



**UNIVERSITY OF GOTHENBURG**  
**SCHOOL OF BUSINESS, ECONOMICS AND LAW**

**Swedish Public Distribution Strategies and the Effect on the  
Development of Innovations within Medical Device Companies**

Lotti Lindgren Sjöberg

**Graduate School**

Master of Science in Innovation and Industrial Management

Master Degree Project No. 2011:60

Supervisor: Johan Brink

## ABSTRACT

Through its significant proportion of overall demand for goods and services, public procurement is increasingly relied upon as an attractive and feasible instrument to address various social goals. A body of research has at the same time evolved around the concept of innovation as the engine of economic growth and competitive advantage. While the existing literature supports the notion that public procurement can promote innovation, little is known about the influence of public distribution strategy on innovation.

Therefore, the current paper aims to examine the impact of the choice of public distribution strategy, and more precisely the choice between wholesaler and third-party logistics solution, on the development of innovations within medical device companies in Sweden. The research is also intended to study if distribution strategies affect the type of innovation developed, i.e. product versus process innovation.

Empirical findings demonstrate through a multiple case study that the use of a medical wholesaler as opposed to a third party logistics solution alters the communication between medical device companies, county councils and medical device users – which negatively affects the source and market access of innovations. In addition, the increased procurement insecurity and less defined standards, associated with the use of a medical wholesaler, are found to inhibit innovations. Other findings indicate that the medical wholesaler strategy is positively related to medical device companies' focus on process innovations. Finally, the results are summarized by the development of six propositions for future research.

Keywords: Public Procurement, Innovation, Healthcare Logistics, Purchase Groups

## ACKNOWLEDGEMENTS

This study would not have been made possible without the assistance, support, and encouragement of many people. I wish to take this opportunity to thank all the people who have in one way or another helped me during the journey of completing the research.

First, I would like to thank my supervisor, Johan Brink, for his support and guidance in the course of my Master thesis. I would also like to express my gratitude towards Håkan Strandberg and Anders Wennerberg, for their invaluable assistance and provision of industry specific knowledge.

Further, I am incredibly grateful to all informants that participated in the study and provided valuable insights in relation to their organizations. I greatly appreciate each informant's time and efforts devoted to making this Master thesis possible.

Finally, I am indebted to my family for their unhesitant support, unconditional love and understanding of my pursuits over the years. Without their help and encouragement I would not have been able to complete my degree. It is to them that this Master thesis is dedicated.

Gothenburg, May 2011

Lotti Lindgren Sjöberg

# TABLE OF CONTENTS

1. Introduction .....	1
1.1 Background.....	1
1.2 Problem Discussion .....	2
1.3 Purpose and Research Question.....	3
1.3.1 Research Question .....	4
1.4 Delimitations of the Study.....	4
2. Theoretical Framework .....	5
2.1 Literature Review .....	5
2.1.1 Public Procurement.....	5
2.1.2 Public Demand as a Driver of Innovation.....	7
2.2 Driving Product versus Process Innovation.....	8
2.2.1 Driving Specific Innovations: The Case of Green Innovations.....	10
2.2.2 Public Sector Supply Chains and Healthcare Logistics.....	10
2.3 Purchasing Groups and Consolidation .....	12
2.4 Operationalization Innovation Indicators.....	13
3. Research Methodology .....	17
3.1 Research Strategy .....	17
3.2 Literature Review .....	17
3.3 Research Design.....	18
3.3.1 Choice of Empirical Setting and Case Selection.....	18
3.4 Research Method.....	19
3.4.1 Accomplishment of Interviews .....	20
3.5 External Validity and Reliability.....	21
4. Empirical Context .....	22
4.1 Public Procurement in Sweden.....	22
4.1.1 Public Procurement Regulations in Sweden.....	22
4.1.2 The Public Procurement Process .....	23
4.1.3 The Swedish Medical Device Market.....	24
4.1.4 Public Procurement of Medical Devices.....	24
4.2 Market Channels for Innovations within the Swedish Medical Device Industry.....	25
4.3 Swedish Public Distribution Strategies: Wholesaler versus Third-party Logistics.....	26

5.	Case Studies .....	28
5.1	Medical Device Companies .....	28
5.1.1	Company Sigma .....	28
5.1.2	Company Epsilon .....	28
5.1.3	Company Omega .....	28
5.2	Case Interviews .....	29
5.2.1	Drivers of Innovation .....	29
5.2.2	The Development of the Distribution Strategies in Sweden .....	29
5.2.3	The Relationship between Medical Device Company and County Council .....	30
5.2.4	The Relationship between Medical Device Company and Medical Device User .....	31
5.2.5	The Use of Product Standards .....	31
5.2.6	The Pre-creation of Markets .....	33
5.2.7	The Encouragement of Competition .....	34
5.2.8	The Definition of a Clear Set of Needs towards which R&D Efforts can be directed .....	34
5.3	County Councils .....	35
5.3.1	Stockholm Läns Landsting .....	35
5.3.2	Landstinget i Östergötland .....	35
5.3.4	Västra Götalandsregionen .....	36
5.4	Case Interviews .....	36
5.4.1	Medical Distribution Strategy .....	36
5.4.2	Procuring Innovation .....	37
5.4.3	Procurement Standards .....	38
5.4.4	Contact Medical Device Users .....	39
5.4.5	Contact Medical Device Companies .....	39
5.4.6	Pre-creation of Markets .....	41
5.4.7	Encouragement of Competition .....	41
5.5	Other Actors .....	41
5.5.1	The Wholesaler Beta .....	41
5.5.2	The Swedish Association for Medical Technology .....	42
6.	Analysis .....	44
6.1	Factors Affecting the Market Channels .....	44
6.1.1	Relationship Medical Device Company, County Council and Medical Device User .....	44
6.2	Establishment of High Standards, Needs and Pre-creation of Markets .....	47
6.3	Competition .....	48

6.4 Process versus Product Innovation .....	48
7. Conclusion.....	50
7.1 Theoretical Contributions.....	50
7.2 Managerial Implications.....	50
7.3 Limitations and Future Directions.....	51
References.....	52
Appendix.....	58

# LIST OF FIGURES

Figure 1. Categorization of 3PL Functions.....11

Figure 2. Medical Wholesaler Supply Chain.....12

Figure 3. Overview Indicator and Measure Structure.....14

Figure 4. Overview Procurement Process.....23

Figure 5. Market Channels for Innovations within the Swedish Medical Device Market.....25

Figure 6. 3PL Distribution Strategy.....26

Figure 7. Wholesale Distribution Strategy.....27

Figure 8. Changes in Supply Chain Relationships.....45

Figure 9. Relationship between Medical Device Company, User, Wholesaler  
and County council with a medical wholesaler strategy.....46

# LIST OF TABLES

Table 1. Comparison between Medical Devices and Pharmaceuticals.....5

# 1. INTRODUCTION

---

*Chapter one is intended to introduce the concepts of public procurement, health care logistics, group purchasing and their relationship to the development of innovation. The purpose is additionally to briefly illustrate the Swedish health care sector, with a focus on public procurement. Finally, the section's aim is to portray the study's purpose, research question(s) and delimitations.*

---

## 1.1 BACKGROUND

The realization that public procurement has a significant impact on the affluence of nations has led to a proliferation of studies on the economical impacts of public procurement. Essentially, public procurement has been the subject of extensive research since the beginning of the 1980's (Murray, 2007; Preuss, 2009; Rothwell, 1983; Uyarra and Flanagan, 2009).

Theoretical work emphasizes public procurement's role in promoting sustainability through initiatives by local procuring entities (Preuss, 2009; Walker and Brammer, 2009). Other researchers have studied the procurement's structure - in the essence of optimal degree of legislative flexibility (Lidestam and Abrahamsson, 2010) and the role of transaction costs in a public context (Brege, Brehmer and Lindskog, 2010). The literature further suggests that public procurement can, through the support of top-mangers, be efficiently utilized to support minority business enterprises (Carter, Auskalis and Ketchum, 1999). Much of the public procurement-related research appears to position public procurement as a sole concept. In other words, public procurement is studied within its own context with little consideration to its complexity and many processes. As argued later, however, although this proposition is intuitively appealing it is not sufficient to illustrate the impact with which public procurement decisions can direct whole economies. As an example, only in recent years has researchers recognized the role of public procurement in promoting innovations (e.g. Aouad, Ozorhon and Abbott, 2009; Borins, 2001).

Similarly to public procurement, supply chain management is a commonly discussed topic among researchers. A supply chain consists of production and distribution operations, comparable to a network of processing centers and inventory stocking points that are linked by the transportation of materials, and information systems (Powell et al., 1998). By tradition, the theoretical field of supply chain management has been entirely dominated by the private sector and empirical examinations of the public sector supply chains remain scarce. However, the management of the public supply chain has gained importance in recent years and theories regarding its optimization are emerging. Despite the topic's current recognition some critics still suggest that the public supply chain should remain uninvestigated –politicians are stated to be too concerned with political affairs to efficiently manage a supply chain (Jansen, 2008). Nevertheless, especially health care logistics and distribution strategies are becoming well scrutinized fields of research that gained importance in times when hospitals and public institutions are forced to employ cost-savings (Callender, 2011). As a result, health care managers are continuously searching for new ways to contain costs without sacrificing quality (Kumar et al, 2008).



Within this research stream, researchers have studied public sector group purchasing (GPO), often focusing on hospitals (Chapman, Gupta and Mango, 1998; Cleverly and Nutt, 1984; Nollet and Beaulieu, 2005; Scanlon, 2002). A purchasing group provides additional value to its members through their negotiation with suppliers, and reduces administrative costs as the negotiation process is carried out by one organization, as opposed to many (Nollet and Beaulieu, 2005). Researchers disagree regarding the true benefits of joining a purchasing group, Chapman, Gupta and Mango (1998) conclude that in contrast to the suggested benefits, GPOs have had limited success in rationalizing vendors and improving the way products are used. Their results are supported by Scanlon (2002) who state that purchasing groups cannot guarantee lowered prices. Regardless of the results, group purchasing is becoming increasingly utilized – especially within the health care sector (Hovenkamp, 2002).

Redesigning supply chains is another commonly utilized vehicle when reducing costs within the health care. Activities related to procuring, distributing and managing medical supplies essentially account for approximately one third of the operating costs of health care facilities. Hence, improvements in cost containments are often focused on the health care supply chain (Kumar et al, 2008). Kumar et al (2008) conclude, in their research on health care supply chains in Singapore, that executives often focus cost containment efforts to lower acquisition price of supplies as opposed to lowering the total delivered cost.

Despite the relatively great attention paid to both public procurement and health care logistics within the academia, there is comparably little research that has focused on the role of distribution strategies within public procurement and group-purchasing, and how these two academic fields in combination impact innovative companies. Specifically, there has been little research on county councils' change from providing medical devices through third-party logistics to wholesaler distribution and the effect this change has on medical device companies' development of innovations.

## 1.2 PROBLEM DISCUSSION

The average life expectancy of men and women in Sweden was in the 1960's 71 and 74 years respectively, 100 years later those numbers are expected to increase to 85 and 87 years (LIF, n.d. b). The rising average life expectancy, in combination with an increasing population, suggests that health care will be one of the dominant sectors within the Swedish business environment in the future (EIU, 2007). Despite the fact that the Swedish population is getting increasingly older, the percentage of total cost of healthcare of pharmaceuticals and non-durable medical devices decreased from 13.9% in 2001, to 13.2 % in 2008. At the same time, the health care's share of GDP has increased steadily to account for 9.4 % in 2008 (LIF, n.d. a).

With the majority of health care provision being public, the Swedish public procurement is highly regulated and managed through decentralized county councils (EIU, 2007). As previously stated, the economical impact of public procurement can be of great importance and Sweden is not an exception; the estimated annual value of the public procurement is SEK 500 billion. All procurement is regulated in the Swedish Public Procurement Act (LOU), and the law is intended to ensure that the county council use public funds to finance public purchases in the best way possible (LOU, 2007). Despite the high degree of regulation, the county councils independently choose how to manage the procurement.

Just like public procurement can direct the wealth of nations, innovations may have great impact on countries' wellbeing and prosperity. The European Commission has, as a result, suggested that a future affluence in Europe should be ensured through the development of innovations (Blind and Georghiou, 2010). At the same time, a discussion regarding how Europe can become more innovative has driven the focus on how demand drives innovation. Consequently, the Swedish government ordered in 2009 an Innovation Procurement Inquiry in order to come up with proposals on how to increase the application of innovation procurement. The inquiry concluded that all innovations should be innovation-friendly, i.e. procurement should be carried out so that innovations are not excluded or disadvantaged (Jeppson, 2010).

In spite of the results of the previously mentioned inquiry there is no national innovation procurement law or policy within Swedish health care field and the county councils are left singlehandedly to manage their procurement (Jeppson, 2010). Moreover, these county councils' revenues have since the mid 1990's decreased as a result of reductions in the tax rate. Consequently, county councils diminished their expenditures on health care in real terms by 1.5% per year during the 1990's (EIU, 2007). Accounting for a great fraction of the budget expenditures, procurement is often reviewed when cost reductions are necessary, and the councils are increasingly examining their distribution strategy. As an example, in 2010, by shifting the common medical device procurement of Sörmland, Västmanland, Örebro and Uppsala towards a wholesaler distribution strategy a cost reduction of SEK 7.5 million annually was achieved (Landstinget Sörmland, 2010). Moreover, a collective procurement of defibrillators for Östergötland, Jönköping and Kalmar in 2009 saved the three county councils SEK 27 million in procurement costs. The change resulted in lower administrative costs, lower purchase price and a guarantee that patients in all councils would receive equal treatment (LIO, 2009). Another example is the county council in Stockholm and their change in distribution strategy from third-party logistics to medical wholesaler. That change resulted in cost reductions with SEK 35 million, according to the medical wholesaler (Swahn, 2011). At the same time, there are conflicting opinions regarding the true cost savings of a change in distribution strategy. According to Pär Dahlgren, from the procurement organization within region Skåne, their switch in distribution strategy barely reduced their total costs (Dahlgren, 2011). In summary, the rising share of health care costs of GDP in combination with the opportunity to reduce costs through changes in the public distribution strategy undoubtedly put the focus both on the potential savings, but also on the consequences of the change.

### 1.3 PURPOSE AND RESEARCH QUESTION

The present study aims to advance this line of research by analyzing the role of public distribution strategies in promoting innovation within the Swedish medical device market. Specifically, the focus will be on examining the effect on the choice between medical wholesaler and a third-party logistics solution on Swedish medical device companies, with relation to the development of innovation. The study is also intended to investigate how the choice of public distribution strategy is related to the nurturing of various types of innovations, i.e. if the selection of a medical wholesaler will direct process as opposed to product innovation.

### 1.3.1 RESEARCH QUESTION

- *What are the Impacts of the Choice of Public Procurement and Distribution Strategy in Sweden, on Medical Device Companies' Development of Innovations?*

Sub-questions:

- What are the effects on medical device companies' development of innovations when councils choose a medical supplies wholesaler over a third-party logistics solution?
- What is the relationship between choice of public distribution strategy and type of innovation developed?

### 1.4 DELIMITATIONS OF THE STUDY

This study is focused on the relationship between large medical device companies and county councils in Sweden. Due to time constraints, the research will focus solely on the organizational view of public distribution strategies and disregards the medical supply users' point of view. The external factors affected by public procurement will be addressed, but each company's research strategy and internal drivers of innovation are excluded from the research in order to facilitate unbiased results. Hence, the market factors and the subsequent relationships as opposed to internal research and development facilities are illustrated.

## 2. THEORETICAL FRAMEWORK

---

*The purpose of this chapter is to introduce the concept of public procurement, health care logistics and purchasing groups and consolidations, and the characteristics of the same in relation to the development of innovation. The section is also intended to highlight the characteristics of different innovations, with respect to a contextual framework, while at the same time demonstrating historically validated public drivers of innovation. Additionally, the chapter aims to illustrate the impact of purchasing groups on the relationship between buyer and seller, and ultimately the innovation capacity.*

---

### 2.1 LITERATURE REVIEW

In order to examine what factors drive innovation in medical devices it is first necessary to define what medical devices represent. Medical devices are all instruments, apparatus, appliances, materials or other products related to the medical and health industry, except pharmaceuticals. The formal definition can be found in “lagen 1993:584 om medicintekniska produkter”, where the purpose of medical devices is said to diagnose, prevent, monitor, and treat diseases but also to alleviate an injury or handicap and replace or modify the anatomy. It is further stated that the medical devices does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but may be assisted in its function by such means.

Examples of medical devices range from pacemakers, bandages, incontinence pads and insulin pens, to contact lenses and surgical instruments. These products have in general a shorter lifecycle than pharmaceuticals, thus suggesting a greater need for innovation and renewal within the medical device industry (Eucomed, 2006). A comparison of the differences between medical devices and pharmaceuticals can be found in Table 1 below.

Category	Medical Devices	Pharmaceuticals
<b>Industry</b>	Young	Long history
<b>Firm size</b>	Small and Medium	Multinationals
<b>Means of Action</b>	Generally physical means	Biologically active
<b>Lifecycle</b>	Short	Long
<b>Cost of Distribution</b>	High	Low
<b>Cost of Training and Education</b>	High	Low

*Table 1: Comparison Medical Devices and Pharmaceuticals (Eucomed, 2006, p.2)*

#### 2.1.1 PUBLIC PROCUREMENT

Public procurement refers to “the acquisition of goods and services by government or public sector organizations” (Uyarra and Flanagan, 2009, p.127). In general, government expenditures account for approximately 30 to 50 % of total economic activity within an economy (Dodgson et al, 2008). The management of procurement is thus an inherently sensitive issue; especially regarding the great amount of public money it involves (Schapper, Malta and Gilbert, 2006).

The public procurement is regulated by laws and principles aimed to facilitate transparency, accountability and attain value for money for citizens and taxpayers. The underlying reason behind the detailed laws surrounding the procurement lies within the fact that the spending is substantial, estimated to account for between 8 and 25 % of GDP (Walker and Brammer, 2009). There is also an ongoing discussion regarding to what degree public procurement should be regulated. A highly regulated procurement process suggests greater insight and ability to reduce risks, while also opening up the opportunities to use the procurement as a vehicle to promote certain economic activity. But there are also downsides to a highly regulated public procurement, and those demonstrate a procedurally costly framework that is slow in adapting to changes, or simply too complex for all suppliers to understand and thus participate in (Schapper, Malta and Gilbert, 2006). Lidestam and Abrahamsson (2010), in their study on public procurement of bus transportation, concludes that all parts involved in a public procurement will gain from less detailed and more flexible procurement contracts.

