Control over and inspections of the incoming flow of deliveries
- A case study at Staples Sweden

Master thesis 30 hp
Acknowledgement

We would like to thank the logistic manager at Staples, Lennart Simm who gave us the opportunity to investigate a logistical problem, and thereby put our logistical skills to the test. We would also like to thank all the respondents who took their time to be interviewed and who applied us with internal data. We hope that our results are satisfactory, and will help Staples to improve their daily work.

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Växjö 24\textsuperscript{th} of May

\hspace{1cm}

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Abstract

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Title: Control over and inspections of the incoming flow of deliveries

Background: Staples experiences difficulties to get their incoming flow of deliveries to deliver on time. This is because Staples has a poor control of its suppliers in the current situation. Another problem that Staples experience is that their inspection of the incoming flow is taking too long time. These problems can lead to unnecessary tied up capital, backlogs and rest orders. Staples would like to explore the possibility of improving the control and inspection of the incoming flow.

Purpose: To identify the amount of late and early incoming flow of deliveries and describe how Staples could control them in order to receive more on-time deliveries. Moreover to describe how Staples could improve the inspection process in order to make the incoming flow of deliveries flow faster into storage.

Methodology: The study is a case study in Staples central warehouse in Växjö, Sweden.

Results: Suggestion has been made for how Staples could improve the control over the incoming flow of deliveries, and the inspections of the incoming flow of deliveries. The suggestions made are based on how Staples could control deliveries in advance in order to receive more on-time deliveries. Moreover specific requirements could be made towards the suppliers to improve the inspections in order to reduce the flow time into storage.
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1. Introduction

The introduction part begins with a company presentation. Then the authors present the background of the problem, and a theoretical background referred to the problems. After the background, the problems are discussed in the problem discussion, which falls into the research questions and the purpose of the research.

1.1 Company presentation

The founder of Staples, Tom Stemberg, came up with a business plan on how to improve the availability of office supplies. So in 1986 the first Staples shop was opened in Brighton, outside of Boston USA. Today Staples is the biggest player in its field and has revolutionized the market for procurement of office supplies, computer accessories and consumables. (Staples, 2012)

The strategy is to sell everything to offices and public spaces and it should be done easily. Their aim is to be market leaders in terms of price, quality and delivery times. Staples sell everything that is in offices (including phones, furniture etc.) and public places as schools, kindergartens and health centers, that does not need a prescription. Staples Sweden has three sales channels, each customized depending on the aim of customers. They are: Staples Advantage who focuses on contract customers, such as companies and the public sector, Staples Direct which is a mail order business directed at smaller companies and unions and Staples Retail which consists of 18 stores located all over Sweden. (Staples, 2012)

Today Staples Inc has a turnover of about 175 billion SEK and has about 91 000 employees in 27 different countries and the head office is in Boston, USA. For Staples Sweden the turnover is about 1,8 billion SEK and they have 475 employees. The main office is in Borås and the central warehouse is in Växjö. The Warehouse in Växjö is 20,000 m² large, 12 meter high and is Europe’s most modern office supply warehouse. Staples Sweden has about 540 suppliers. The warehouse contains about 15,000 articles, and the maximum outbound capacity is 50,000 orderlines per day. Today there are a total of 115 employees in the central warehouse of which 100 is actively working within
the operational part, and about 15 employees’ works with the administration. (Staples, 2012)

1.2 Practical background
Staples’s central warehouse in Växjö, Sweden experiences difficulties to get their incoming flow of deliveries to deliver on time. The problems lies in a poor control of the incoming flow of deliveries where Staples do today not know if the suppliers that arrive to the warehouse, are meant to deliver that specific day. The Logistic manager (2012) believes that the reason of the poor control lies in the information exchange between the suppliers and the purchasing department and also between the purchasing department and the inbound department. This is according to the Logistic manager (2012) believed to be the reason why suppliers delivers too early, which could lead too unnecessary tied up capital, and too late which could lead to backlog and rest orders to Staples customers. However Staples would like to know the extension of the late and early incoming flows, and how they could improve the control of their incoming flow of deliveries.

