, picking error – wrong product delivered, customer keeps/returns the product



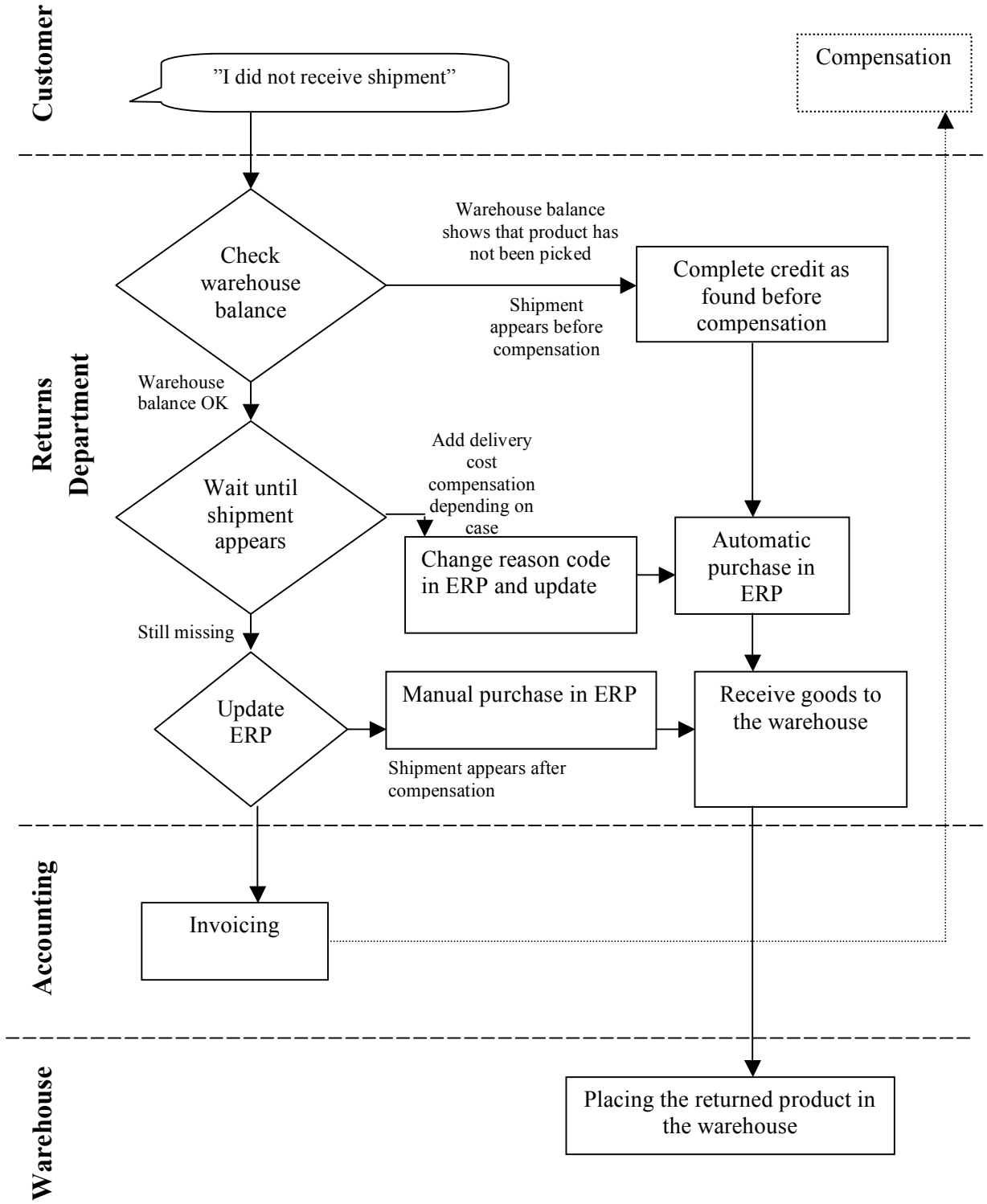
4. New return activity: Customer order mistake; Order receiving mistake, Short best before period