Despite the degree of regulation, Murray (2009) concludes that public procurement could be utilized in order to accelerate economic recovery after a recession. By focusing on short-term and “multi-source” objectives the procurement reduces risk and promotes, in the long-run, superior quality in products and services (ibid). This view is further supported by Uyarra and Flanagan (2009), who conclude that public procurement is a multi-objective policy that is increasingly used as a key vehicle for local economic development. Erridge (2007) distinguishes three sets of goals that occasionally are conflicting: commercial, regulatory and soci-economic. The author, in his study on public procurement in Great Britain, concludes that too much attention is paid to the commercial and regulatory goals, often on the expense of the soci-economic goals (ibid). Although public procurement has been subject to extensive exploration for many years, there is little research on the role and impact of politicians (Murray, 2007). The core goals, prioritization and resource allocation are set by politicians, yet Murray suggests that procurement managers often carry out dysfunctional procurement strategies (ibid).

Public Procurement also provides a mean to contain costs for governmental bodies under financial pressure (Eucomed, n.d.). But the pressure in conducting public procurement comes not only from within. There are great tensions between the public expectations of high standards in terms of governance and performance, and the external pressure from other stakeholders such as businesses and independent politicians. Since there is no model for best practice of public procurement the governments’ responses to the scattered pressure have varied; thus reflecting a need for aid in addressing the management of public procurement (Schapper, Malta and Gilbert, 2006).

In contrast to ordinary commercial practices, the context within which the public procurement is carried out is affected by a need to be transparent and accountable in the purchasing process. Where supply and demand drive prices and trade in a free market, governments have additional tasks in achieving social, environmental and other benefits in their procurement. Although private enterprises may have other objectives than purely revenue, an innovation- or environmentally friendly procurement is in most cases a choice rather than an obligation (Walker and Brammer, 2009). Moreover, a private sector buyer often award contracts through negotiation rather than open competitive tendering, which is the case for public procurement. The lack of

negotiation within the public procurement results in that the main information exchange between the public authority and the companies is carried out ex ante (Waara, 2007). In summary, the public procurement is an inherently complex process which is significantly different from procurement within the private sector.

### 2.1.2 PUBLIC DEMAND AS A DRIVER OF INNOVATION

“The benefits of innovation can only be realized by fully understanding the components of the whole innovation process that is based on knowledge acquisition, transformation, and diffusion” (Aouad, Ozorhon and Abbott, 2009, p. 389).

Innovation can in general terms be defined as the creation and adoption of new knowledge to improve the value of products, processes, and services (Aouad, Ozorhon and Abbott, 2009). A similar definition state that “innovation is the successful commercial exploitation of new ideas” (Dodgson et al, 2008, p. 2). The ability to manage these idea commercializations is a core competency in many companies and involves managing innovation strategy, innovation communities, research and development, new product and service development, operations and value delivery (Schilling, 2010).

However, the creation of innovations within organizations is increasingly recognized as highly dependent on the external environment, and the traditional in-house theories are being replaced by open-innovation and national innovation systems (Aouad, Ozorhon and Abbott, 2009). As an example, evidence suggests that countries that are innovative enjoy higher productivity and income, compared to less innovative ones (Dodgson et al, 2008). Traditionally, the research on the external environment’s impact on innovation has been focused on the role of universities and the creation of industry clusters (Ibrahim and Fallah, 2005). Nevertheless, besides supporting innovations through research and development at universities, innovations can be supported through governments’ procurement policies (Dodgson et al, 2008).

In terms of benefits derived from pursuing more research and development it is, within the literature, emphasized that innovations are crucial for the development and success of economies; hence, also the focus of political power and interest in many regions (Uyarra and Flanagan, 2009). For example, in the recent European Union 2020 strategy, the European Commission relies heavily on innovation as the core driver of economic growth (Blind and Georghiou, 2010). The focus on the promotion of innovations on a national level has resulted in the adoption of new innovation policies throughout Europe. In e.g. the U.K., the government introduced what is referred to as “innovation platforms” that are created to better integrate technologies, and coordinate policy and procurement. One key aspect of the innovation platform is to link research to the market through procurement, and the universities’ cooperation with companies is stated to underpin this development (Aouad, Ozorhon and Abbott, 2009). In a report on drivers and impediments for innovations in Europe, Blind and Georghiou (2010) identifies the universities role in basic research, the importance of a well-developed patent system and a system that is based on merit selection. The market’s role in influencing demand and motivating companies to launch their investments in innovative activities is another emphasized requirement driving innovation in Europe.

The explanations to why public procurement is such a powerful tool in promoting innovation are many. Because of governments' great budgets and sheer size they can take on high levels of risks, and support uncertain, innovative projects and smaller, innovative firms through their procurements (Dodgson et al, 2008). Moreover, the governments' introduction of various regulations and standards, e.g. environmental, provide a key source for new ideas and innovations (Schilling, 2010). As an example, Nidumolu, Prahalad and Rangaswami (2009) conclude that companies should use the compliance to environmental regulations as an opportunity to experiment with new technologies, materials and processes. The research further demonstrates that sustainability in businesses will become the main driver behind innovations in the future.

Additionally, Cabral et al. (2006) concluded that the public authorities can promote innovation through the creation and enlargement of markets for new products, facilitating the adoption of new standards and changing the market structure so it becomes more beneficial for innovations. Importantly, the enlargement of markets may provide incentives for companies to invest in research and development and thus promote innovations both directly and indirectly (Blind and Georghiou, 2010; Uyarra and Flanagan, 2009). Shortage of labor, global competition, need to respond to the economic environment and the regulatory environment are other factors pointed out as important innovation drivers (Aouad, Ozorhon and Abbott, 2009). Geroski (1990) studied the efficiency of publicly driven innovation and concluded that certain conditions must be fulfilled in order for innovations to successfully emerge from public requirements: establishment of high standards, a definition of a clear set of needs towards which R&D efforts can be directed, the provision of a market for the products at an early stage of the product life cycle and encouragement of competition. These factors are supported within many other researchers' studies (Blind and Georghiou, 2010; Cabral et al., 2006; Uyarra and Flanagan, 2009).

Finally, it is recognized that the pure development of knowledge within organizations is not sufficient to promote innovations; one must instead focus on the commercialization aspect of innovation (SOU 2010:56). Based on this, Ibrahim and Fallah (2005) make a distinction between invention and innovation. "Invention is the process of discovering or creating a new "thing"—a new product or a process. If this new "thing" is developed and successfully introduced into the market, it becomes an innovation" (Ibrahim and Fallah, 2005, p. 34). It is within this latter process that public demand may have a great impact. There are many explanations to why most new products fail in the market place; among them is the risk of being overpriced, not meeting technical specifications or not meeting the users' needs (Dodgson et al, 2008). By creating demand for new products, public procurement can aid companies in the commercialization process of innovations (SOU 2010:56).

Public demand is, in conclusion, one of the greatest external drivers of innovation and affects the innovativeness through the support of high-risk projects, creation and enlargements of markets and change in market structure. Essentially, public procurement may aid companies in the commercialization process of the innovations and thus prevent market failure.

## 2.2 DRIVING PRODUCT VERSUS PROCESS INNOVATION

As previously stated, public procurement is an important tool in promoting innovations. However, it is necessary to specify what type of innovation that is supported in order to optimize

a national innovation strategy. With the roots in an extensive definition, innovation is in broad terms anything that brings new value to products, processes and services (Aouad, Ozorhon and Abbott, 2009). The types of innovations can consequently range from quality improvements, efficiency enhancements and totally new products, to improvements in a product's sustainability. It is further of value to establish if the innovation within the firm is competence-enhancing or destroying. A competence-enhancing innovation builds on the company's existing knowledge and skills. If the innovation, on the contrary, is not built upon existing technology or makes the technology obsolete the innovation is said to be competence-destroying (Schilling, 2010). The innovation can, on another dimension, also be categorized as either radical or incremental (Dogson et al, 2008).

Regardless of a categorization, a commonly utilized distinction separates product and process innovation. Athey and Schmutzler (1995, p. 26) state that "product innovation is formalized as an upward shift in the demand curve, whereas process innovation lowers the marginal cost of production". Mantovani (2005) supports this definition and state that process innovation is concerned with cost-reductions, while product innovation is characterized by a new or improved product.

Within the literature, the origin of each type of innovation is discussed by several researchers and it is suggested that these are driven by different factors. Process innovation involves investments in how companies manage knowledge, capabilities and resources and is often associated with the introduction of new machinery and the adoption of new production processes. On the contrary to investing in new machinery, investments in close organizational integrations are required for product innovation. It involves a minimization of organizational reporting layers and the encouragement of cross-divisional links between R&D, operations and marketing (Dogson et al, 2008). The role of the manager is further emphasized as crucial for product innovation, often in combination with the utilization of some form of project management technique (Schilling, 2010).

Weiss (2003) suggest that the choice between product and process innovation is dependent on the degree of competition within the market. When competitive is severe, companies favor product innovation to produce substitutes, while with a less intensive competition companies focus on process innovation. Dogson et al (2008, p. 262) state that process innovation is driven by "the need to find ways to manufacture and deliver new products and processes, improve operational productivity and quality, and to comply with regulations". In a research paper by Thompson and Waldo (2000) it is stated that process innovation, which results in reduced production costs, can be readily measured by existing techniques of data collection whereas product innovation, which results in new or improved products, can only partially be explained by existing techniques.

Occasionally, product and process innovation can occur in tandem, i.e. they drive each other. For example, a product innovation may require that the production processes changes, and vice versa (Schilling, 2010). In summary, product and process innovation may occur simultaneously and a separation between the two is not always feasible. However, there are aspects when the two types of innovation differ: in terms of the required investments and the ultimate outcomes.



### 2.2.1 DRIVING SPECIFIC INNOVATIONS: THE CASE OF GREEN INNOVATIONS

By examining both process and product innovation in detail it becomes evident that each in itself contains a variety of different innovation subtypes. An innovation within both product and process can, among other things, be directed to achieve cost-efficiencies, higher quality or greater sustainability (Dodgson et al, 2008). Essentially, the variety in innovation types filters down to a core question: what factor within public procurement drives each type of innovation?

The research within this field is very limited, and the majority of the studies are focused on how public procurement is used to support green innovation (Preuss, 2009). A second stream of research regarding procuring to promote a specific type of innovation examines innovation within small and medium sized enterprises (SMEs). Carter, Auskalnis and Ketchum (1999) conclude that in order to promote procurement and innovations within SMEs, the support of the procurement's top management is essential.

In terms of promoting green innovation, Qi et al (2010) concluded in their study on 123 constructing companies' implementation of green innovation practices that government regulations is one of the two most important drivers of innovation. This statement is further supported by many experts that shifted focus from the internal requirements for innovation to the demand-driven innovation processes where governments have a key role (Uyarra and Flanagan, 2009). One example is Aouad, Ozorhon and Abbott's (2009) continued study on the constructing industry which identified environmental concerns as one of the main drivers for facilitating innovation within the industry. In terms of barriers to procure in a sustainable manner, Walker and Brammer (2009) in their article on sustainable procurement in the U.K. conclude that among the barriers that exist cost is leading. The authors further conclude that top-management support is the most important facilitator of green procurement. Carter, Auskalnis and Ketchum's (1999) research on procurement from minority business enterprises is consistent with these findings. Environmental innovations are thus supported through environmental product requirements, environmental purchasing policies and the encouragement of suppliers to pursue environmental friendly operations. Other direct initiatives consists of procuring from local suppliers only, encouraging ISO certificates, assessing sustainability risks of suppliers and launching sustainability awards for suppliers (Preuss, 2009).

In summary, it is evident that the underlying procurement goals are crucial in order to direct the procurement towards a specific aim. Whether it is a more sustainable community, innovations within SMEs or reducing employment as in "the Northern Ireland Unemployment Project" in Erridge's (2007) research, an alignment of goals and processes, in combination with support from procurement managers, is important for successfully driving public procurement goals.

### 2.2.2 PUBLIC SECTOR SUPPLY CHAINS AND HEALTHCARE LOGISTICS

Supply chain management (SCM) is a widely discussed theoretical field that has been scrutinized by researchers for decades. SCM is most commonly cited as the process of planning, implementing, and controlling the flow of goods and information from point of origin to point of consumption (Bowersox, 2010). Regardless of its attained attention within the academia, many researchers are focused entirely on private companies' various logistics strategies and neglects to recognize the public supply chain and its characteristics (Callender, 2011). Public supply chain management can be defined as "the co-ordination of all parties involved in delivering the

combination of inputs, outputs or outcomes that will meet a specified public sector requirement” (OGC, 2005).

The public supply chain can be both inbound and outbound. The inbound supply chain is the supply chain where suppliers delivery goods into the public organization to support its operational objectives. The public outbound supply chain is, on the contrary, directed out from the public sectors towards the end consumers and serves a wider, external objective. The latter is associated with health care logistics and distribution strategies of e.g. medical devices to hospitals and patients (OGC, 2005). The confusion between private and public supply chains reflects the increased complexity a public supply chain often suffers from. Callender (2011, p. 14) concludes that “public sector supply chains not only contain both direct and indirect links between buyers, sellers, a range of intermediaries including logistics providers and members of the financial services sector, they also carry both political responsibility and the burden of public scrutiny”. In a study on a proposed public sector supply chain forum Mellor (2005, p.53) states that “at this point in time there is clearly confusion about the roles of procurement and supply-chain and as a result there is the potential for missing additional benefits”. This view is further supported in the report by OGC (2005) where it is concluded that the public authorities should encourage a better understanding of supplier management, while at the same time increase the transparency.

Within the health care sectors, the focus of supply chain management is on the logistics and the transportation of goods and services in and out of hospitals (OGC, 2005). Managers of health care supply chains have traditionally perceived their supply chains radically different from the managers within the manufacturing industry, a consequence of that the output and production schedules cannot be as easily controlled (Kumar et al, 2008). As in the case for private supply chains the type of public logistics strategy can take many forms. A third party logistics (3PL) solution is one form, and it is associated with the provision of comprehensive logistics services, see Figure 2 (Sink et al., 1996).

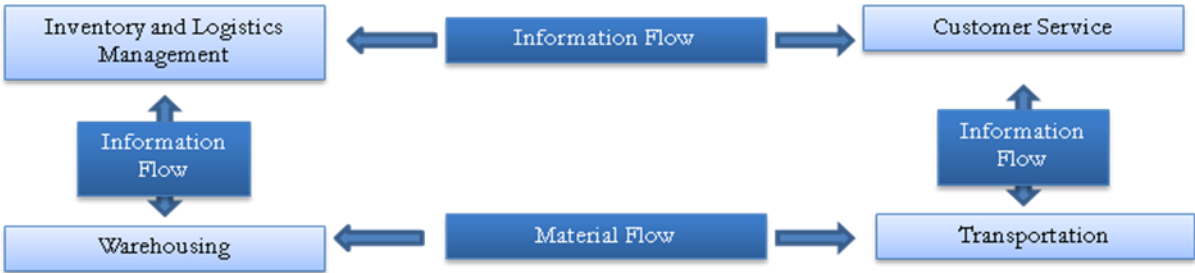


Figure 1: Categorization of 3PL functions (Vaidyanathan, 2005, p. 91)

Importantly even the third-party logistics solution can, within itself, take many forms as the services offered vary greatly from case to case (Frankenberg, 2011). In the literature, researchers have focused on examining the relationship between service capability, operational performance and financial performance of 3PLs. There are many benefits of using a third-party logistics solution, which can be related to the mere scale of the third party’s operations. A logistics provider is in essence able to provide warehousing on demand, transportation expertise, perform assembly and store inventory – in a short amount of time (Frankenberg, 2011). Hence, many

companies use a third party logistics solution to increase efficiency by allowing them to focus on their respective core competencies (Vaidyanathan, 2005).

Next, another form of strategy is to utilize a wholesaler. A medical wholesaler is a medical device company that purchases a diverse product portfolio from various producers or vendors, warehouses them and resells them; see Figure 2 (Business Dictionary, n.d.). A common feature of a medical wholesaler is the centralization of supply and inventory, which often results in lower price-per-item due to greater volumes purchased and an efficient distribution system (Swahn, 2011). Additionally, some medical device wholesalers also produce and distribute their own, private label brands (Onemed, n.d. b).

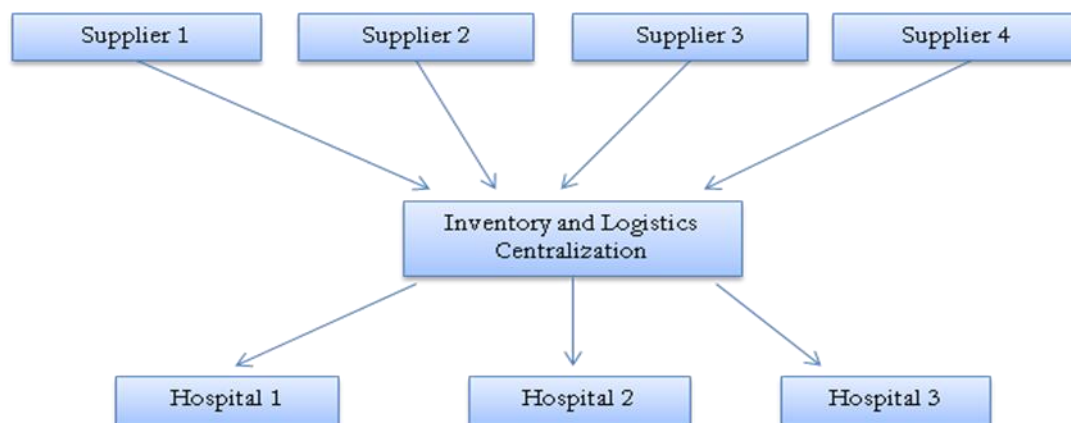


Figure 2: Medical Wholesaler Supply Chain (Kumar et al, 2008)

### 2.3 PURCHASING GROUPS AND CONSOLIDATION

In the literature on health care, purchasing groups refers to organizations that negotiate and purchase medical devices and services on behalf of their members, often hospitals (Hovenkamp, 2002). Essentially, purchasing groups are intermediaries in the supply chain for pharmaceuticals and medical devices (Weinstein, 2002). The phenomenon is often referred to as “group purchasing organizations” (GPOs) and is since the beginning of the 1980’s widely discussed (Chapman, Gupta and Mango, 1998; Cleverly and Nutt, 1984; Hendrick, 1997; Nollet and Beaulieu, 2005; Schneller, 2000; Weinstein, 2002).

Two of the most prominent features of a purchasing group are that they, similar the previously mentioned wholesalers, provide additional power to its member in the negotiation with suppliers and reduces administrative costs (Nollet and Beaulieu, 2005). By pooling the purchasing volume the GPOs can negotiate lower prices with the vendors and thus offer discounts to hospitals because of sheer size (Chapman, Gupta and Mango, 1998; Scanlon, 2002). Hovenkamp (2002) state that GPOs reduce the per unit transaction costs as the administrative work of handling orders and suppliers is bundled together.

There are opposite opinions within the literature on the actual positive outcomes of GPOs. Chapman, Gupta and Mango (1998) highlight that GPOs have relatively little impact on the standardizing of products and rationalization of vendors; two activities that often are pointed out as crucial when reducing vendor prices. The authors further state that, with GPOs, hospitals are left unaided in their search to improve the way the products are used. Beyond this, purchasing

groups constitute an additional link in the supply chain which increases the distance between buyers and sellers (Nollet and Beaulieu, 2005).