Another problem which the inbound department experiences is that the inspection of the incoming flow of deliveries in the inbound department requires a lot of time, which increases the flow time into storage. Consequently this leads to that it takes longer time until the deliveries are registered and stored in order to be able to be sent to the customers. Staples would like to know what the underlying reasons behind the long flow times in the inspections are and how these could be reduced. (Logistic manager, 2012)

Figure 1 below, shows the two main areas that will be researched in the thesis. The big circle illustrates the control of the incoming flow of deliveries, and the small circle illustrates the inspection of the incoming flow of deliveries.
1.3 Theoretical background

The dynamic market in today’s uncertain competing environment has initiated the need for robust supply chains to become more persistent (Marufuzzaman & Deif, 2010). Complex company networks in the global competition have affected interruptions in the flows of materials and information (Bode et al, 2011). The dynamic cooperation of companies in the supply chain determines by the effectiveness in the cooperation, how the services provided to the end customer looks like (Marufuzzaman & Deif, 2010). Harrison & van Hoek (2008) defines supply chain management as “planning and controlling all of the business processes from end customer to raw material suppliers, that link together partners in a supply chain in order to serve the needs of the end customer”. Therefore, it is critical that each player of the supply chain makes efforts to collaborate with each other in order to maintain business success. (Qureshi et al, 2009; Harrington & Van Nimwegen, 1997)

1.3.1 Incoming flows of late and early deliveries

Distribution has come to be a very important aspect for customers. Especially on-schedule deliveries have turned out to be an important consideration in order to avoid queues and to smooth the workloads. This requires that deliveries have to meet specific
times determined by the customer. (Cooper, 1994) In order to manage on-schedule deliveries the customers have to collect information about critical performance measures over time. This will make it easier to identify problems that could occur within late and early deliveries but also make the customer more knowledgeable to steer the incoming deliveries in the direction they want. (Anupindi et al, 2006; Ljungberg & Larsson, 2001)

1.3.2 Control the incoming flow of deliveries

The aim within a supply chain is according to Harrison & van Hoek (2008) to keep materials flowing from the source to the end customer, and in order to prevent build-ups of inventory, flows must be arranged so that parts move in a coordinated way. The control of the material flows across the boundaries between companies and their customers is according to Lewis et al (1997) important for the success of their internal operations. According to Dudek (2009) no single company in the supply chain can fully control the manufacturing and distribution of its products, and therefore they have to depend on its suppliers in order to reach a good performance within these processes. Purchasing management refers to all activities necessary to manage supplier relations in such a way that their activities are aligned with the company’s overall business strategies (van Weele, 2010). Baily et al (2008) adds that purchasing is a part of procurement which is defined as the systematic process of deciding what, when, and how many to purchase and the process of ensuring that what is required is received on time, in the right quantity and quality. Walker & Robinson (2008) includes that a sustainable purchasing process provides a way that value is generated for both the buying company and its suppliers.

Good planning decisions require buying companies to have exact information of the quantified demand, lead-times from suppliers and inventory levels so it makes it easier for them to make plans for its business processes (Button, 1993). Heinritz et al (1991) argues that when a single person or department is not in charge of ordering and controlling of the inventory levels, then the buyers and planners need to be in constant communication concerning supplier delays, lead time change, and quality problems.
1.3.3 Inspection of the incoming flow of deliveries

Inspections may be extremely costly in companies that need to inspect large quantities of incoming items, the inspection and incoming control costs can be divided into handling costs, storage costs, supplier handling costs and so on (Gadde & Håkansson, 1993). This could be the case at warehouses that collects and combine large quantities of products from a lot of different suppliers. The warehouses handle most products in four cycles which are, receive, store, pick and ship (Langevin & Riopel, 2005). These costs can be hidden and still stand for a large proportion of the buying company’s internal costs (Gadde & Håkansson, 1993).