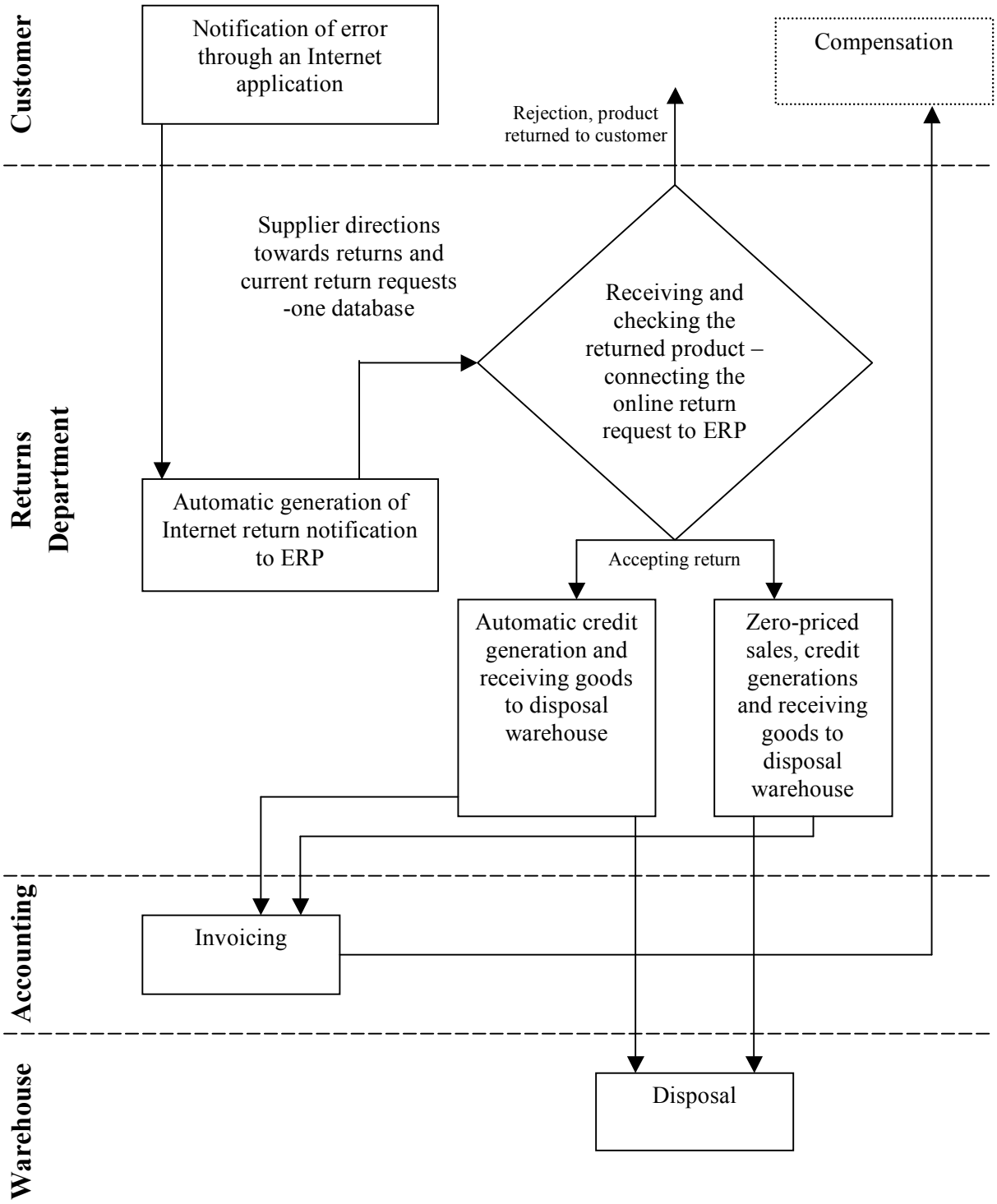
5. New return activity: Broken in transport



6. New return activity: Credit – Reclamation – Entire shipment missing->found before compensating->found after compensating



7. New return activity: Selling license ended or changed and product out of date



8. New return activity: Product error