Scanlon (2002), in his study on 11 hospital, share this view and concludes that there is little evidence that large purchasing groups actually lower the costs for hospitals. It is instead suggested that purchasing groups disregard smaller manufacturers of medical devices by limiting their connection with the hospitals – something that finally could result in that patients are not being provided with access to new, innovative medical devices (Scanlon, 2002). Weinstein (2002) states that GPOs have, through engagements in non-competitive practices, turned the American market for medical products into a bilateral oligopoly. The author further highlights the many possible anti-trust lawsuits that the GPOs are facing. Another potential negative consequence of using GPOs is that number of purchased brands is reduced, which could have a negative effect on the fit between patients' needs and the medical device (Hovenkamp, 2002). Despite the discussion on the actual benefits of a GPO, it is a commonly utilized mean within large markets for healthcare such as the United States (Chapman, Gupta and Mango, 1998).

## 2.4 OPERATIONALIZATION INNOVATION INDICATORS

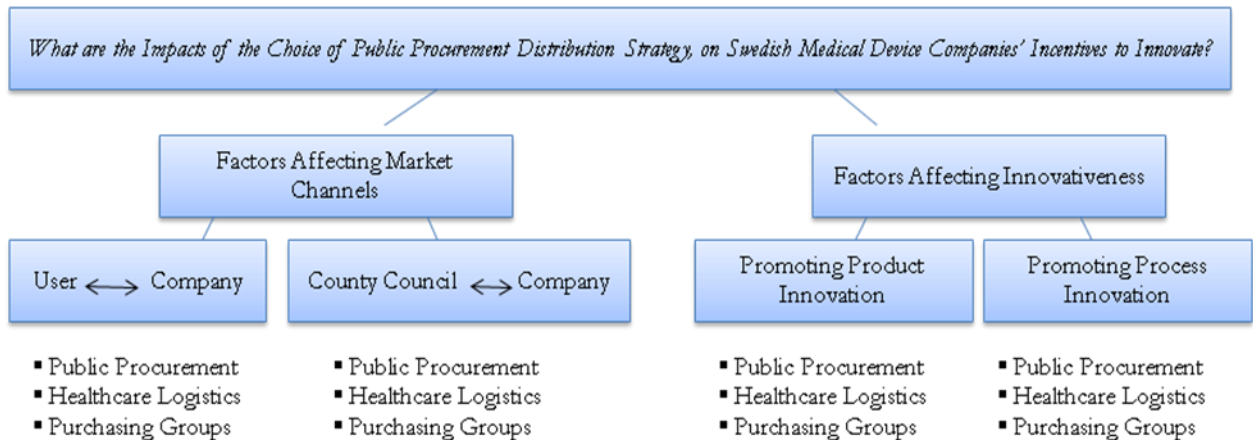
---

*This section is intended to highlight and illustrate the utilized measures and the indicators used to answer the research question. Importantly, the indicators employed were derived from the literature review and the interview with the industry organization Swedish Medtech.*

---

The creation of measures of the concepts examined is referred to as “operationalization”. The present research will operationalize each literature concept through employing direct and indirect “indicators”. An indicator is “a measure that is employed to refer to a concept when no direct measure is available” (Bryman and Bell, 2007, p. 570). Since there is no previously employed and validated set of measures and indicators within this field of research, each indicator will be derived from the literature review and case interviews, where key concepts that affect innovation through public procurement are summarized. From the literature review and the research on the empirical setting, it is also apparent that the overall research question comprises several different dimensions (e.g. purchasing groups, distribution strategies, promotion of innovations) and these dimensions must be addressed in order to fully grasp the effects. Consequently, the study will make use of multiple-indicator measures since this approach ensures that a wider range of aspects become illustrated and thus increase the validity of the findings (Bryman and Bell, 2007).

In order to examine how the choice of public distribution strategy affects the development of innovations in medical device companies the measures are divided between two sub-dimensions that are evaluated against a 3PL and wholesale distribution strategy (see Figure 3). The reasons that underpin why these dimensions were chosen as the two primary lies within each dimension's impact on innovation. In essence, the first sub-dimension (the market channel) assesses the overall impact on the development of innovations in medical device companies whereas the second dimension (the innovativeness) evaluates the character of the promoted innovation. The combination of these two dimensions is essential in order to assess the research question in whole.



*Figure 3: Overview Indicator and Measure Structure*

Through the literature review a set of aspects that affect innovation within public procurement became apparent, which filter down to the promotion of various innovations (i.e. process versus product innovation). At the same time, an initial interview with Swedish Medtech revealed that the structure of the market channels within the Swedish medical device market is of great importance to the promotion and creation of innovations (Wennerberg, 2011). As a result, the research question is divided into two separate fields. Importantly, each indicator has been developed to examine the impact of not only public procurement, but also health care logistics (i.e. public distribution) and purchasing groups (which is illustrated in Figure 3).

The first sub-dimension contains factors that affect the market channels of medical devices. The Swedish market channel for medical devices is illustrated in Figure 5. By examining the figure it becomes apparent that the relationship between the county councils and the medical device company is affecting how and if innovations reach the market. Hence, the first two indicators developed concern how the choice of distribution strategy within each county council impacts the relationship's frequency and strength:

1. *Relationship medical device company → county council*
2. *Relationship county council → medical device company*

In terms of assessing the frequency and strength of the relationships, which is indicated to have a positive relationship with the firms' incentives to bring innovations forward, the frequency is equivalent to number of hours of contact while the strength corresponds to perceived quality of the relationship. The perceived quality of the relationship will be assessed from both a county council and medical device company perspective, with an emphasis on the latter since it is more dependent on the former. The focus within this set of indicators is on evaluating if the public distribution strategy alters the relationship between the county council and the medical device companies, and subsequently change the many ways in which innovations can be promoted. In terms of the indicators, two are used to fully grasp the width of the communication, i.e. the easy with which medical device companies perceive they can contact and communicate with county councils regarding e.g. a new product and, in the opposite direction, how easily county councils can communicate e.g. procurement notices and product needs to medical device companies. In the case when a medical wholesaler strategy is employed, the measures will assess the relationship

between wholesaler and county council as well as the relationship between the medical device companies (i.e. the supplier) and the wholesaler.

Related to this dimension is the fact that Swedish medical device companies are greatly interrelated with the users of their products, i.e. nurses and doctors. The Swedish law requires the medical device companies to educate the users, and many companies experience the direct contact with the nurses as an important source of innovation (Wennerberg, 2011). Within the literature, Schilling (2010, p. 23) highlights the great impact users have as a source of innovation and states that “users often have both a deep understanding of their unmet needs and the incentive to find ways to fulfill them”. Hence, the next set of indicators will evaluate how public distribution strategies affect the relationship between the medical device companies and their users:

3. *Relationship medical device user → medical device company*
4. *Relationship medical device company → medical device user*

The frequency and the quality of the communication will be attended and this will be executed in the same manner as mentioned for the previous indicators. The aim is to find out if there is a difference between 3PL and medical wholesaler in how easily users can contact medical device companies if they have a new idea regarding a product and in the opposite way, how easy the medical device companies can contact users to gain information or introduce a new product. However, since medical device companies receive information from the product users that later can be utilized in new product development and there is no equivalent gain from the relationship to the users, the research will focus solely on the companies’ perceptions and disregard to interview the users. In brief, the derived indicators will be devised through a series of questions within the interview schedule (see Appendix), towards county councils, a medical wholesaler and medical device companies. Because of limitations in time and scope, the medical device users will not be interviewed.

The second sub-dimension encloses the factors that have an impact on innovativeness and the type of innovation developed (see Figure 3). These factors, derived from the existing literature, indicate that public demand and procurement can affect the innovativeness of companies in various ways. Hence, four main indicators were included in order to obtain more accurate findings. The factors that were either most often pointed out as innovation drivers, or were evaluated as the factors with greatest impact per se and subsequently will be used as indicators, are:

1. *Establishment of high standards (Cabral et al, 2006)*

The establishment of high standards concerns both county councils and medical wholesalers’ utilizations of high standards, and if there is a difference between how the organizations use and view product standards. Importantly the type of standards (e.g. environmental or aesthetical) will be evaluated. To solely establish standards is not enough to drive innovation; therefore the medical device companies’ perceived need to reach certain standards will also be paid attention. In order to direct what effect it will have on type of innovation developed, the companies’

perceptions of the consequences in terms of product range offered and focus of research and development will be assessed.

2. *Pre-creation of markets (Blind and Georghiou, 2010; Geroski, 1990)*

The pre-creation of markets will be evaluated by assessing to what extent county councils ensures sales of newly invented medical devices and encourages innovative products in their procurement notices, and if there is a difference between the county councils of the same. The frequency of the county councils' requests for products that does not yet exist will also be evaluated. Beyond this, the companies' perceptions of the same will be illustrated and to what extent the companies take action, i.e. the impact a pre-creation of market has on their incentives to commercialize a product, on product requests.

3. *Encouragement of competition (Geroski, 1990; Uyarra and Flanagan, 2009)*

A boost in competition between medical device companies can spur innovation (Uyarra and Flanagan, 2009). Hence, this indicator is concerned with how the county councils and the medical device companies perceive that competition has developed in relation to choice of public distribution strategy. With regard to this, questions concerning the medical device companies' response to an increased competition and its effect on the incentives to innovate are assessed. It is also important to establish if the county councils consciously paid attention to increasing competition through their procurement.

4. *Definition of clear set of needs towards R&D efforts can be directed (Geroski, 1990)*

Finally, the establishment of clear medical device needs, e.g. functional and/or aesthetical, is important to examine since this may impact the incentives to innovate for the companies (Geroski, 1990). First, it is of great importance to gather knowledge regarding if county councils define needs differently when they utilize a 3PL solution versus a wholesaler distribution strategy. Next, the corporate view must be examined and this will involve addressing to what extent companies perceive that a clear set of needs are defined by the county council. Again, the focus is on potential differences between 3PL and wholesale distribution strategies. Finally, if other needs are identified it is important to determine where these origin from.

In order to address these indicators a combination of interviews and analysis of secondary data will be utilized. Importantly, the focus will be on the differences between 3PL and wholesale distribution strategy. When applicable, the opinions of a medical wholesaler will also be examined to shed light on each indicator.

### 3. RESEARCH METHODOLOGY

---

*The purpose of this section of the paper is to outline the research's utilized research strategy, design and method. Additionally, the purpose is to review the choice of case companies and councils, as well as empirical setting. The chapter is finally intended to shed light on aspects such as the external validity and reliability of the findings, and how these were made certain.*

---

#### 3.1 RESEARCH STRATEGY

Within research strategy, a qualitative approach is especially preferable when “the stress is on the understanding of the social world through an examination of the interpretation of that world by its participants” (Bryman and Bell, 2007, p. 280). Consequently, with the aim of understanding what impact public distribution strategies have on medical device companies’ development of innovations, a qualitative research strategy was applied. The qualitative approach enables individual interpretations (attained from the medical device companies and county councils) in terms of the context within which the research is conducted, which is suitable for a research focused on the contextual and institutional influence. With a qualitative approach, individual interpretations are also attained regarding how interconnections between participants in social settings are evolving over time (Bryman and Bell, 2007), which is crucial when examining the on-going, dynamic relationship between medical device companies and county councils.

The literature within the field of public distribution strategies and their effect on innovativeness is very limited and there are consequently few valid measures to utilize. Without tested and valid measures, a quantitative study is unachievable. Moreover, the development of generally applicable data measures for a quantitative study was unfeasible given the decentralized structure of the county councils and their individual organizational settings and strategies. Essentially, it became evident that there was a great lack in public data which hindered a more extensive (quantitative) data analysis. The fragmented characteristics of the medical device market and the intricate net of distributors and suppliers are other factors that further add complexity to the development of possible quantitative measures. The external validity of such measures would have been highly questionable. Finally, a qualitative research strategy was chosen due to its favor for rich and deep data. It was initially difficult to exemplify how a quantitative study could fully illustrate the dynamic context and effects of the relationship between the institutional (the county councils) and the corporate (the medical devices), in terms of innovativeness. The qualitative approach was accordingly evaluated as the preferable research strategy.

#### 3.2 LITERATURE REVIEW

In order to establish a theoretical basis for the analysis a literature review was in an early stage carried out. The literature review’s purpose was to identify the most prominent theories within each research field, which was achieved through the search of keywords within established databases. From the literature, a set of measurements were derived that are explained in detail in the previous chapter. The literature review’s purpose was also to highlight the most commonly



employed research strategies and designs, and to explore the most suitable research method for the study.

### 3.3 RESEARCH DESIGN

Since this research is focused on determining the consequences of public distribution strategies for innovative, medical device companies this research applied a cross-sectional multiple case study design in order to determine the nature of the effects. The reasons behind the selection of a case study-design are multiple. First, a case study is preferable when the difference between what is studied (the phenomenon) and its context is not clearly evident (Yin, 1984). The complexity of the procurement process and the link between corporate and institutional organizations suggests that the contextual impact is great, which further indicate that a case study is optimal. Second, the purpose of this study is not only to illustrate the current state of public procurement of medical devices, but to investigate “how”, i.e. the innovation consequences of the county councils’ distribution strategies, and for this a case study is more suitable than e.g. a quantitative survey (Yin, 1984).

#### 3.3.1 CHOICE OF EMPIRICAL SETTING AND CASE SELECTION

The empirical setting for the study was Sweden and there are several reasons why Sweden was chosen as the optimal location. There is little previous research on public procurement, medical devices and innovation in Sweden, perhaps due to the country’s longtime superiority in innovativeness. Another potential reason could be the relatively minor domestic market of medical devices in Sweden, which merely accounts for 1% of the global market (Wennerberg, 2011). Consequently, much of the previous research have focused on greater markets for hospital and health care, such as the United States (e.g. Chapman, Gupta and Mango, 1998; Scanlon, 2002; Weinstein, 2002) and the United Kingdom (e.g. Preuss, 2009; Walker and Brammer, 2009). Essentially, Sweden provides the ultimate context for promoting innovation through procurement with its highly regulated public sector and low degree of corruption. While Sweden’s great public sector justifies the context, the country’s diverse public distribution strategies provided the ultimate micro research field for innovation studies. Thus, a combination of a lack of previous research and great impact of the public sector made Sweden the empirical setting for the study.

The companies and county councils that are included in the case study were selected based on several criteria. First, the medical device companies were selected among the 150 medical device companies that are members of Swedish Medtech, and that produces and/or distributes medical devices in Sweden. Naturally, medical devices can range from complex technology driven products such as a pacemaker to consumer products such as a plastic glove. The case companies were therefore, to enable a viable comparison in data, selected based on similarity in product range, i.e. companies that provided consumable medical devices such as catheters and hygiene products. The next selection criterion was that the companies were innovation-oriented, either through own research and development or through procurement of innovative products. Given the character of the industry, i.e. relatively short product-life cycles, it is difficult for medical device companies to have a competitive advantage in the long run **without being innovative** (Eucomed, 2006). Hence, most medical device companies could be referred to as “innovative”. Despite this fact, each case company was ensured to have an innovation-orientation through

several criteria. First, the innovation focus was secured by examining that the companies' vision statements were focused on being leading in innovation. Additionally, it was ensured that the companies had successfully launched a new product within the previous six months.

When determining the effects of public procurement on innovation it is important to take into consideration that smaller companies are inherently different to larger corporations, which filters down to their sensitivity to institutional pressure (Carter, Auskalis and Ketchum, 1999). In order to establish a rich illustration on the effect of distribution strategies, the companies selected were required to be relatively dissimilar in terms of size (number of employees), origin, global presence, managerial governance and product diversity. Hence, variations in corporate and operational characteristics, and especially in size, were a prerequisite for the selection of case companies. Next, each of the companies was required to depend on the county councils as their major customer. By ensuring dependence, the study would be able to examine the effect of the public procurement strategies, while disregarding market-related factors originating from other customers. The interviewed medical wholesaler was chosen based on its superiority within the Swedish medical device market, with contracts stretching over several geographical regions.

After the selection of case companies was made, the choice of informants within each case company was determined. The participants were decided based on their experience and knowledge of the company, their insight into the corporation's sales strategy, contact with the customers and their involvement in the management of public procurement. Preferably, the interviewees would rate high on each of the previously mentioned factors. As a result the informants that were interviewed had positions such as *Sales Manager*, *Division Manager* and *Chief Executive Officer*.

Finally, the study focuses on three independent county councils. Importantly, the procurement strategies within Swedish county councils differ greatly (on various levels) and a selection based on similarity does not ensure a comparison, which traditionally would be the case. Consequently, the selection of county councils for the case study was primarily based on each council's distribution strategy; one council has 3PL, one has a combination of medical wholesaler and 3PL and one has recently chosen to maintain their 3PL distribution strategy. The intention of choosing county councils with different distribution strategies was to provide a richer illustration of the county councils' procurement, and if found; examine the differences that exist – in relation to the distribution strategy. Within each of the county councils informants with positions such as *Procurement Manager* and *Primary Health Care Manager* were interviewed. These participants were selected based on their great insight and impact on strategic procurement and distribution decisions.

### 3.4 RESEARCH METHOD

The data for this research paper was collected through semi-structured interviews and secondary data sources. The primary reason for this selection was that semi-structured interviews, as opposed to unstructured, allow for a reduction in errors due to a reduction in impact of the interviewer in the data collection. Moreover, multiple-case studies, such as this research, are likely to employ some form of structure in order to ensure cross-case comparability (Bryman and Bell, 2007). The semi-structured interview does not however secure an error reduction to the same extent as a fully structured interview. Yet, the semi-structure method was chosen due to its

increase in flexibility that is crucial when assessing such a dynamic and changing relationship as the relationship between public distribution strategies and innovativeness. A purely structured interview method would hinder the assembling of knowledge as it dictates the boundaries of the conversation (Bryman and Bell, 2007), and valuable information could thus have been lost.

Next, Bryman and Bell (2007) conclude that the more the researcher has a clear idea of how the data will be analyzed and the more specific the topic is, the more structured will the interview be. Public distribution strategies and its effect on the innovativeness of Swedish medical device companies is a research field that has not been given much attention in the past, and the general opinion on the development is thus missing. Hence, a fully structured interview would not be suitable. As previously stated, public procurement in county councils differ widely and each organization may be managed differently. Consequently, an entirely structured interview would not enable the organizational differences that exist to be illustrated during the interview and valuable information would be lost. An overview of the interview questions applied can be found in Appendix.

The second source of data was secondary, qualitative and quantitative, data from public archives, where procurement documents and reports were studied. The secondary data provided a complementary source of information to the interviews, and was focused on the county councils' procurement policies and publications of contract notices. The reason why these documents were chosen lies within that they are the primary way in which county councils communicate their procurement objectives and needs. To reduce biases only the most recent procurement policies were used and historical documents were only applied if connected to a specific historical event being studied.