1.4 Problem discussion

1.4.1 Incoming flows of late and early deliveries

The logistic manager (2012) believes that approximately 50 percent of the incoming flow of deliveries arrives too late or too early. The flows that arrives too late sometimes leads to rest orders and backlog within Staple, which arises when Staples do not have the ability to send the product to the customer in time. However there are also incoming flow of deliveries that arrives earlier than expected. This leads to that Staples store more products than their customers’ demands, which leads to unnecessary tied up capital. (Logistic manager, 2012). According to Van Weele (2010) this could depend on that Staples suppliers are not systematically evaluated, in terms of which suppliers that delivers too late or too early. This could lead to that troublesome suppliers still will be a part of the buying company’s supplier base and probably will continue with delivery problems. (Van Weele, 2010) Therefore it would be rewarding to investigate the extent of the incoming flows of late and early deliveries.

1.4.2 Control the incoming flow of deliveries

Problems regarding to the control of the incoming flow of deliveries is that the inbound- and purchasing department does not exactly know when the deliveries will occur, the inbound department does further not know when a delivery that has arrived is on time or not. For this reason all the incoming flow of deliveries are received without consideration to the delivery date. Furlan et al (2011); Harrison & van Hoek (2008) suggest that the purchasing- and logistics department should work together in a
cooperative manner in order to pursue internal integration, which will improve the logistics performance compared to less integrated companies. Staples feel that the problem lies in the control of the incoming flows which are not managed today. Van Weele (2010) lifts up this problem and means that the reason for this might depend on unclear specifications towards suppliers. Therefore it would be rewarding to investigate how Staples could improve the control of their incoming flow of deliveries.

1.4.3 Inspection of incoming flow of deliveries

When Staples receives a delivery, they must first inspect the incoming flow of deliveries before the goods could be stored in the warehouse and ready to be sent to the customers. This gives the inspection process a lot of extra unnecessary work due to the quality checks and handling of the incoming goods that have to be done. Inspections may include, for example physical inspections regarding that the right article has been sent and that no shipping damage has occurred and that the right amount has been sent, but also inspection and registration of the delivery note in Staples internal data system. These activities could according to Ljungberg & Larsson (2001) be seen as non-value adding activities that do not create value for the customer but are necessary to have in order to keep the process in work, and should be minimized. This is also stated by Ishikawa (1985) who argues that the quality control of the purchased items is a problem that takes time and contributes to slowing down the flow time into storage. Staples would like to investigate the possibilities to improve the inspection of the incoming flow of deliveries in order to speed up the flow into storage.

The discussed problems above lead us to the research questions:

1.5 Research questions

1. To what extent is the incoming flow of deliveries late or early?

2. How could Staples improve the control of the incoming flow of deliveries?

3. How could Staples improve the inspections of the incoming flow of deliveries?
1.6 Purpose

To identify the amount of late and early incoming flow of deliveries and describe how Staples could control them in order to receive more on-time deliveries. Moreover to describe how Staples could improve the inspection process in order to make the incoming flow of deliveries flow faster into storage.

1.7 The thesis continued disposition

Figure 2 below shows the thesis continued disposition

- **Methodology**: In the methodology chapter the authors will show their methodological standpoints regarding the approach and way of collecting and analysing of the data for the thesis.

- **Theoretical**: In the theoretical chapter the authors will present relevant theories which are: measures of late and early deliveries, process mapping, control of incoming flow of deliveries and inspection improvements.

- **Empirical**: In the empirical chapter the authors presents the results of the incoming flow of late and early deliveries. The authors then further presents the purchasing process, and its connection to the control of the incoming flows. The last empirical part illustrates how the inspection process works with the incoming flow of deliveries.

- **Analysis**: In the analysis the empirical results will be analysed with help of the theoretical framework.

- **Results**: In the conclusive chapter the authors presents the conclusions, further on contribution to the theory, own reflections, suggestions for further research and critics is pointed on to the thesis.

*Figure 2: The thesis continued disposition showing what each chapter will contain.*
2. Methodology

In the methodology chapter the authors will present the standpoints of the methodology chosen to construct the thesis. Every methodology part is prefaced with a short theory description in order to give the reader an understanding of the subject, and is then followed by the author’s standpoint. The last part of the methodology ends with a graphical summary of the selections made.