### 3.4.1 ACCOMPLISHMENT OF INTERVIEWS

As previously mentioned, the interviews were semi-structured and contained a list of indicators to be covered (i.e. an interview guide), plus an opportunity to develop the answers further by extending the answers into other topics. The interview questions were carefully formulated to fulfill the requirements of Bryman and Bell (2007) p. 365 and can be found in Appendix. To reduce the effect of the researcher on the interviewees the interviews were all administrated by the same researcher. Moreover, in order to facilitate as rich data as possible without any errors related to misinterpretations, the interviews were conducted in the interviewees' native language (Swedish). The interviews were recorded and transcribed, where after the answers were translated into English. From these transcription, specific or general issues that the interviewees proposed as relevant to the relationship between distribution strategy and development of innovation were identified.

The case companies were interviewed on site, at each company's Swedish central office. The county council representatives, on the other hand, were interviewed differently, depending on the accessibility of the key personnel. Consequently, a combination of on-site and telephone interviews was adopted when addressing the county councils. On the basis of the interviewees' request the identity of the case companies will remain anonymous.

### 3.5 EXTERNAL VALIDITY AND RELIABILITY

External validity can be described as the ability to generalize the results (Bryman and Bell, 2007), and it was ensured in various ways. First, the sample of case companies were selected to replicate the characteristics of medical device companies in Sweden, i.e. their size and origin differs. The validity was further ensured by selecting responses from individuals deemed to be knowledgeable of the aspects under scrutiny. The results show that all the informants interviewed held or had previously been holding a managerial position, which in public procurement research often are regarded as knowledgeable of these issues. Moreover, the impact of the external environment during the data collecting was minimized by conducting the interviews in the informants' natural environment, i.e. their offices. Hence, disturbing factors such as noise, time and location were reduced and should not affect the data gathering.

The reliability of the results concerns the repeatability of the measures used (Bryman and Bell, 2007). Since this is a qualitative study, retests and internal consistency tests were not feasible and the reliability of the measures is instead resting upon their use in previous research. The indicators concerning the relationship between the actors in the supply chain were derived from an interview with Swedish Medtech, and were thus the only measures not validated in previous research.

## 4. EMPIRICAL CONTEXT

---

*The purpose of this chapter is to illustrate the empirical context within which the research was carried out. The empirical setting is Sweden, and the public procurement laws and process will accordingly be portrayed. The section is also intended to demonstrate the constructs of the Swedish medical device market and its market channels, and the various existing forms of distribution strategies. Finally, the chapter aims at portraying the recent development of public distribution strategies among Swedish county councils.*

---

### 4.1 PUBLIC PROCUREMENT IN SWEDEN

Sweden has in the past been successful in promoting innovations and was, in a recent report on innovativeness in the European Union, ranked as the most innovative country with investments in intangible capital competencies of 9% of GDP (Blind and Georghiou, 2010). With a tight cooperation between state-owned enterprises such as SJ, Vattenfallsverket and Televerket, Sweden has historically experienced an efficient supervision and promotion of innovations. However, with deregulations and privatization the characteristics of the Swedish market has become vastly different and the government must seek new ways to support innovations. A response to this need is the basic principle that all procurement must be “innovation-friendly” (SOU 2010:56; Uyarra and Flanagan, 2009).

#### 4.1.1 PUBLIC PROCUREMENT REGULATIONS IN SWEDEN

The public procurement is in Sweden governed by the Swedish Public Procurement Act (LOU, 2007), which is based on the EU Directive 2004/18/EC concerning public procurement. LOU essentially directs how the public procurement should be carried out, and five fundamental principles are emphasized: transparency, equal treatment, non-discrimination, proportionality and mutual recognition (Konkurrensverket, n.d. a). Sweden is, as many other countries, increasingly subject to a growing European Union influence, specifically through EU public procurement directives (Lidestam and Abrahamsson, 2010). Consequently, all contracting authorities must follow the fundamental principles of the EU Council’s directives on public procurement (Göteborgs stad, n.d.). The purpose of the public procurement laws is to ensure that “contracting authorities use public funds to finance public purchases in the best possible way by seeking out and taking advantage of competition in the relevant market in order to get a good deal” (Konkurrensverket, n.d. a). In Sweden, the Competition Authority exercises supervision of the procurement and provides information about regulations and rulings. Although the procurement is overseen by a national public body, the procurement within LOU is referring to procurement conducted by local government authorities, county councils, central government authorities and certain public undertakings that do not conduct any of the operations belonging to the utilities sectors (LOU, 2007).

Depending on what is being purchased, the public procurement is managed through a decentralized structure where Sweden’s 20 county councils each manage their procurement. Consequently, the supervision of the procurement differs greatly between the various councils’ chosen procurement strategy (Dahlgren, 2011). As an example the county councils’ procurement in Dalarna, Västmanland and Uppsala län were in 1999 united into one unit:

“Varuförsörjningen”. A supervisory public authority with representatives from all councils was established and the procurement was carried out simultaneously for all the participating councils (Varuförsörjningen, n.d.). Similar forms of procurement constellations can also be found in other councils.

#### 4.1.2 THE PUBLIC PROCUREMENT PROCESS

The public procurement can be regarded as a six-phase process which is illustrated in Figure 4 below. On average a procurement process starts 12 -18 months before the procurement is expected to be finished (Varuförsörjning, n.d.).

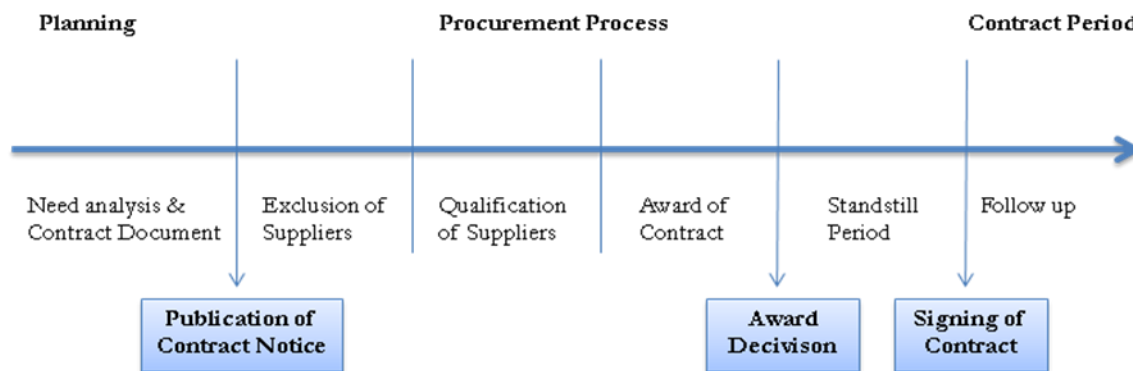


Figure 4: Overview Procurement Process (LOU, 2007)

The first steps compose of a need analysis, contract value calculation and the creation of a contract document. When the value of the contract is established it is evident if the contract is lower or higher than the threshold value, which in its turn has an effect on what rules that will be applied. Within the contract technical specifications (e.g. functional requirements), principles for evaluation or environmental and social requirements are stated. The suppliers can either be evaluated based on lowest price, or on being most economically advantageous. The latter is often dependent on a summary of factors such as quality, delivery period, environmental characteristics, price, aesthetics, service and technical support (LOU, 2007). This type of awarding is often referred to as “scoring-based competitive tendering” (Waara, 2007).

The next step is the publication of a contract notice, which can be published in several ways depending on procurement procedure applied. In terms of communication between the councils and the tenders, the contracting authority is free to choose means of communication, but it is usually carried out by post or email (LOU, 2007).

After receiving offers from suppliers, the contracting authority excludes suppliers and determines their suitability, to finally award the contract. In the process of determining a supplier’s suitability the contracting authority examines which supplier that satisfies the qualification requirement that were imposed for the procurement (Konkurrensverket, n.d. b). When the contracting authority has awarded the contract, they must inform all the candidates and tenders in writing as soon as possible. The tenders that were not selected then have an opportunity to appeal ( LOU, 2007).

### 4.1.3 THE SWEDISH MEDICAL DEVICE MARKET

Sweden accounts for approximately 1% of the global medical device market and is thus a relatively small market. Despite its small size the estimated net sales account for SEK 76,833 billion annually (Wennerberg, 2011). The medical device industry is, opposed to the pharmaceutical industry, characterized by a dominance of small and medium sized enterprises (accounting for 80% of all companies) (Eucomed, 2006). In terms of development, the medical device market is growing rapidly with a compound annual growth rate of the industry of 13.2%, between the years 2002-2006 (EDM Service, 2011).

### 4.1.4 PUBLIC PROCUREMENT OF MEDICAL DEVICES

Sweden has a national, public health system that is highly decentralized. The government dictates the basic principles for the health care, and then the directly elected county councils are responsible for providing the health care. Approximately 85% of the healthcare is thus financed through revenues from taxation (EIU, 2007).

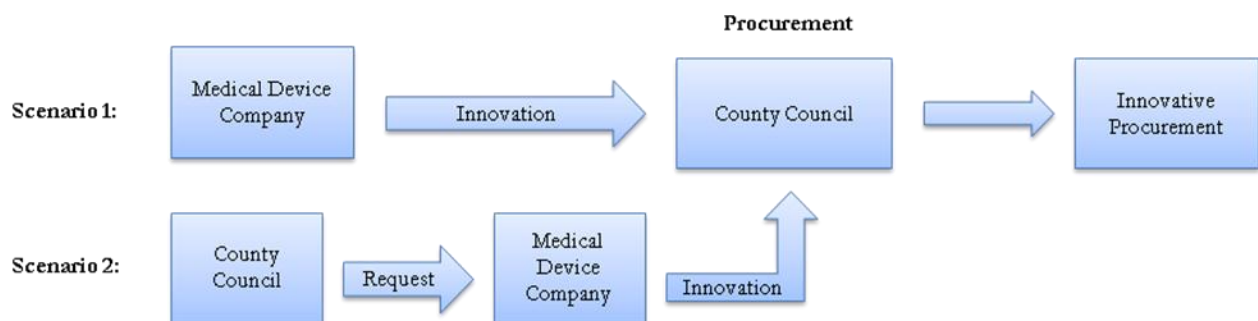
The procurement process of medical devices follows the regulations that are stated in LOU and is initiated with a need analysis. The usually length of the medical device contracts are four years, occasionally with opportunities for extension. In contrast to more basic products, such as writing materials and office supplies, where the functional requirements are less advanced the county councils often consult with a group of references when procuring medical devices. These reference groups consist of product users, nurses, doctors and other experts that have greater knowledge in the subject. The reference group participates in four meetings during the procurement process, which can stretch over a one-two year period. The reference group has great authority in affecting what products characteristics that is required and how these will be evaluated, and finally chosen (Varuförsörjningen, 2008). Occasionally, medical device companies are invited to the councils to present their latest innovations (Wennerberg, 2011).

As a result, the need analysis for medical devices is a relatively time demanding process for the councils. The needs and functional characteristics that are established for the procurement vary according to the degree of complexity of the product. Each requirement is then awarded a weight, and the suppliers are evaluated based on the total amount of points they receive (VGR, 2009). As an example, when Stockholms Läns Landsting was procuring medical incontinence devices in 2010 the products were required to, among other things, be produced by a plastic material that did not contain PVC. Other factors required were that the medical device company should provide education about the medical devices, have specific opening hours for their customer service and be able to distribute devices within four workings days to the patient. Importantly, some requirements are demanded in order to be considered as a potential supplier, while other requirements are used as evaluation criteria when awarding the contract (SLL, 2009). Another example is a procurement carried out by Västragötalands län regarding the procurement of catheters. Besides having product information in Swedish within the package, the catheter's surface was required to be hydrophilic (meaning a material that is wet and slippery for a frictionless insertion) and the degree of friction should be indicated on the package (VGR, 2009).

## 4.2 MARKET CHANNELS FOR INNOVATIONS WITHIN THE SWEDISH MEDICAL DEVICE INDUSTRY

There is no national law regulating innovation procurement policies within the Swedish health care and the Swedish Competition Authority recently declined the suggestion of a new law concerning innovation friendly procurement. The main reasons behind this decision were the fear of a too complex procurement process, which ultimately could result in a procurement exclusion of small and medium enterprises, and a decreased intelligibility of the current procurement regulation (Konkurrensverket, 2010; SOU 2010:56). Hence, the drivers of innovation within the Swedish medical device industry are to be found outside the regulatory framework.

There are two main ways in which innovations reach the market within the Swedish medical devices market (see Figure 5 below). The first channel is the company-driven innovation, where companies through their R&D develop innovations and bring their new medical devices to the county councils to assess if they can be procured (Wennerberg, 2011). This type of innovation-driver is often categorized as a “direct” driver (Uyarra and Flanagan, 2009). Second, the county councils can contact medical device companies with their needs of new products or product improvements, and it is then up to the companies to produce the innovation (SOU 2010:56). The latter is often referred to as “public technology procurement”, and occurs when the councils place orders for products that does not yet exist, but which may be developed within a reasonable period of time by e.g. more investments in R&D. The driving force behind innovativeness in this category is of an “indirect” character (Uyarra and Flanagan, 2009). This phenomenon is also referred to as “forward commitment procurement” and is suggested as a tool for promoting innovation in Sweden (SOU 2010:56).



*Figure 5: Market Channels for Innovations within the Swedish Medical Device Market*

Accordingly, the drivers of innovation need to be divided within each subgroup. The company driven innovation (scenario 1) features all the traditionally emphasized internal drivers of innovation, such as: a team with high levels of trust, the formulation of innovation strategies, the management of creativity, cross-border collaborations and industry clusters (Dodgson et al, 2008). The potential procurement regulatory influence on these factors is not as prominent as in scenario 2, since these factors are managed within the organizational boundaries.

With “the forward commitment procurement” driven innovation (scenario 2), new standards and needs (e.g. the need for a firmer material or less environmentally harmful plastics) provided from the healthcare sector and politicians supply the companies with incentives to carry out research and development, and ultimately develop innovations (Dodgson et al, 2008; Wennerberg, 2011).



One great benefit for companies that are exposed to new requirements such as these is the guarantee of a future market and thus revenues, which may justify expensive investments in R&D (Blind and Georghiou, 2010; Uyarra and Flanagan, 2009). A mutual requirement for both scenarios is the communication between the medical device company and the county council. This communication is constituted of organized meetings, public announcements and means of communication regulated in LOU (e.g. email) (Brundin 2011).

### 4.3 SWEDISH PUBLIC DISTRIBUTION STRATEGIES: WHOLESALER VERSUS THIRD-PARTY LOGISTICS

After procuring the medical devices, a functioning logistics that transports the products from the medical device company, to a storage area or inventory, hospitals and district health centers alternatively directly to the end-users' homes is essential (Brundin, 2011). There are three primary ways in which the county councils can manage the distribution of medical devices, and the choice of strategy is decided independently within each county council.

The first strategy is procuring the medical devices directly from the medical device company and using a third party logistics solution (3PL) that organizes the logistics and transportation of the devices, while the council often still owns and manages the device inventory (see Figure 6 below). The third party logistics firm is a company that is specialized in distribution, e.g. Schenker or Posten, but occasionally medical wholesalers, such as Mediq or Onemed, are also hired to carry out the distribution (Wennerberg, 2011). The law of public procurement (LOU) is thus applicable to the procurement of the medical devices, as well as the procurement of the logistics. In this type of distribution strategy, the county council manages two public procurements (Swahn, 2011).

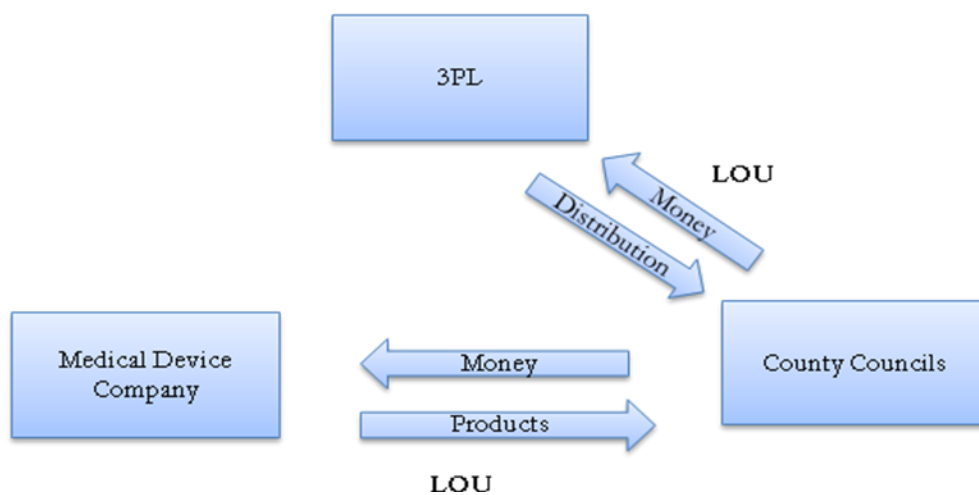


Figure 6: 3PL Distribution Strategy (Wennerberg, 2011)

The second strategy is similar; the only difference is that the county council itself carries out the distribution, i.e. integrates forward in the value chain. In this case the county council often organizes the distribution of medical devices with the distribution of other product categories, e.g. office supplies (Wennerberg, 2011).

Finally, county councils can purchase medical devices *and* distribution from one organization, a medical device wholesaler, which is very similar to a purchasing group (see Figure 7 below). The medical device wholesaler offers a variety of products, and the county council's contract agreement with the wholesaler is thus much more extensive than a "normal" agreement, both in terms of volume and number of articles procured. The medical wholesaler, in summary, offers the market's whole product range, manages supplier relations, organizes the logistics, manages customer service and coordinates inventory (Swahn, 2011).



Figure 7: Wholesaler Distribution Strategy (Wennerberg, 2011)

As a result, instead of having multiple contracts and procurements of different medical devices and logistics solutions, the medical wholesaler offer a unified solution that only requires one public procurement agreement (Onemed, n.d. a). Another consequence worth noting is the change in application of laws. The procurement from the medical wholesaler is still regulated by LOU, while the relationship between the medical wholesaler and the medical device company is changed to a business-to-business agreement (Wennerberg, 2011). Through greater volumes and an efficiently managed logistics the medical wholesaler can offer a mutual delivery for various articles, which they market as "lowering the prices and being more environmentally friendly" (Swahn, 2011). According to one of the greater medical wholesalers, a 3PL solution is less flexible than a wholesaler distribution strategy since the medical wholesaler is not obligated towards the supplier. It is further suggested that the total cost for the county councils is much higher with a 3PL solution, especially considering that many suppliers today appeal the procurement decisions (ibid).

The majority of the county councils in Sweden use a third party logistics strategy, while the wholesaler solution is least applied. Some county councils in Sweden use a combination of the distribution solutions, and some councils have joined procurement (e.g. Sörmland, Västmanland, Dalarna, Örebro och Uppsala). For an overview of each county councils distribution strategy, see Appendix.

## 5. CASE STUDIES

---

*The upcoming chapter is intended to outline each of the case studies selected for the research. The chapter is divided into three parts, where the first one portrays the medical device companies' perspective. The second part's purpose is to describe the development from a county council point of view, and finally the chapter intends to examine the opinions of a medical wholesaler and the Association for Medical Technology in Sweden. First, a short overview of each organization's operations will be illustrated. Next, the perception of public distribution channels and the effect it has on the innovativeness of the medical device companies are portrayed.*

---

### 5.1 MEDICAL DEVICE COMPANIES

#### 5.1.1 COMPANY SIGMA

Sigma is a relatively large medical device company with around 2,000 employees, where the majority is employed in Sweden. The total sales in 2009 amounted to SEK 3.9 billion, which was divided between Sigma's two main business areas: urology and dental care. Since the establishment in the mid 1900's the company has expanded internationally and can now be found in 16 countries. Sigma relies heavily on R&D and spends a significant amount of its budget each year on innovations, and the majority of their products are their own innovations. Their main research and development unit is established in Sweden, but the company occasionally purchases innovations from other companies.

#### 5.1.2 COMPANY EPSILON

Epsilon is a medical device subsidiary that was founded in the early 1990's, and is currently employing around 40 workers in Sweden. The company is part of a global group, with more than 40,000 employees globally and the Swedish market's importance is thus relatively small. Epsilon's product range consists of urology products, hygiene products (e.g. disinfectant), wound products and stoma care (e.g. colostomy bags), and sales in Sweden estimate approximately to SEK 300 million annually. Epsilon develops its own products through global innovation networks.

#### 5.1.3 COMPANY OMEGA

Since the start in the end of the 1960's, the Nordic medical device distributor Omega offers products within e.g. radiology, cardiology, intensive care and endoscopy. The Swedish branch employs approximately 30 workers and has a turnover that estimates to SEK 160 million. Importantly, Omega does not itself produce the medical devices but is instead a distributor of medical devices with over 50 suppliers. The business model is centralized around marketing and distributing the medical devices, which of many are produced internationally. The company demands that its suppliers are highly engaged in research and development, and has a clear environmental policy. The suppliers are both small and large medical device companies, most do not want to have a business branch of their own in Sweden. Omega is an independent part that engages in the procurement process with the county councils, and it is also Omega that has the direct contact with the users of the products.

## 5.2 CASE INTERVIEWS

### 5.2.1 DRIVERS OF INNOVATION

In order to facilitate a rich analysis it is first important to determine what drives innovation within the companies. All companies perceive themselves to be innovative, and the Division Manager at Epsilon state that with three to five innovations per quarter the force of innovation within their company is great. The companies also are of the same opinion concerning that a key source of innovations is the users of the products, i.e. doctors and nurses. The Chief Executive Officer at Omega states that 90% of the innovations originate from other sources than the company itself: “In general, most innovations are driven from the users”. The Division Manager at Epsilon explains that innovation can arise in several ways.

There are essentially two ways that innovation is driven within our company: One driver is the competence we built through working at the company and meeting the users. The second is someone within the healthcare that has an idea regarding an area within the medical device area where we are represented. They contact us and we write a contract regarding confidentiality, where after we test to find out if the idea seems to be good and if we can produce it.

The distributor Omega has a relatively different outlook on the other factors that drive innovation since they do not carry out any research and development on their own. Instead, Omega constantly evaluates their suppliers to find the most innovative, but agree that the contact with the users is essential.

We often chose the smaller, more innovative companies. These companies are built on one single innovative idea and have developed a product that is more or less ready to be launched. We often take the product to the specialists we have within our network, that potentially could be interested in the new products, and presents and discusses, directly with the users.

One of the managers explains that they have an internal benchmark, where they measure 55 countries on their innovativeness. Sweden is ranked as one of the worst countries when it comes to publicly procure innovations. He points out that two of the reasons behind this are that the county councils often procure the same products they had the year before and that the procurement process is very time consuming.

There is also another aspect, and that is the Principle of Public Access to Official Documents. As soon as you launch a new product in Sweden the competitors can get information about it, and that results in that Sweden might not be your first choice when launching a new product.

### 5.2.2 THE DEVELOPMENT OF THE DISTRIBUTION STRATEGIES IN SWEDEN

The companies' point of view regarding the development of the county councils' distribution strategies is of importance to evaluate how they are affected. All companies perceive that the county councils, after pressures to reduce costs, more frequently turn to a medical wholesaler. However, the Division Manager at Epsilon mean that some companies perceive this development as a new phenomenon, while their company experienced this for as much as 20 years. The increased discussion regarding the use of 3PL or medical wholesaler is, according to the informant, due to that more and more companies have been affected by the downsides of this “new” type of distribution strategy. This point of view is supported by the Sales Manager at Sigma, who perceives that there have always been medical device wholesalers for some type of

products, e.g. plasters and adhesives. These medical wholesalers have grown and gained importance, and essentially developed into large and powerful medical wholesalers.

The business idea is obvious: you [the medical wholesaler] brand your own products and put them besides the other products. You have the same type of products, but to a lower price... By doing this, the intermediary earns money and the supply chain has changed from transportation to a way to earn money.

Two informants put an emphasis on the product evaluation process of the county councils. The Division Manager at Epsilon and the CEO at Omega has experienced that the county councils limit their assessments when they evaluate if they should carry inventory or not.

The county councils are questioning if holding inventory is part of their core activities. They thereafter assess everything, even their own staff. No one within the county councils assess all their 7,000 products, one is too busy with staff and logistics. As a result, the county councils only look into 300 products, a sample of the whole list of products. The medical wholesalers then lower the prices on these 300 products as much as possible. Different prices in different products then only depends on if the product is on the 300-list or not... In terms of a national economical view, this system is absurd.

The Sales Manager at Sigma believes that when county councils use a 3PL strategy as opposed to a wholesaler, all parts involved do what they are best at. This can be a time consuming process that demands a high degree of coordination, but the county councils have more control over what products they purchase. He concludes that “when the councils use a medical wholesaler the procurement managers get a lot less to do, since they only purchase a basket of products”.

### 5.2.3 THE RELATIONSHIP BETWEEN MEDICAL DEVICE COMPANY AND COUNTY COUNCIL

The contact between the medical device companies and the county councils is the next indicator to be examined. Importantly, this is a two-way relationship that consists of the ability for the medical device companies to contact the county councils and the communication from the county councils towards the medical device companies. The contact is determined by both the quality of the relationship and the frequency of their meetings. With regards to the latter part, the three companies are not able generalize and estimate how many hours they meet each county council, and also point out that they have different contact depending on the function of the staff within the county council. However, the Division Manager at Epsilon perceives that the amount of contact with the county councils differs depending on the type of distribution strategy: “We do not have as much contact with those county councils that choose a wholesale distribution strategy”. The Chief Executive Officer at Omega has another standpoint and states that the contact with the procurement division at the county councils is in general the same, and does not differ for the councils that choose a medical wholesaler.

In terms of the quality of the relationship, the CEO at Omega perceives that the law of public procurement (LOU) is too limited as it is today, which have an effect on the relationship. This is something that is confirmed by the other companies as well. The Manager at Epsilon says “the county councils want to procure innovations, mentally, but the law concerning public procurement makes it more difficult to procure innovation now than it was before”. The companies do not perceive a significant reduction in quality in the relationship with councils that

choose a medical wholesaler. The CEO at Omega concludes that the relationship is not open enough, despite type of distribution strategy.

#### 5.2.4 THE RELATIONSHIP BETWEEN MEDICAL DEVICE COMPANY AND MEDICAL DEVICE USER

“The contact with the users is very important, it is essential” – the CEO at Omega.

One of the single most important indicators for the medical device companies, in terms of impact on innovativeness, is the one that concerns the relationship between the company and the user. The Division Manager at Epsilon says that the relationship with the users is directly influencing the company’s understanding and competency. He concludes that “the contact with the users is very important to drive innovations; it is absolutely one of the most important innovation drivers”.

All three companies believe that this relationship is negatively affected by the choice of a medical wholesaler over a 3PL distribution strategy. The Sales Manager at Sigma explains that the medical device wholesaler often dictates the “rules” of the relationship, and that the only exception is if you have a brand that is so strong that the users demand to have your specific product.

The worst consequence with the choice of medical device wholesaler is that you are not allowed to have contact with the final consumer. The wholesaler is like a filter between you and the person that is using the products. ..You do not get the crucial feedback about how your product is perceived and performing... That is the main problem with the medical device wholesalers; they do not want you to have contact with nurses and doctors.

Both the quality and frequency of the contact is reduced with a medical wholesaler, according to the CEO at Omega. “We get a lot further away from the users and we get less control over what it being used. The ways of communication lengthens and there is a risk that we do not find out if there is dissatisfaction with the product... The contact with the users is very important, it is essential”. A conflicting view is brought up by the Division Manager at Epsilon. Since the information requirement is great on all of their products, they have people within their organization that are constantly occupied with meeting and educating staff at the hospitals, despite type of distribution strategy.

In terms of the consequences of the reduced amount of contact the CEO at Omega believes that one likely outcome is that it will be more difficult to commercialize new products. Essentially, he concludes that there are many potentially negative risks and that the company misses out on important feedback.

I also believe that it will be more difficult to bring innovations to the market. It is much easier when you can go directly to the users and procurement managers and says “now there is a new product”... That is what we have experienced. The communication in lengthened and I don’t think that is good.

#### 5.2.5 THE USE OF PRODUCT STANDARDS

There are indications that the use of standards within the procurement varies greatly between the 3PL and medical whole sale distribution strategies. The Sales Manager at Sigma believes that the

overall use of standards has decreased over time, and that the county councils focus more on how the product should look (e.g. length and width) as opposed to its functional requirements.

Essentially, it results in that the companies produce a product that looks in a particular way, instead of solving the medical issue. I think that it [the reduced use of standards] is a result of lack in time, it is easier for the councils to just describe the looks of a product - to describe its functionality demands time and knowledge.

All three companies agree that a consequence of the use of a medical wholesaler is that the product requirements are lowered and there is an increased focus in price. The Sales Manager at Sigma states that the medical aspects' importance has declined while the economical aspects gained importance.

Yes, there are different requirements on the product depending on if the councils' chose 3PL or medical wholesaler. With a medical wholesaler, the only thing that matters is the price and if you can deliver towards the decreased costs.

The CEO at Omega agrees and says: "The county councils focus differently if they use a medical wholesaler". He further concludes that with a medical wholesaler it is not a real public procurement because "you do not get the contract with the product follow-up that you had before and that results in that you do not require high product standards, because it is outside the public procurement".

All companies highlight that the relationship with the medical device company and wholesaler is affected during this pressure towards lower prices. The Division Manager at Epsilon provides an example of that the wholesalers often change the product assortment, after the procurement, to include more of their own private label products.

It is important to know that the medical wholesalers have own private brands, copies of our products, and we have discovered that they tell the users that "this supplier is experiencing some delivery issues, so either you can get this product now [the wholesaler's private label] or you will have to wait for the product". The health care cannot wait for products because the patients are sick, and the medical wholesalers can in this way rearrange the product assortment towards their own products. This happens.

The CEO at Omega also experienced that the medical wholesalers changed the assortment, which he believes will result in a reduced quality in the medical devices supplied. The Sales Manager at Sigma says that the medical wholesaler pressure them to lower their prices, if not they will not procure their products.

The medical wholesaler turns to the suppliers and says that "if you want to be part of this product range, you have to give me a very good price because if you don't then I will use another supplier"... This happens because the final user is not per se as interested in the quality of the product.

It is suggested by the Division Manager at Epsilon that the hospitals have to some extent started to use other products after choosing a wholesale distribution solution, but that it depends on what type of medical device: "Medical devices with a high degree of instinctive feel will always be prioritized by doctors and hospital, despite distribution strategy". Importantly he emphasizes that

the instinctive feel is not necessarily greater for a more technologically advanced product; he states that there is the same instinctive feel with a less complex product like a syringe. Instead, he perceives that the county councils' use of standards occasionally is dependent on their intended user.

It seems like the county councils thinks that if the product is for a nurse, the procurement is about price and if the product is for a doctor then you evaluate the device more carefully.

What consequences will this downward pressure in price have on the companies? The informant at Epsilon state that an intense focus in lowering prices could result in an internal shift in product range, towards cheaper products.

When there is this downward pressure on prices, we must choose to either produce simpler and cheaper products or we must evaluate what degree of service we can offer the users of our products – because the money must come from somewhere... We have not yet changed our product assortment, but we will most likely change it in the future.

The CEO at Omega agrees and state that the company will in the future segment their assortment according to the county councils' price-focus.

If there is only a focus on distributing the cheapest product possible and the product standards are decreasing, you will naturally adapt and distribute other products... You may distribute some products to the councils that have more detailed standards and other [medical devices] to the councils that are focused on price.

Finally, the Sales Manager at Sigma states that the product standards today are not supporting the procurement of innovations. On the contrary, he believes that it is more difficult to procure innovations with the standards that are used today: "I think that the product standards generally are bad, they suffocate innovations". This conclusion is supported by the CEO at Omega, who concludes that "there is an increased focus on price, and it is more difficult to introduce innovations".

## 5.2.6 THE PRE-CREATION OF MARKETS

The creation of markets, prior to the development of the medical device innovation, could provide a great incentive to innovate. However, the medical device companies percieve that with a medical wholesaler it becomes less clear what type of products that are being purchased. "There are a couple of county councils that have chosen the medical device wholesalers' total "package". You [the county council] do not get control over the products" says the CEO at Omega.

The companies have experienced an increasingly insecurity in the markets associated with the use of a medical wholesaler. This insecurity is related to the fact that the medical wholesaler often change the product assortment during the procurement, and that the county councils have less control over what exact medical devices are being delivered. "With a medical wholesaler, the county councils lose their own responsibility and insight into the inventories; they do not know what they purchase", says the Division Manager at Epsilon. The Sales Manager at Sigma supports this view.

The county councils just say "give us medical devices, approximately in this volume and to this price" and what they [the medical wholesaler] deliver is not that important.



Related to this issue is the frequency of requests in new products by the county councils. With a medical wholesaler the contact between county councils and medical device company is often reduced. Consequently, the companies perceive that it becomes more difficult for the county councils to communicate new needs and product suggestions.

### 5.2.7 THE ENCOURAGEMENT OF COMPETITION

Is the choice of public distribution strategy affecting the degree of competition between the companies? If yes, then this could spur the incentives to innovate. The Sales Manager at Sigma means that the competition has increased in the industry as a whole, and states that the number of medical devices in the Swedish market has increased from 5,000 to 25,000. This view is supported by the other companies, but they are not sure if the increased competition is solely related to the choice of distribution strategy. Instead, the fact that each county council chooses different products is pointed out as a potential driver of competition. The CEO at Omega additionally states that the use of a wholesaler could have an adverse effect on competition.

The competition has increased to some degree, especially within more mature [business] areas. The main reason behind this development is that the public procurement has become more acute... I don't believe that the medical wholesalers per se contributed to the increased competition... There are only a few companies that offer the wholesale solution, and the result could rather be the reverse; to reduce the competition within the assortment because you are locked towards one, single actor.

### 5.2.8 THE DEFINITION OF A CLEAR SET OF NEEDS TOWARDS WHICH R&D EFFORTS CAN BE DIRECTED

The definition of a clear set of needs towards which the medical device companies can focus their R&D efforts can work as an important driver or innovation. This innovation driver is inter-related with the previously mentioned use of standards and pre-creation of markets, as both are part of directing the R&D investments within companies. The companies perceive that the definition of needs is worsened with the use of a wholesaler, which originates in two factors. First, with a medical wholesaler the communication with the county councils and the users is separated by the medical wholesaler. It is thus more difficult to communicate what the users' needs are and thus more difficult for the medical device companies to prioritize their R&D investments. The CEO at Omega perceives that the relationship between supplier and medical wholesaler is not a real relationship; it is of static characteristics.

I get the impression that the relationship between medical device company and wholesaler is more of mechanical in nature... I believe that it is difficult to approach a medical wholesaler with a new innovation so that they can bring it into their product assortment; in that case I think it is easier to approach the users.

Second, the medical device companies explain that the county councils lose control over what products that are purchased with a medical wholesaler, and consequently it becomes very difficult to assess what to produce. As previously concluded, some companies have experienced that the medical wholesalers have changed the product assortment – a fact that further add insecurity into where to focus their R&D efforts. The only direction that is emphasized with the use of a medical wholesaler is the need to produce cheaper products.

## 5.3 COUNTY COUNCILS

### 5.3.1 STOCKHOLM LÄNS LANDSTING

Stockholms läns landsting (SLL) is one of the greatest county councils in Sweden, and is responsible for a procurement of SEK 14 billion annually. Through the procurement, which generally takes one year to coordinate, the county council provides products and health care to the 1.9 million inhabitants. The public unit “Hälso- och sjukvårdsnämnden” is responsible for the procurement of medical devices and was until 2010 using a 3PL distribution strategy (SLL, 2006). The county council in Stockholm was the first county council to procure medical devices from a medical wholesaler. Elizabeth Knudsen, responsible for the procurement of medical devices explains that they utilize what they refer to as a “functional procurement”.

We have said in this procurement that the contracting entity is responsible for addressing detailed product requirements, we say that we are simply interested in procuring “a function”, e.g. catheters and they must follow the medical directives that exist.

SLLs contract with medical wholesaler Onemed came into force in November 2010 and Onemed is essentially responsible for selecting products, holding inventory, managing the logistics, the contact with product users, negotiating with medical device companies, and providing education and information about the products.

Onemed works in “assortments groups” with doctors and nurses and their own, competent staff to declare what type of e.g. catheters we need, based on the users’ needs. Then Onemed contracts with the producing medical device companies and establishes an assortment that we bring to the doctors and nurses.

As a result, the county council pays a fixed price per product. “Within this fixed price everything from transportation, education to nurses and doctors to the work with establishing contracts with producers and suppliers is included, we do not add any other costs”, says Knudsen. The new contract is worth SEK 300 million and is thus a relatively large contract. Because of its size and the council’s limited experience with this type of solution the length of the contract is shorter than unusual: three years with an opportunity to extend the contract with two years. “In general, when we are preparing for a public procurement we want to have contracts that are longer, it is an investment for the companies and we put in extensive work when we do this procurement... We shortened this procurement to three years because we wanted evaluate it, because it is new”, says Knudsen.

### 5.3.2 LANDSTINGET I ÖSTERGÖTLAND

The procurement for the 420,000 habitants in Östergötland is managed through a service function called ”Upphandlingscentrum”, which utilizes a 3PL strategy. The unit is responsible for the procurement of all products, services and indoor decoration for Östergötland, and the total budget amounted to SEK 3 billion in 2006 (Dnr InKL-2003-1027, 2008). The purpose of the unit is to ensure that the procurement is managed in compliance with LOU, while at the same time optimizing the efficiency. Out of the SEK 3 billion budget, SEK 1.7 billion is spent on services and products for the health care sector. Occasionally, the county council cooperates with other county councils (e.g. Jönköping and Kalmar) and joins in a unified procurement, often based on needs for cost savings.