2.1 Scientific stance

The scientific approach can be divided into two different theories: positivism and hermeneutics. Positivism has its origin from the sciences but has also been important in social science. Hermeneutics is a humanities-oriented theory originating from theology. (Bryman & Bell, 2005)

Positivism is an epistemological view that implies that the scientific methods should be used in studies of the social reality. Positivism is an event, which only can be confirmed as true knowledge through people's minds, which is also called phenomenalism. The purpose of this theory is to generate hypotheses that can be tested which afterwards get confirmed or rejected. (Bryman & Bell, 2005)

Hermeneutics is an approach that involves the interpretation or understanding of texts. The guiding foundation of hermeneutics is that the analysis of a text must be done in a way that tries to get the text's meaning from the perspective of the author. (Bryman 2005)

2.1.2 The authors' scientific stance

The authors let the theory lead the research and were the foundation for the results. The research had a positivist approach, which was an appropriate method because the authors let the work be based on collected facts rather than to base them on subjective judgments. The authors collected data at Staples through internal data and interviews with people who had access to that information that was required for the development of the essay. All data were composed and examined in an objective manner in which the authors did not interpret the information through their feelings and perceptions, but the statements has been examined after what actually have been said and done.
2.2 Scientific approach

The relationship between theory and empirical work is attributed to either deduction or induction. (Bryman 2005) Deduction is usually described by the knowledge that exists within an area, and the theory of ethical reflections concerning an area derives one or more hypotheses to be subjected to an empirical investigation. Inductive theory goes in the opposite direction as to how the relationship between theory and empirical work looks like. This leads observations and results to a generation of theory as contrary to the deductive process, which means that it is based on theory as on the basis of observations that lead to the results. (Bryman & Bell, 2005)

2.2.1 The authors' scientific approach

The authors choose to use a deductive approach because the authors used theories as a basis to generate the research questions. The study had a position of adopting the answers through the research questions by means of theory and empirical work, which resulted that the thesis had a clear deductive approach.

2.3 Research method

There are two ways of relating to research. One is called quantitative research and the other is called qualitative research. The differences between these research methods are that the quantitative research method is often shaped through numbers while the quality is produced by words. In the quantitative method, it is usually the researcher who controls the investigation, while the quality method is shaped by the participants' perspective investigation. Quantitative researchers are usually distanced in its exploratory because they want to stay as objective as possible, while a qualitative researcher seeks nearness to perceive "the world" in the right way. (Bryman, 2008)

2.3.1 The authors' research method

The author's used a combination of a qualitative and quantitative approach. The qualitative approach was used in the thesis when dealing with explaining the empirical findings from interviews and observations in order to get better understandings of how the purchasing- and inspections process looks like today. The quantitative data used was internal data of the historical delivery records from a specific time period.
2.4 Survey Design

A survey design is a different criteria used in assessing the various business surveys. Examples of survey designs are case studies, survey studies and longitudinal studies (Bryman, 2008).

When a study is carried out in a deeper and more detailed occasion, it is often called a case study (Bryman, 2008). A case study is an empirical study, which is used when studying a recent phenomenon in its real context and where the boundaries between phenomenon and context are unclear. The case study applies the technically specific situation in which there are more interesting variables than data points. This means that the case study is based on several sources of empirical evidence, and that data needs to meet on a linking manner. (Yin, 2007)

A survey investigation is a thorough and detailed review. It is also related to the acquisition of data to an exploration. It is important to emphasize that a survey study is a research strategy and not a research method. Researchers who use this strategy may use a part of various methods such as questionnaires, interviews and documents. (Denscombe, 2009)

A longitudinal design has as purpose to study a sample at two different time points. The design can be divided into panel survey and cohort study. Panel survey focuses on a sample e.g. what is representative of an entire nation and the collection of data from two or more separate occasions. Cohort study is chosen with regard to the data collection, either a whole group of people (cohort) or sample that is randomly done. Cohort of people may have a common characteristic such as the same birth week, wedding or perceived unemployment. (Bryman, 2008)