### 5.3.4 VÄSTRA GÖTALANDSREGIONEN

Västra Götalandsregionen (VGR) is a county council in the south-west of Sweden. The 1.5 million inhabitants are supplied with health care through a central procurement division that is responsible for all public procurement within the region. Consequently, VGR utilizes both a 3PL solution and integrates forward through own inventories. The two inventories (located in Skövde and Sisjön) within VGR, handles all articles of consumption from all 300 suppliers (VGR, n.d. b). The council procures products worth more than SEK 7 billion annually. There are around 60 employees that work full-time in handling the public procurement (Brundin, 2011).

There are three units that take part in the procurement process in VGR: the procurement unit (inköpsrådet), the steering committee (styrgruppen) and the project team. The procurement unit is responsible for developing the procurement process, nominating the steering committee and setting the procurement goals. The steering committee consists of experts within the medical device area, i.e. therapists, nurses and doctors (VGR, n.d a). This group of experts assists the project team in specifying the product requirements. Finally, the project team is responsible for carrying out the procurement process, i.e. among other things managing the contact with the suppliers, creating the contract document and calculating the contract value (Brundin, 2011). In terms of innovative procurement, VGR invested SEK 150 million in 2009 in sustainable transportation through innovative procurement where one of the key features of the investment is to develop efficient innovation-friendly procurement methods (Upphandling 24, 2009).

## 5.4 CASE INTERVIEWS

### 5.4.1 MEDICAL DISTRIBUTION STRATEGY

The county councils manage their distribution strategies differently, and their perceptions on the choice of distribution strategy vary. VGR and LIO, which both utilizes a third party logistics solution, are satisfied with their choices. Leif Örmvall, the Procurement Manager at LIO explains that their decision essentially was based on minimizing costs.

We have a 3PL distribution strategy... At first the county council director thought that we shouldn't manage the logistics ourselves, but then we decide to keep it.

Tommy Brundin, a Manager within procurement at VGR concludes that price is an important factor but that VGR is satisfied with their current logistics solution.

We have our inventories, and we purchase the most optimal packages for transportation. In my mind we get a good price.

The underlying explanation why SLL chose a medical wholesaler was based on an internal request to privatize and make the procurement process more efficient. "The main reason why we shifted distribution strategy was to rationalize the management of the procurement", says the Procurement Manager Elizabeth Knudsen. She adds: "We were interested in a wholeness - that was our thought. We also wanted to remove certain functions that were carried out twice - those exist within a third-party logistics". Before SLL decided to use a medical wholesaler they sought advice from two consultants who examined if there was a market for what they were searching for. "The consultants did interviews with several distributors and potential contracting entities to investigate if they were interested in being part of "the whole chain" or if they solely wanted to

work with logistics”. After the report by the consultant was published Stockholm’s “Hälso- och sjukvårdsnämnd” (HSN) officially decided to procure from the wholesaler.

VGR and LIO’s opinions regarding the use of medical wholesaler are aligned. The informant from LIO states “the difference for us is that when using a 3PL strategy you own the content of the procurement, you can control what is in your inventory”. Axel Berg, previously employed within VGR as Manager for a division concerning strategic development of the health care, however understands the councils that choose a medical wholesaler.

I can understand that it is not possible to purchase small products from each supplier, and that one then instead decides to purchase from a medical wholesaler... Because we face pressures to reduce costs the council is gradually trying to avoid managing a central inventory.

#### 5.4.2 PROCURING INNOVATION

The county councils each address innovation, through procurement, differently. All councils believe that innovation is important, and want to be part of the development, but none have explicitly chosen to direct their procurement to support innovation. The Procurement Manager in Östergötland Leif Örnvall explains that the county council spends SEK 3 million annually in other areas than procurement to promote innovations.

There are certain environmental rules so it is not possible to do an entirely innovative procurement. There was a suggestion to rewrite the rules, which was declined... Within our council we are instead trying to capture innovations through other projects.

Another issue raised concerns the contract the county councils have with the suppliers and/or wholesaler. Both VGR and SLL mean that their procurement processes and contracts are designed to promote innovations. Elizabeth Knudsen, Procurement Manager at SLL state that a flexible assortment is one side of the coin.

We are interested in being part of the development. Therefore, we have an article within the contract with Onemed that they must “follow the development”. We also require them to continuously work with their assortment to be able to address changes in treatments... To the extent that the assortment must be changed it should be possible – the assortment should not be fixed in any way during the time of the contract... You should consider the users’ needs and the development and work forward.

To design a procurement contract that is flexible so that the assortment can be changed if an innovation occurs is something that VGR also utilizes. “In our contract we state that one should be able to change the assortment as the products develop and improve in e.g. quality”, says Tommy Brundin, Procurement Manager within VGR.

Another way the county councils work to support innovation is to invite medical device companies to present their new products. Axel Berg, from VGR state that “if you are unsure of what is available at the market, one can invite suppliers and ask them if they have something they want to add to the “discussion”, before closing the door”. Tommy Brundin, VGR, agrees: “Before a procurement we also talk with suppliers to get an image of what is out there, what is on the market”. VGR also attempts to support innovations of more technology intensive products by using functional as opposed to aesthetical requirements.

### 5.4.3 PROCUREMENT STANDARDS

The county councils work actively with standards and requirements within their contractual agreements, but the degree of detail is lower for the council that has a medical wholesaler than the other two with a 3PL strategy. The standards are usually developed by a reference group of nurses and doctors, who develop the product requirements. “The users range from nurses to doctors and that is the primary source of information in terms of the use of standards”, says Axel Berg from VGR.

A standard that is used by all county councils is that the medical devices should be PVC-free. Having standards and requirements that are of environmental character is also the most common. Manager Tommy Brundin at VGR explains that the existing knowledge of the product can determine the level of detail in the standards.

We do have certain standards, often of environmental character. We are for example trying to remove PVC from the products; if we are sure that there exist those products we require it in the procurement. Otherwise we only have it as an evaluation criterion... We have to make sure that we do not kill the competition.

SLL, that uses a medical wholesaler, has a slightly different approach to the use of standards. Elizabeth Knudsen, Procurement Manager at SLL says that although they have certain standards, such as environmental requirements, the use of detailed product requirements is outsourced to the wholesaler.

We left those requirements and other standards to Onemed because they have contact with the hospitals, the nurses and doctors and know the detailed product requirements. We have said that we e.g. need catheters, we have a more general responsibility, and then it is their job to work with the details.

Onemed establishes reference groups whose purpose is to set up evaluation requirements and criteria, but the work with the groups is not always untroubled.

There is a problem with the creation of these assortment groups, people must volunteer and it can sometimes be a bit difficult to get people to participate. But I believe that it will be managed because if things do not work, the doctors and nurses are very quick to pick up the phone and send an email to us that it is not working. I am not worried that this will not work.

The county councils institutes requirements that are not only of functional character. The use of “lowest price” is also common. Axel Berg state that within VGR, a focus on price is frequent, but it often depends on the type of product procured.

The standards are focused on price in 80% of the cases, sometimes it is even more. It essentially depends on what type of product it is and what the purpose of the product is. The knowledge you have about the quality of the product also determines how much of the standards that are focused on quality.

Tommy Brundin at VGR further suggests that when procuring less technically advanced products there is an increased focus in price.

When we procure we evaluate the products and they can maximum get 100 points, all products that exceed 80 points are accepted and after that it is only lowest price that determines which product that is chosen. It is enough to get a “normal” level of quality, where “good enough” applies.

#### 5.4.4 CONTACT MEDICAL DEVICE USERS

The 3PL using county councils’ contact with the users of the products, i.e. nurses and doctors, is essentially in the form of specific reference- and procurement groups. The relationships’ purpose is to aid the procurers in the process of setting evaluation criteria and standards. The meetings are on a regular basis, often in relation to the initial process of a public procurement. Leif Örnvall, Procurement Manager at Östergötland says: “We have certain procurement groups where we have doctors and nurses that test materials and evaluated products. We sometimes invite suppliers that can show us their products, but we rarely have patients within the groups”. According to VGR, the relationship with the health care is good and the procurement is essentially centered on the health care. “We do not do any procurements without the input from the healthcare”, says Tommy Brundin.

In Stockholm, where a medical wholesaler is used, the pattern is different. SLL does not have much contact with the healthcare; it is instead the wholesaler Onemed that is responsible for managing the relationship with the users. “

It is difficult to have contact because we have 6,000 active doctors and nurses within SLL, it is not possible to have those meetings and that is also the reason why we chose to outsource the responsibility of the contact with the users to Onemed.

There are no rules or regulations within the contract on how much contact Onemed should have with the product users. “We have only said that it should be “continuous” meetings regarding the assortment. We feel like it has to be alive, otherwise there is a risk that you just waste time”, says Knudsen. When the contract came into place SLL met some criticism from the user groups.

There were initially some complaints, because it is a new agreement in a new way, but then me and Onemed went to some hospitals and clinics and talked with the nurses and doctors about the thought of the procurement.

Before deciding to use a medical wholesaler SLL had reference group meetings with doctors and nurses, and product user-organizations, the purpose was to “gather information about the perception on how the current organization functioned”. Essentially, Knudsen explains that the major change in the whole process was a change in mind of the product users.

We have to switch the mindset of the prescribers from “I miss this certain product” to “I need this function”. Otherwise we will end up like VGR and manage detailed requirements; Onemed does that for us, because I say “I need catheters”.

#### 5.4.5 CONTACT MEDICAL DEVICE COMPANIES

The contact between medical device companies and county councils is a relationship that the medical device companies value highly. From the county council point of view the relationship is of slightly different character and regulated to maintain the competition. Leif Örnvall, Procurement Manager at LIO says has the same contact with all companies and state that “our relationship is strictly commercial and all agreements must be documented”. Within VGR

however some suppliers are more important than others, and the county thus meets them more regular than others. “There are some companies that we never meet, and other we meet more often, on different levels”, says Tommy Brundin from VGR. He adds that the relationship is perceived to be good, but the frequency of the contact could be improved.

We should however meet them more often, I should meet the companies CEOs and Sales Managers.

The relationship between SLL and the medical device companies is very different from the other two county councils. Elizabeth Knudsen, Procurement Manager from SLL, explains that SLL essentially has no contact at all with the medical device companies.

No, we do not have any contact. Because, I see it as that is under Onemed’s responsibility, because they are having contracts with the producers... Onemed decides how much contact they should have with their suppliers, it is their issue.

The only contact the county council has had was during the first period of the contract when some medical device companies contacted the council with questions related to the new medical wholesaler. “The contact we have had have been the companies that contacted me and asked about the procurement and “can Onemed really do this or that”, and who is responsible”, concludes Knudsen. Traditionally, the medical device companies would contact the county councils to present their innovations, but within SLL that is no longer the case.

Many call me and want to present their products to me, but it is on the wrong level, they have to manage those things with Onemed and then Onemed must decide what should be done.

When SLL contracted with Onemed there were no regulations or rules regarding how much contact Onemed should have with the medical device companies or the extension of the product range.

We do not have any demands regarding the length of their [Onemed] contracts; they should make sure that we get the function we purchase from them. Nor have we said that they have to have a certain amount of products, we have just said that there should be an assortment that fits the users’ needs.

Instead, the county council has regular meetings with Onemed. The meetings have been more intense in the beginning of the contract, to make sure that everything falls into place. Knudsen says “we have regular meetings. We have follow-up meetings once per month to evaluate that everything goes as planned”. The relationship between SLL and Onemed is perceived as good and Knudsen believes that they both share the same goals: “It feels like we both work towards the same direction... It feels like a good relationship”. The relationship is supported by shared objectives, and SLL mean that they can benefit from Onemed’s negotiation with the medical suppliers.

In the report we did we saw that the suppliers that are able to affect the assortment are interested in going to the producers and negotiate prices, and of course make a profit that we perceive that we also can take part of, in the form of the function-price that gets lower - so you work in two directions.

#### 5.4.6 PRE-CREATION OF MARKETS

The pre-creation of markets is another way in which county council explicitly can support innovations. None of the interviewed county councils actively work with innovation through pre-created markets; instead the councils expect that the relationship with the companies and healthcare will result in that innovations can be commercialized. Elizabeth Knudsen says: “It is nothing we take into consideration within the procurement, but my hopes are that it will come up in the work with the assortment”. VGR is the only council that approaches the medical device companies with requests for product features and Tommy Brundin states that these often are of environmental character.

Sometimes we ask the suppliers if certain types of products do exist, if for example we hear from the health care that “it would be good if the plastic gloves could look like this and this”, and then we ask the companies... It is often concerning environmental requirements, if they can produce products in a more environmentally friendly way.

#### 5.4.7 ENCOURAGEMENT OF COMPETITION

There are no clear intentions from the county councils in terms of encouraging competition, which could stimulate innovations positively. However, all councils take competition into consideration in the procurement analysis. One council work with their required product standards to support competition: “We should have as many general requirements as possible, so that the competition is stimulated and more suppliers can take part of the procurement”, says Leif Örnvall from LIO. Axel Berg, from VGR, agrees and means that the requirements should be less complicated so that more companies can participate.

In the future, it will be difficult for the smaller companies to be part of certain procurements; I think that the procurement in the future should be less complex.

### 5.5 OTHER ACTORS

#### 5.5.1 THE WHOLESALER BETA

The wholesaler Beta is one of the largest wholesalers in Sweden, with operations that span over all the Nordic countries. The company is mainly focused on consumable medical devices, and has an expected turnover of SEK 1.5 billion. Beta supplies both 3PL and wholesaler solutions, but the majority of the sales are attributed to the wholesale function. There are approximately 800 employees, that have the goal to supply the most innovative and customer oriented medical devices. The Business Area Manager explains that the idea behind the wholesalers is to support the councils with lower costs.

The county councils outsource their supply of materials to private organizations, such as Beta, and the councils then get lower costs than if they would manage it internally.

Beta not only provides various medical devices; the company also has private label products that account for approximately 15-20% of the annual turnover. The private brand consists of 1,000 articles and it is primarily within this group that innovation is driven within Beta. “We have a central function within the company that is focused on developing our own products”, says the Business Area Manager. In order to drive innovation through the other medical devices, Beta meets the suppliers on a regular basis: “When we meet our suppliers, one topic on the agenda is always to discuss the new products on the market”. Occasionally, the medical device companies



approach Beta with new products directly and sometimes Beta receive ideas from products from the product users.

Regarding Beta's contact with the medical device users Beta uses its sales workforce as the primary source of communication. "Our sales personnel meet the users once or twice per year, to make sure that everything is managed correctly", says the Area Business Manager. Occasionally, the users contact Beta and want a meeting and Beta then gets feedback from the users regarding the products.

We sometimes get feedback from the users concerning the products if they are not happy with them... If there is something wrong with the products we have the possibility to deliver an alternative product.

The education of the users is an area that Beta is active in as well but the activity depends on what is included within the procurement: "If the users want education they can get it, or if you order from our online store", concludes the Area Business Manager. Beta's contact with the county councils on the other hand it is relatively intense and, is as in the contact with the users, primarily directed through its sales force.

We have in essence daily contact with the county councils... We have key-accounts that have contact with the material consultants or greater private health care institutions. Then we also have a sales organization that work to influence the county councils.

In terms of the quality of the relationship between the wholesaler and the county councils, Beta perceives that the relationship is great. The Business Area Manager summarizes: "I think that we have a very good relationship with the county councils". Moreover, he perceives that the county councils often have well-defined product standards within their procurements, but that it depends on the type of product that is being procured. He says "there is not much to argue about if it is very simple products". Furthermore, he perceives that the county councils often emphasize price within their procurement: "There is a great focus in price in the requirements from the county councils".

With regards to the degree of competition within the industry, the Business Area Manager perceives that the competition has increased in recent year. "When it comes to procurement today one must have a very detailed analysis. The competition has increased especially with regards to wholesale procurement", he says. The increased competition and price-focus will have consequences, but Beta will not change their products.

We will not change much in the products; it is more so that one will lower the prices further to meet the increased competition.

## 5.5.2 THE SWEDISH ASSOCIATION FOR MEDICAL TECHNOLOGY

Swedish Medtech is the industry organization for medical device companies in Sweden. The organization has approximately 150 member companies, which represent 90% of the total turnover of the medical technology market in Sweden. The organization's many goals strive to strengthen the premises for medical technology in Sweden, to improve the business conditions for the medical technology field within the global market and to create greater conditions for the medical device companies to interact with healthcare institutions. In order to achieve these goals,

Swedish Medtech interacts with county councils and Government offices, but also with the public to create awareness of medical technology.

The Executive Vice President of Swedish Medtech, Anders Wennerberg, emphasizes that Swedish Medtech understands that the county councils want to use a medical wholesaler or 3PL to improve the efficiency of their logistics. He, however, points out that there are a few aspects the county councils should bear in mind when evaluating and deciding upon distribution strategy. With regards to the contact between medical device company and medical device user, Wennerberg is concerned that a medical wholesaler may reduce the amount of time and quality of the relationship between the two.

The relationship, and thus the mutual understanding, between the producer and the user could become disrupted by an intermediary in the form of a medical wholesaler.

Wennerberg further explains that there is a need for interaction between actors in the medical supply chain to find better solutions to the healthcare's and the patients' needs. He is critical towards how a medical wholesaler may impact this direct interaction.

The necessary direct contact and dialogue becomes disrupted by an intermediary. It takes a two-way communication for innovations to arise... It is necessary for the ideas originating from the actors within the healthcare to be communicated with the producing medical device companies in for them to be developed into new products.

Swedish Medtech further believes that in order to develop an attractive innovation and business climate in Sweden it is necessary to have a long term approach towards innovation, where cooperation between healthcare, the academia and the industry is necessary. The county councils' use of standards is another area that could become affected with the use of a medical wholesaler: "There is an increased risk of a price-focus with an additional intermediary", says Wennerberg. The consequences of the focus in prices could result in that it becomes difficult to procure innovations.

The county councils in Sweden risk to, in the future, get what they ask for: the cheapest possible products, without consideration to e.g. innovation and total cost.

## 6. ANALYSIS

---

*The purpose of this section is to compare and analyze the conflicting and consistent views, emergent from the case studies, regarding public distribution strategies of medical devices. Additionally, the chapter is intended to portray the findings in response to each indicator, in order to provide the basis of an answer for the research question. Finally, six propositions for future research are developed.*

---

### 6.1 FACTORS AFFECTING THE MARKET CHANNELS

This study examines the effect of public distribution strategy on the development of innovations within medical device companies in Sweden. The impact on the type of innovation developed, as a result of public supply chain design, was further intended to be illustrated. The first set of indicators that were measured concerned the effect a choice of medical wholesaler over 3PL distribution strategy has on the market channels for innovations, i.e. the relationships between medical device company, medical device user, county council and potentially wholesaler.

Overall, the results show that the medical device companies generally are united in their perception of how a medical device wholesaler changes relationships, procurement contracts and competitive advantages within the Swedish medical device market. There were no major differences in perceptions found related to the companies size or origin, which could indicate that the interviewed companies' perceptions correspond to the majority of the medical device companies active on the Swedish market. The same view was also supported by the industry organization Swedish Medtech, but the organization recognizes the county councils' pressures to reduce costs through redesigning their supply chains.

Opposite to the medical device companies, the county councils' perception on the use of a wholesaler differed. Not surprisingly was the variation in opinions closely related to the used distribution strategy, and there seem to be a general consensus that each employed strategy was optimal. The greatest difference in perception was found between the councils using 3PL and the council with a medical wholesaler, where the conflicting views concerned the benefits of owning the supply chain versus procuring one, integrated solution.

#### 6.1.1 RELATIONSHIP MEDICAL DEVICE COMPANY, COUNTY COUNCIL AND MEDICAL DEVICE USER

There seemed to be an understanding among the case companies' that a medical device wholesaler reduces or even eliminates the communication between the county council and medical device company. However, one informant believed that the distribution strategy did not make a difference – instead the law of public procurement was the villain. Surprisingly the opportunity to reduce the contact with the companies seemed to be one of the main drivers behind SLLs decision to employ a wholesaler, and little attention was being paid to the benefits of the same. In contrast to this view, VGR believed that they should have more contact with their suppliers. It is consequently apparent that the county councils' perception of the medical device companies varies greatly, and that the medical device companies' fears are confirmed by the county council with a medical wholesaler: the relationship is being replaced with a

relationship between medical device company and wholesaler – which was perceived as a relationship characterized by unreliability. An illustration of the effect of the introduction of a wholesaler on the relationships can be found in Figure 8. Importantly, the eliminated relationships are being replaced by a relationship between medical wholesaler and medical device user.

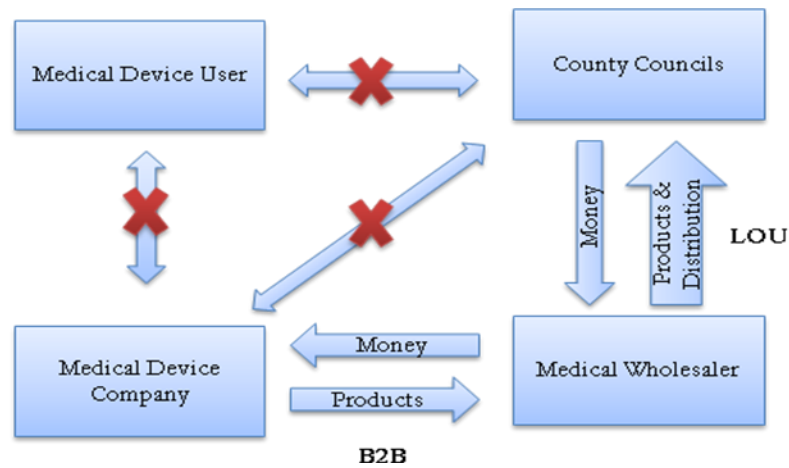


Figure 8: Changes in Supply Chain Relationships

The reasons underlying why altered relationships may impact the development of innovations can be found within the literature. Geroski (1990) mean that the use of high standards, the definition of a clear set of needs towards which R&D efforts can be directed and the creation of markets for products at an early stage of the product life cycle are ways in which public procurement may positively influence the development of innovations. The majority of these factors is the result of explicit public initiatives, and requires to be actively managed, i.e. their introduction is the result of careful management. Since the use of a wholesaler changes, not only the communication within the supply chain, but also the applied law (from LOU to B2B) it can be concluded that the application of innovation initiatives towards the suppliers will become more difficult to put into place. However, the councils still have the opportunity to promote innovations within the medical wholesaler through e.g. detailed product standards. Bearing in mind that the medical wholesalers' core capabilities are restricted to negotiation greater volumes and providing more efficient logistics, it is not likely that they possess the capabilities necessary to respond to the innovation initiatives to the same extent as a medical device “researching” company would.

The consequences of the altered relationship between medical device company and county council thus essentially depend on the quality of the contact between supplier and wholesaler. If the relationship is being replaced with a superior communication through which product needs and standards are communicated, the negative impact of the wholesaler could potentially be counterbalanced. Yet, the empirical data suggest that this might not be the case. One informant indicated that the relationship was static and only concerned price-negotiations. Although the wholesaler did not confirm the poor quality of the relationship, it was obvious that the imposed flexibility within the contracts contributed to a communication of inferior quality.

Next, the weakened relationship between medical device company and medical device user was the single most emphasized outcome of a medical wholesaler, according to the medical device companies. Not only did all respondents stress the importance of the contact for innovations, but also in terms of providing necessary education. There was also a clear difference between the county councils that use 3PL and wholesale distribution; the latter had almost no contact with the user groups. Additionally, the companies, council and wholesaler confirmed that the communication with the product users were guided and managed entirely by the wholesaler, see Figure 9. The literature on healthcare procurement has in the past focused on the use of purchasing groups, which convey similar characteristics as a medical wholesaler. Scanlon (2002) produced similar findings and show that purchasing groups often disregard smaller suppliers through a limitation of their contact with hospitals. The conclusion is that patients are not provided with innovative medical devices, a consequence that also could become the case on the Swedish medical device market.

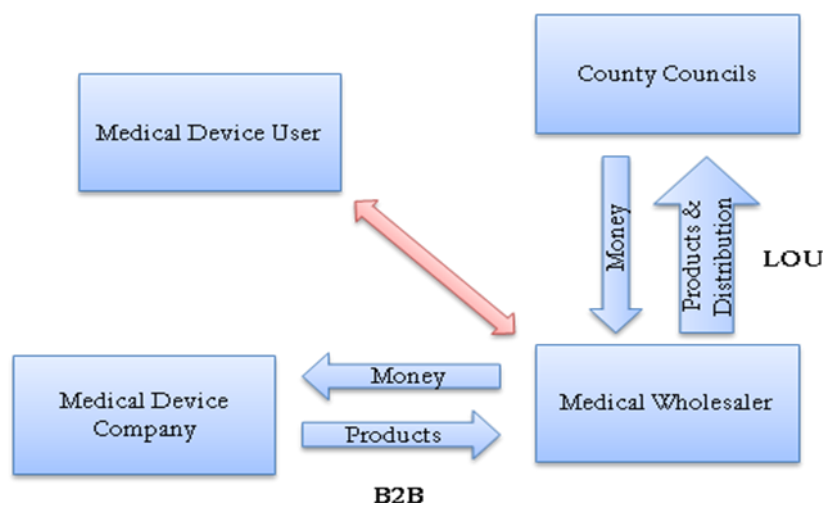


Figure 9: Relationship between Medical Device Company, User, Wholesaler and County council with a Medical Wholesaler Strategy

As previously stated, the contact with the medical device users is essential for the companies and their development of new products. Schilling (2010) also confirms this by concluding that users provide a great source of innovations. To limit or even reduce this contact could therefore have a negative impact on the reception of feedback and new ideas that the healthcare provides. Ultimately the pace of innovation within the industry could be reduced and the companies would have to seek new channels through which they can receive ideas from the healthcare, or rely on other sources for input.

*Proposition 1: The use of wholesaler as a public distribution strategy is negatively related to the quality and frequency of the communication between medical device company and county council.*

*Proposition 2: The use of wholesaler as a public distribution strategy is negatively related to the quality and frequency of the communication between medical device company and medical device user.*

## 6.2 ESTABLISHMENT OF HIGH STANDARDS, NEEDS AND PRE-CREATION OF MARKETS

When identifying the emergent patterns of use of standards, the creation of needs towards which R&D can be directed and the pre-creation of markets, the nature of the issues related to choice of public distribution strategy and the lack of institutional knowledge concerning its great impact becomes apparent. Despite the recommendation from the government report on procuring innovations to ensure that all procurement is “innovation-friendly” (Jeppson, 2010), none of the county councils explicitly or consciously utilized pre-creation of markets to spur innovation, neither were they aware of the impact their definition of needs have on the medical device companies’ research efforts. Hence, these factors were not found to differ depending on distribution strategy – they were simply missing in all cases. Not surprisingly, the informants within the medical device companies gave an impression that pre-creation of markets was not as important as the previous literature indicated (e.g. Blind and Georghiou, 2010; Geroski, 1990) – which could be related to the limited use within the councils. In terms of the establishment of needs, the companies perceived it difficult to separate this from the creation of standards and a distinction between the two was consequently not feasible.

*Proposition 3: The positive relationship between public innovation procurement policies and the development of innovations is moderated by the knowledge of public procurement managers.*

When assessing the use of standards the medical device companies strongly agreed that a medical wholesaler convey an increased focus in price, and that it ultimately becomes more difficult to commercialize innovations. Despite the companies’ perceptions, there seemed to be great price focus even with a 3PL solution – especially regarding medical devices that were either less technically advanced or used on a daily basis. The wholesaler, who autonomously decided the product requirements for their assortment, also confirmed that there is a price focus for less advanced medical devices. The opinions among the medical device companies varied regarding the standards within the councils with a 3PL solution, and one informant suggested that there generally should be less aesthetic and more functional requirements. Interestingly, the public procurement within SLL utilizes such functional requirements in their contract with the wholesaler Onemed. However, there seem to be a difference in what type of requirements that should be utilized depending on if they are intended directly for the medical device company or through the wholesaler. Independent of distribution strategy each county council employed environmentally friendly standards, such as that “medical devices should be PVC-free”. Despite the environmental requirements, it can be concluded that the councils that use a 3PL solution employed significantly more standards and requirements than the council with a medial wholesaler. Within the literature it is suggested that innovation can be supported through public procurement standards, and the definition of public needs (Blind and Georghiou, 2010; Cabral et al, 2006; Geroski, 1990). It is therefore presumable that the relationship would work in the opposite direction, i.e. that a reduced use of product standards would have a negative impact on the development of innovations through an increased insecurity regarding what type of products that will be procured. Essentially, for many companies within the medical device market the sole customer is the county council, and the awarding of contracts is therefore of crucial importance to the profitability of the organization.

*Proposition 4: The employment of product standards is negatively related to the use of a wholesaler within the public supply chain.*

### 6.3 COMPETITION

While all the companies and the wholesaler agree that the competition in the industry has risen in recent years, only one of the county councils explicitly focus on increasing competition within their procurement. It has been suggested within the academia that if competition is severe companies must come up with innovations to remain competitive (Geroski, 1990; Uyarra and Flanagan, 2009). Hence, the increased industry competition that is confirmed by all company informants should benefit the development of innovations within the Swedish medical device market. However, the use of a wholesaler is not something that the participants explicitly can relate to the increased competition, but as it neither can be neglected it is unfeasible to determine if public distribution strategy has an indirect effect on the development of innovations. Instead, it is obvious that the county councils only take competition into account within the procurement if the number of potential suppliers is too low. In order to boost the competition the councils then lower or eliminate the required product standards. As a result, even if competition initially would increase due to the county council, the means used (i.e. in the form of lesser use of product standards) could offset the positive innovation effect. In summary, it is difficult to argue that a wholesaler has or has not an effect on the competition and it is once more noticeable that this innovation vehicle is not actively used within the public sector.

### 6.4 PROCESS VERSUS PRODUCT INNOVATION

Bearing in mind the previously mentioned factors it is of great importance to determine what innovation specific consequences an increasing focus in price, reduced utility of product standards and re-designed supply chain relationships will have on the specific type of innovations developed. All medical device companies agree that the focus in price that is connected to the introduction of wholesalers could ultimately result in that their product assortment becomes shifted towards cheaper products. This view was also shared by the industry organization Swedish Medtech.

Since the interviewed case companies currently rely on being competitive through new innovations, a focus on lowering their prices would most likely not build on their existing competencies and skills since producing something cheaper does not require the same investments as producing something new (Schilling, 2010). Seemingly, it can be concluded that the innovations would become competence-destroying as opposed to competence-building.

The shift in assortment could further be defined as a shift towards process innovation. Athey and Schmutzler (1995) mean that process innovation is connected with lowering the production costs, which would be the case for the medical device companies. The alternative would be a focus in product-innovation, which would require the development of entirely new or improved products. The wholesalers and county councils' conscious cost-reducing efforts, in combination with a decreased used of product standards towards which R&D efforts can be directed not only send signals that the price will dictate the choice of suppliers, but the market insecurity is also increased compared to when using a third-party logistics solution. The medical device companies rely on procurements as a sole source of income, and the required product standards previously worked as a guideline towards which they could direct investments. Without these "guidelines"

the decision to carry out R&D is imposed additional insecurity since the companies no longer can rely on that their products actually will be procured. In essence, the only aspect that can ensure a competitive advantage within a public procurement with a wholesaler distribution strategy is lowest price and it is likely that the companies will make investments to make it achievable. Hence, it become evident that medical device companies will increasingly focus on process innovation to remain competitive.

*Proposition 5: The use of a wholesaler within a public supply chain is positively related to the suppliers' development of process innovations.*

*Proposition 6: The use of a wholesaler within the public supply chain is negatively related to the suppliers' development of product innovations.*

Moreover, it is important to emphasize that although the councils were limited in their use of innovation procurement policies most of them employed other projects to encourage innovation. If the reduced procurement cost, that is associated with a wholesaler, would be transferred into an innovation fund that supports e.g. minority business and their risky projects, the promotion of innovations through procurement could be exchanged for other support mechanisms and innovations would still be sustained. However, as with the management of innovation procurement policies, innovation projects require knowledge and skill to become successful; capabilities that seemingly are lacking within the Swedish public sector today.

Finally, the challenge to cut costs through redesign of the supply chain appear to indicate that the councils have an inadequate view of the relationship between the health care and its imposed costs. The initial savings from a wholesaler may in the long run be replaced by extended time spent at hospitals, as products of poorer quality carry with them risks of additional ailments. Hence, the mathematical equation and thus the arguments used to support a medical wholesaler will in the long become contradictory.



## 7. CONCLUSION

---

*The purpose of this chapter is to elucidate the study's findings with regards to the overall research question: "What are the impacts of the choice of public procurement and distribution strategy in Sweden, on medical device companies' development of innovations?". The section is also intended to shed light on the study's theoretical and managerial implications, limitations and directions for future research.*

---

The major aim of the study was to advance the understanding of how public procurement and the choice of distribution strategy affect the development of innovations within medical device companies. This research extends the previous literature by combining two different theoretical fields: public procurement and group-purchasing, and examine how these play a role in fostering an external driver of innovation.

The empirical findings suggest that a medical wholesaler will have an effect on the development of innovations in medical device companies, which take its form in an increasingly insecure market and focus on process innovation. The changed relationships between the actors in the supply chain in combination with a decreased use of product requirements indicate that the, in the literature, proposed public drivers of innovation will be inhibited if the county councils engage a medical wholesaler. Considerable support for a shift in assortment towards cheaper products as a result of the relationship with the wholesaler was also found. The only factors that was perceived as unaffected by the utilization of a wholesaler was the competition, which due to other factors had increased in the industry as a whole.

### 7.1 THEORETICAL CONTRIBUTIONS

The findings generally support the notion that public procurement is a powerful tool in driving (or in this case inhibiting) innovation, and add particular credence to the theories presented by Geroski (1990) regarding the circumstances under which public procurement can affect innovation. With regards to its novelty and the fact that few researchers have examined the relationship between public supply chains and the development of innovation, a comparison of the findings with previous results is not feasible. Instead, the results show the critical importance of the ability to manage public procurement and emphasizes that the consequences of strategy decisions within the public sector may reach further than seemingly possible. The findings reported herein unique contributions to the knowledge of external drivers of innovations and the dynamic features of public supply chains. Hence, the major theoretical contribution of the paper is that it extends the previous literature into a new context and facilitates future research through the six propositions developed.

### 7.2 MANAGERIAL IMPLICATIONS

Several practical implications can be drawn from the findings of this study. The research indicates a need to broaden and deepen the management skills of public procurers to create a greater understanding for the impact public procurement decisions can have on the development of innovation. These skills include an awareness for the various vehicles through which innovation can be promoted, creating a longer-term approach towards both the management of health care

but also of innovations, and enhancing the management of innovations in other project forms. In addition, the findings have implications for the choice of medical wholesaler and the factors that must be taken into consideration. The negative consequences in terms of reduced communication between the supply chain members could be counterbalanced by e.g. more detailed contractual restrictions on the county council's expectations of the wholesaler.

Moreover, the cost-efficient concerns that underpin the councils' procurement decisions, particularly for less technologically advanced products, provides an insight for the medical device companies in Sweden on their major customers' sourcing objectives. Information of this type is gaining importance in the absence of detailed product requirements that otherwise would guide the medical device companies' R&D investments.

### 7.3 LIMITATIONS AND FUTURE DIRECTIONS

As with most empirical and interview based research, there are a few limitations experienced during the present study. First, the case study was restricted to the public procurement of medical devices in Sweden and whilst this serves to control for extraneous sources of variation, caution should be taken in transmitting the results to other contexts. The medical device market exhibits many industry-specific characteristics, especially in terms of the close relationship with the healthcare, which may impact the possibility to generalize the findings to other industries. Yet, the study could pose a useful source of insightful lessons to the vast number of companies subject to public procurements. Since the research indicates that the medical device users have a great impact on the development of innovations as a source for new ideas, data collected from the health care may provide additional insights. This suggests that future research may seek to collect data from the medical device users' point of view.

The research employed perceptual data from a single respondent within each of the companies and councils interviewed. This raises the issue of possible biases, such as misinterpretations when transcribing the material into English and that the informants' opinions don't translate into the perception of their organizations. The number of informants is also subject to limitations since the study only examines one county council with a medical wholesaler. It will be important for future research to provide a more rigorous examination of the councils with a wholesaler, through the use of alternative research designs that e.g. employ multiple informants and longitudinal data.

This study has indicated that external factors such as the participants in a public supply chain can affect companies' development of innovations. The study is qualitative in nature and has limitations in terms of examining the real effect of the external factors, especially in relation to the firm-specific factors. Future studies may address the strength of each innovation driver/inhibitor in relation to other factors, e.g. use of procurement standards versus investments to spur internal creativity, to translate the findings into real life consequences. Although the understanding of the complex relationships discussed herein remains incomplete, this research provides a steppingstone towards the full knowledge on what the real outcomes of public distribution strategies may have on the development of innovation.