2.4.1 The authors' study design

The authors choose to use a case study as a survey design because the problem was of complex nature and that a specific case was to be studied within one company, which in the author’s case was Staples. This required a more detailed understanding of the object during the study. The authors studied a phenomenon in its real context, and this required that the authors were agreed upon the problems that existed in the company.
2.5 Data Collection

There are two different types of data to work from within data collection, primary data and secondary data. Primary data means that there have been collections of data sets for the first time. Secondary data means that data set is already available for further processing or can be used directly, and may include official statistics. (Edling & Hedstrom, 2003)

There are different approaches for the collection of primary data such as interviews and observations. An interview can be explained as a conversation with a goal that is definite. The interviewer has the purpose to obtain information about a specific topic and choose to ask questions to a person to obtain information. There is various interview forms, depending on how well structured the interview should be, and these interview forms are: unstructured, structured and semi-structured. Unstructured interviews are characterized by the fact that the interview is closed to a particular subject and a question and where the respondent can talk freely and reflect on the subject. In semi-structured interview the interviewer made a number of questions on the subject, but which the respondent may freely formulate their responses. In a structured interview the interviewer leaves less room for respondents to respond freely to questions. Observation can be explained as a specific objective for observation. It is a methodology of collecting information in different situations and can be divided into direct or indirect method. Direct method is the collection of data made by studying the physical reality. By fact-finding through surveys or interviews in which someone has described what has happened or experienced is an indirect method. (Carlström et al, 2007)

Secondary data is data collection that has been made by another than those who study the material. Secondary data can include numbers, and examples of this are the financial statements and annual reports from companies and organizations, but it can also be in text form, for example, investigations, and journals. (Jacobsen, 2007) A problem with secondary data is that the data collection has been made for a specific case and used a completely different view of the original data collector than those who analyze the data. Furthermore, those who analyze the material do not surely know which measuring instruments that have been used, how the data collection was done and who have registered the information. (Jacobsen, 2007)
2.5.1 The authors' data collection

The authors began its work with collecting primary data by having unstructured interviews with the logistics manager and the supply chain planning manager in order to understand the problems that existed within the control of the incoming flow of deliveries and with the inspection process. Having unstructured interviews and discussing the problems with the logistic manager and the supply chain planning manager, lead to that the managers could freely reflect over the problems Staples was experiencing. This gave the authors a better overview of what the problems depended on.

For the first research question regarding the extent of late and early deliveries, the authors observed by direct method how the flows came in to Staples. The observations was made from Monday 2\textsuperscript{th} until Thursday 5\textsuperscript{th} of april, and Tuesday 10\textsuperscript{th} of april. These days were not chosen for a specific purpose, they were radomly selected to illustrate how the incoming flow could look like. The observations were made of the incoming flow of deliveries, during Staples receiving hours 07:00 – 16:00. This was done with the help of the delivery coordinator who helped the authors to note down which suppliers that arrived. The formula that the incoming delivery coordinator filled in can be seen in appendix 7. The authors had access to walkie talkies and could hear which suppliers that arrived and to which gates these were coordinated to. The authors then went to these gates and noted down the suppliers name and the purchase order number of the delivery. This formula can be seen in appendix 8. With this information, the authors could illustrate how the flow looked like day by day during the period, but also see which suppliers that arrived too late or too early. This could be done with the help of secondary data in form of a list over which suppliers that was planned to deliver to Staples each day by comparing the specific purchase ordernumber and supplier name.

The authors also investigated six suppliers (Stora Enso, Metsä Tissue, Esselte, Nilfisk, Staples Europe Import and Polynova) that Staples wanted to examine during a longer time period. The authors chose the time period of 30/1 – 2/3-2012 in order to show the extent of late and early deliveries for the specific suppliers during this time period. The chosen time period was randomly chosen by the authors, and had no further purpose more than to show the extent of late and early deliveries during a longer time horizon. This was done with the help of internal data which contained information about
confirmed delivery dates that had been agreed between the purchaser and the supplier, and when the delivery was registered in the SAP system.