## REFERENCES

- Aouad, G., Ozorhon, B., and Abbott, C. (2009) "Facilitating Innovation in Construction", *Construction Innovation* 10(4): 374-394.
- Athey, S. and Schmutzler, A. (1995) "Product and Process Flexibility in an Innovative Environment", *RAND Journal of Economics* 26: 57–574.
- Berg, A. (2011) *Interview on VGR's Distribution Strategy*, Interviewed by... Lotti Lindgren Sjöberg [in person], 11 March 2011, 10.00.
- Blind, K., and Georghiou, L. (2010) "Drivers and Impediments for Innovation in Europe", *Intereconomics*: 264-286.
- Borins, S. (2001) "Encouraging Innovation in the Public Sector", *Journal of Intellectual Capital* 2(3): 310-319.
- Bowersox, D. J. (2010) "Supply Chain Logistics Management", New York, McGraw-Hill Higher Education.
- Brege, S., Brehmer, P., and Lindskog, H. (2010) "Sourcing, Insourcing and two times Outsourcing: 4 Phases of Procurement of Telecommunications Services within the Swedish Public Sector", *Strategic Outsourcing: An International Journal* 3(2): 144-162.
- Brundin, T. (2011) *Interview on VGR's Distribution Strategy*, Interviewed by... Lotti Lindgren Sjöberg [telephone], 21 April 2011, 10.00.
- Bryman, A. and Bell, E. (2007) "Business Research Methods", Oxford University Press Inc., New York.
- Business Dictionary, (n.d.). Available at:  
<<http://www.businessdictionary.com/definition/wholesaler.html>> [Accessed 20 April 2011]
- Cabral, L., Cozzi, G., Denicolo, V., Spagnolo, G. & Zanza, M. (2006) Procuring innovations, in: N. Dimitri, G. Piga & G. Spagnolo (Eds) *Handbook of Procurement*, 483–530 (Cambridge, MA: Cambridge University Press).
- Callender, G. (2011) "Alignment of Inter-agency Supply Chains to Enhance Public Sector Performance Management", *International Journal of Productivity and Performance Management* 60(1): 9-23.
- Carter, C.R., Auskalis, R.J. and Ketchum, C.L. (1999), "Purchasing from Minority Business Enterprises: Key Success Factors", *Journal of Supply Chain Management*, 35(1): 28-32.

Chapman, T.L., Gupta, A. and Mango, P.D. (1998) “Group Purchasing is Not a Panacea for US Hospitals”, *McKinsey Quarterly*, 1: 160-5.

Cleverley, W.G. and Nutt, P.C. (1984) “The Effectiveness of Group-purchasing Organizations”, *Health Services Research*, 19(1): 65-82.

Dahlgren, P. (2011), *Upphandlingskonferensen, Grossist som Mellanked*, March 23-24, Uppsala: Uppsala Konsert & Kongress

Dnr InkL-2003-1027, (2008), *Inköpspolicy för Landstinget i Östergötland*. Available at: <[http://www.lio.se/pages/34135/Ink%<sup>c3</sup>%<sup>b6</sup>pspolicy%202008-02-22%20-%20korrektur%202010-06-18%20\\_2\\_.pdf](http://www.lio.se/pages/34135/Ink%c3%b6pspolicy%202008-02-22%20-%20korrektur%202010-06-18%20_2_.pdf)> [Accessed 15 February 2011]

Dodgson, M., Gann, D., and Salter A. (2008) “The Management of Technological Innovation”, 2<sup>nd</sup> Edition, New York: Oxford University Press.

EDM Service, (2011). Available at: <<http://www.medical-distributors.com/countries/sweden>> [Accessed 18 February 2011]

Erridge, A. (2007) “Public Procurement, Public Value and the Northern Ireland Unemployment Project”, *Public Administration* 85(4): 1023-1043.

EIU (2007). “Sweden: Healthcare and Pharmaceuticals Profile”. Available at: <[http://www.eiu.com/index.asp?layout=ib3Article&article\\_id=452768630&country\\_id=1430000143&pubtypeid=1152462500&industry\\_id=620001062&category\\_id=&rf=0](http://www.eiu.com/index.asp?layout=ib3Article&article_id=452768630&country_id=1430000143&pubtypeid=1152462500&industry_id=620001062&category_id=&rf=0)> [Accessed 4 February 2011]

Eucomed, (2006) ”Medical Devices”, Brussels: Eucomed Medical Technology.

Eucomed, (n.d.). Available at: <<http://www.eucomed.org/key-themes/health-economic-issues/procurement>> [Accessed 15 February 2011]

Frankenberg, B. (2011) “When 3PL Makes Sense for Beverage Companies”, *Beverage World* 130(3): 62-63.

Geroski, P. A. (1990) “Procurement Policy as a Tool of Industrial Policy”, *International Review of Applied Economics* 4(2): 182–198.

Göteborgs stad, (n.d.). Available at: <[http://www.uhb.goteborg.se/in\\_english\\_swedish\\_procurement\\_law/](http://www.uhb.goteborg.se/in_english_swedish_procurement_law/)> [Accessed 3 March 2011]

Hendrick, T.E. (1997) "Purchasing Consortiums: Horizontal Alliances among Firms Buying Common Goods and Services: What? Who? Why? How?", Center for Advanced Purchasing Studies (CAPS) Research, Tempe, AZ.

Hovenkamp, H. (2002) "Competitive Effects of Group Purchasing Organizations' (GPO) Purchasing and Product Selection Practices in the Health-Care Industry", *Health Industry Group Purchasing Association (HIGPA)*, Washington, DC.

HSN, (2008) "Utredning för Förutsättningarna för Upphandling av Link Stockholm", HSN 0804-0579.

Ibrahim, S., and Fallah, M.H. (2005) "Drivers of Innovation and Influence of Technological Clusters", *Engineer Management Journal* 17(3): 33-41.

Jansen, E.P. (2008) "New Public Management: Perspectives on Performance and the Use of Performance Information", *Financial Accountability and Management* 24(2): 169-91.

Jeppson, H. (2010) "Innovations Upphandlingen", Betänkande av Innovationsupphandlingsutredningen, Stockholm: SOU 2010:56.

Knudsen, E., (2011) *Interview on SLLs Distribution Strategy*, Interviewed by... Lotti Lindgren Sjöberg [in person], 13 April 2011, 10.00

Konkurrensverket, (2010). "No" to an act on Procurements Promoting Innovation. Available at: <[http://www.konkurrensverket.se/t/NewsPage\\_\\_\\_\\_\\_6978.aspx](http://www.konkurrensverket.se/t/NewsPage_____6978.aspx)> [Accessed 15 February 2011]

Konkurrensverket, (n.d. a). *About the Public Procurement Rules*. Available at: <[http://www.konkurrensverket.se/t/Page\\_\\_\\_\\_\\_6735.aspx](http://www.konkurrensverket.se/t/Page_____6735.aspx)> [Accessed 15 February 2011]

Konkurrensverket, (n.d. b). *The Procurement Process*. Available at: <[http://www.konkurrensverket.se/t/Page\\_\\_\\_\\_\\_7068.aspx](http://www.konkurrensverket.se/t/Page_____7068.aspx)> [Accessed 15 February 2011]

Kumar, A., Ozdamar, L. and Zhang, C.N. (2008) "Supply Chain Redesign in the Healthcare Industry of Singapore", *Supply Chain Management: An International Journal* 13(2): 95-103.

Landstinget Sörmland, (2010). *Nytt Avtal ger Landstinget Billigare Förbrukningsvaror*. Available at: <<http://www.landstingetsormland.se/Halsa-vard/sjukhus/Aktuellt/Upphandling-Varuforsorjningen/>> [Accessed 8 February 2011]

Lidestam, H. and Abrahamsson, M. (2010) "Environmental Evaluation of Public Procurement for Bus Transports", *Management of Environmental Quality: An International Journal* 21(5): 645-658.

LIF, (n.d. a): Available at: <[http://www.lif.se/cs/Publik%20webb/Sidnehall/Publik\\_Bilder/Bilder%20statistik/2.01%20](http://www.lif.se/cs/Publik%20webb/Sidnehall/Publik_Bilder/Bilder%20statistik/2.01%20)

H%C3%A4lso-  
%20och%20sjukv%C3%A5rdskostnadernas%20andel%20av%20BNP%20och%20l%C3%A4ke  
medelsf%C3%B6rs%C3%A4ljningens%20andel%20av%20h%C3%A4lso-  
%20och%20sjukv%C3%A5rdskostnaderna.jpg > [Accessed 10 February 2011]

LIF, (n.d. b): Available at:

<[http://www.lif.se/cs/Publik%20webb/Sidnehall/Publik\\_Bilder/Bilder%20statistik/2.13%20Befolkningsutveckling%20och%20medellivsl%C3%A4ngd%20samt%20prognos.jpg](http://www.lif.se/cs/Publik%20webb/Sidnehall/Publik_Bilder/Bilder%20statistik/2.13%20Befolkningsutveckling%20och%20medellivsl%C3%A4ngd%20samt%20prognos.jpg)> [Accessed 10 February 2011]

LIO, (2009). *Gemensamma Inköp Sparar Miljoner*, Available at:

<<http://www.lio.se/Nyhetsarkiv/Nyhetsarkiv-2009/Gemensamma-inkop-sparar-miljoner1/>> [Accessed 10 February 2011]

LOU, (2007) "Lagen on Offentlig Upphandling", 2007:1091.

Mantovani, A. (2005) "Complementary between Product and Process Innovation in a Monopoly Setting", *Economics of Innovation and New Technology* 15(3): 219-234.

Mellor, B.A. (2005) "NHS Logistics - A Case Study in Public Sector Supply-chain Leadership", *Logistics & Transport Focus* 7(4): 53-54.

Murray, J.G. (2007) "Strategic Procurement in UK Local Government: the Role of Elected Members", *Journal of Public Procurement* 7(2): 194-212.

Murray, J.G. (2009) "Improving the Validity of Public Procurement Research", *Supply Chain Management: An International Journal* 14 (6): 429-434.

Nidumolu, R., Prahalad, C.K, and Rangaswami, M.R. (2009) "Why Sustainability is Now the Key Driver of Innovation", *Harvard Business Review* September: 56-64.

Nollet, J. and Beaulieu, M. (2005) "Should an Organization join a Purchasing Group", *Supply Chain Management: An International Journal*, 10(1): 11-17.

OGC (2005). *Supply Chain Management in Public Sector Procurement: A Guide*. Available at:

<[http://www.ogc.gov.uk/documents/scm\\_final\\_june05.pdf](http://www.ogc.gov.uk/documents/scm_final_june05.pdf)> [Accessed 24 March 2011]

Onemed, (n.d. a). Available at: <<http://www.onemed.se/Templates/Template.aspx?id=219073>> [Accessed 8 March 2011]

Onemed, (n.d. b). Available at:

<[http://www.onemed.com/onemed/onemedwww.nsf/sp2?open&cid=content3048A5&secondNavinf=GroupEnglish\Navi\Product Portfolio\Private Own Brand&secondNavinfa=o](http://www.onemed.com/onemed/onemedwww.nsf/sp2?open&cid=content3048A5&secondNavinf=GroupEnglish\Navi\Product%20Portfolio\Private%20Own%20Brand&secondNavinfa=o)> [Accessed 8 March 2011]

- Powell Robinson Jr., E. and Satterfield, R.K. (1998) "Designing Distribution Systems to Support Vendor Strategies in Supply Chain Management", *Decision Sciences* 29(3): 685-706.
- Preuss, L. (2009) "Addressing Sustainable Development through Public Procurement: the Case of Local Government", *Supply Chain Management: An International Journal* 14(3): 213-223.
- Qi, G.Y., Shen, L.Y., Zeng, S.X. and Jorge, O.J. (2010) "The Driver for Contractors' Green Innovation: An Industry Perspective", *Journal of Cleaner Production* 18: 1358-1365.
- Rothwell, R. (1983) "Creating a Regional Innovation-Oriented Infrastructure: The Role of Public Procurement", *Annals of Public & Co-operative Economy* 55(2): 159-172.
- Scanlon, W.J. (2002) "Group Purchasing Organizations: Pilot Study Suggests Large Buying Groups Do Not Always Offer Hospitals Lower Prices", *GAO*, Washington, DC.
- Schapper, P., Veiga Malta, J.N. and Gilbert, D. (2009) "Analytical Framework for the Management and Reform of Public Procurement", in Thai, K. (Ed.), *International Handbook of Public Procurement*, Boca Raton: CRC Press: 87-104.
- Schilling, M.A. (2010) "Strategic Management of Technological Innovation", 3<sup>rd</sup> Edition, Boston: McGraw-Hill.
- Schneller, E.S. (2000) "The Value of Group Purchasing in the Health Care Supply Chain", School of Health Administration and Policy, Tempe, AZ.
- Sink, H. L., Langley, C.J. and Gibson, B.J. (1996) "Buyer Observations of the U.S. Third-Party Logistics Market", *International Journal of Physical Distribution & Logistics Management* 26(3): 38-46.
- SLL, (2009) "Inbjudan till Anbudsgivning. Drift av Hjälpmedelsverksamhet för Förbrukningshjälpmedel", SLL Upphandling, HSN 0901 - 0033.
- SLL, (2006). *SLL Upphandling – Enhetens Roll och Uppdrag*. Available at: <<http://www.sll.se/sll/templates/NormalPage.aspx?id=24505>> [Accessed 10 March 2011]
- SOU 2010:56, (2010) "Remissyttrande Avseende Betänkandet Innovationsupphandling", Stockholm: Näringsdepartementet.
- Swahn, U., (2011) *Upphandlingskonferensen, Grossist som Mellanled*, March 23-24, Uppsala: Uppsala Konsert & Kongress
- Thompson, P. and Waldo, D. (2000) "Process Versus Product Innovation: Do Consumption Data Contain Any Information?", *Southern Economic Journal* 67(1): 155-171.

- Upphandling 24, (2009), *VGR vill Utveckla Innovativ Upphandling*. Available at: <<http://upphandling24.idg.se/2.1062/1.235477/vgr-vill-utveckla-innovativ-upphandling>> [Accessed 15 February 2011]
- Uyarra, E. and Flanagan, K. (2009) "Understanding the Innovation Impacts of Public Procurement", *European Planning Studies*, 18(1): 123-143.
- Vaidyanathan, G. (2005) "A Framework for Evaluating Third-Party Logistics", *Communications of the ACM* 48(1): 89-94.
- Varuförsörjningen, (2008) "Vårdens delaktighet i Upphandlingsprocessen".
- Varuförsörjningen, (n.d.). *Om Varuförsörjningen*. Available at: <<http://www.varor.lul.se/webbreg/content/text.asp?sid=omvf>> [Accessed 22 February 2011]
- VGR, (2009) "Kvalitetskriterier", Pos 1690-1710, prgr: 32.
- VGR, (n.d. a). Available at: <<http://www.vgregion.se/sv/Omrade-Hjalpmedel/Centrum-for-Lakemedelsnara-produkter/Inkontinenscentrum/Om-oss/Expertgrupp-1/>> [Accessed 15 February 2011]
- VGR, (n.d. b). Available at: <<http://www.vgregion.se/sv/Regionservice/tjanster/Depaerna/>> [Accessed 15 February 2011]
- Waara, F. (2007) "Mitigating Contractual Hazards in Public Procurement: a study of Swedish Local Authorities", *Construction Management and Economics* 26: 137-145.
- Walker, H. and Brammer, S. (2009) "Sustainable Procurement in the United Kingdom Public Sector", *Supply Chain Management: An International Journal* 14(2): 128-137.
- Weinstein, L.B. (2002) "The Role of Group Purchasing Organizations (GPOs) in the U.S. Medical Industry Supply Chain" *Estudios de Economia Aplicada* 24(3): 789-802.
- Weiss, P. (2003) "Adoption of Product and Process Innovations in Differentiated Markets: The Impact of Competition" *Review of Industrial Organization* (23): 301-314.
- Wennerberg, A. (2011). Interview on Swedish Medtech. Interviewed by... Lotti Lindgren Sjöberg [in person], 23 February 2011, 10.00.
- Yin, R. (1984) "The Case Study Crisis: Some Answers", *Administrative Science Quarterly* 26(1): 58-65.
- Örnvall, L. (2011) *Interview on LIO's Distribution Strategy*, Interviewed by... Lotti Lindgren Sjöberg [telephone], 8 March 2011, 13.00.



## APPENDIX

### INTERVIEW GUIDE

#### CASE COMPANIES:

1. Could you tell me shortly about yourself and your role?
2. What drives innovation in your company? What are the primary sources of innovation in your company?
3. How much contact do you have with the county councils? How would you describe your relationship?
4. Is there a difference in the amount of time you have contact with each county council? If yes, how and why? What determines this difference?
5. What is your view on the county councils' distribution strategies?
6. What is your opinion regarding the development of distribution strategies of medical devices in Sweden? In what way does this affect your company? Has this changed throughout history?
7. Do you act upon requests from county councils regarding requirements of products, e.g. an enhanced or softer material?
8. How often do you bring new innovations to councils and ask them to procure them?
9. To what extent do you perceive that you need to reach certain product standards? Does this differ depending on county council?
10. To what extent do you perceive that councils provide increased market security, e.g. in terms of pre-created markets?
11. How much contact do you have with medical device users? What determines the amount of contact? How would you describe your relationship?
12. How do you perceive that competition has developed in the industry? What is the effect within your company?
13. To what extent do you perceive that a clear set of needs are defined for the medical devices? Where do these needs origin from?
14. What is missing in procurement of medical devices in Sweden today? What improvements could be made?
15. Is there anything else you would like to add concerning public procurement and public distribution strategies?

#### QUESTIONS ADDED FOR MEDICAL WHOLESALER:

16. How much contact do you have with the medical device suppliers? What determines the amount of contact? How would you describe your relationship?
17. How do you work with the assortment within your company?
18. To what extent does your company utilize standards? What types of standards are utilized?

#### COUNTY COUNCILS:

1. Could you tell me shortly about yourself and your role?

2. What distribution strategy does your county council employ today?
3. What is your view on the county councils' distribution strategies?
4. Who decides when to use 3PL or a dealer solution? What type of information is this decision based on? Where/How is that information gathered? Do you look at other regions and how they decided? How much information do you gather from companies, versus for example health care organizations?
5. What are the main goals of the procurement?
6. What is your view on your role of promoting innovativeness in each region? Do you take into consideration smaller companies, innovativeness when taking your decisions? If yes, How?
7. To what extent do county councils utilize product standards? What types of standards are utilized? What determines the use of standards?
8. To what extent do you pre-create markets for products that not already exist?
9. How do you take competition into account when procuring?
10. To what extent do you define needs for medical devices?
11. What are the future plans of procurement? Do you believe the procurement will go through changes in the nearby future? If yes, how? Why? If no, why not?
12. Is there anything else you would like to add concerning public procurement and public distribution strategies?

## OVERVIEW DISTRIBUTION STRATEGIES COUNTY COUNCILS

County council	Distribution Strategy
Norrbottn	Integrated forward
Västerbottn	Wholesaler
Jämtland	Integrated forward
Västernorrland	Wholesaler
Gävleborg	Wholesaler
Dalarna	3PL
Uppsala	3PL
Västmanland	3PL
Örebro	3PL
Sörmland	3PL
Värmland	Wholesaler
Västra Götaland	Integrated forward and 3PL
Stockholm	Wholesaler
Östergötland	3PL
Jönköping	Integrated forward
Kronoberg	Integrated forward
Blekinge	Integrated forward
Kalmar	Integrated forward
Gotland	Integrated forward
Skåne	3PL
Halland	3PL

(Wennerberg, 2011)