For the second research question the authors investigated the process activities in the purchasing department by mapping out the purchasing process. The mapping of the purchasing process in the purchasing department was made by combining observations of direct method and semi-structured interviews with the supply chain specialist and with a purchaser so that the authors could get an overview over how the purchasing process looked like. The purpose with the mapping of the purchasing process was to see how the purchasing department worked considering the aspects of controlling the incoming flows. The incoming delivery coordinator was also interviewed regarding on the control of the incoming flows, and how the coordinators work is connected to the control of the incoming flows.

For the third research question the authors investigated the inspection activities by mapping out the inspection process. This was done with observations of direct method and semi-structured interviews with the profiler, incoming delivery coordinator and inbound department manager. The authors also had unstructured interviews with several consignees and two team leaders. In these interviews the authors gathered deeper information over how the inspection process looks like. Based on the process mapping, the authors got a foundation to stand on in order to see where the problems layed in the inspection process, and to find possible activities that could be improved in some way. This was done to see if the flow potentially could flow faster into the storage. The authors followed the inspection process from unloading of the truck until that the handling of the delivery was done. The authors also measured the activities in the inspection process to see approximately how long time the different activities took, and the time spent to handle different suppliers deliveries. The authors intended to measure all six suppliers, which were the same suppliers that also were investigated in the first research question regarding the late and early incoming flow of deliveries. However the authors managed to measure on full-scale upon the suppliers: Nilfisk, Esselte, Metsä Tissue and Stora Enso. The authors did not manage to measure on full-scale upon Staples EUR Import, and deliveries from Polynova was not managed to be measured at all. The time was measured in three main intervals:

1. The time it took to unload the goods
2. The time period from that the goods were unloaded until it had been booked into the SAP system.
3. The time period between that the goods have been booked to that the consignee had handled the delivery and labelled the items.

Within these interval inspections there were separate measures on the inspections regarding quantity control, damage goods control but also the time period of activities such as mixed pallets that have to be divided into other pallets. The authors used a list, which can be seen in appendix 9 to document the measurements. The measurements were done during the time period of Tuesday 3\textsuperscript{rd} until Thursday 5\textsuperscript{th} of april, and Tuesday 10\textsuperscript{th} of april. These days were not chosen for a specific purpose, they were radomly selected to illustrate how the inspections were done to the specific mentioned suppliers.

A summary of the authors approach of working with the research questions can be found in figure 3 down below.
RQ1

- **Activity:** Illustration over the incoming flow of deliveries
- **Method:** The authors measured the incoming flow of deliveries between 2-5th and 10th of april, the measuring was done with direct observations. The authors also used internal data for the time period (30/1 - 2/3-2012) for the six suppliers, to see how these specific suppliers delivered during the time period.
- **Purpose:** The purpose was to illustrate the extent of the late and early deliveries between 2-5th and 10th of april, but also to see how well the six suppliers managed to deliver on time during the period (30/1-2/3-2012)

RQ2

- **Activity:** Process mapping over the purchasing process
- **Method:** Direct observations and interviews
- **Purpose:** The purpose was to get an overview over how the purchasing process looks like, and how the purchasing department worked considering the aspects of controlling the incoming flow of deliveries, and how the coordinators work is connected to the control of the incoming flow of deliveries.

RQ3

- **Activity:** Process mapping over the inspections process
- **Method:** The authors measured the activities in the inspection process by observing how long time approximately the different activities took.
- **Purpose:** The purpose was to identify inspection activities that could be improved, in order to make the flow go faster into the storage.

*Figure 3: The author’s approach of working with the research questions*
Figure 4 down below illustrates the chosen primary and secondary data collection.

![Data collection diagram]

**Figure 4: Overview over the data collection the authors made for the thesis**

2.6 Analytic methods

The purpose of having a framework of a general strategy is to guide the author for the analysis of data. The differences between quantitative data and qualitative data are that analysis of quantitative data is always made after that the data has been collected. The analysis of the qualitative data usually has a recurrent iterative interaction between collected data and the analysis of the data. (Bryman & Bell, 2005)

Analytic induction is a method where the author analyses data and strives for universal explanations by different phenomenon and continuing collecting data to that all cases fit to the hypothetical exploitations. (Bryman & Bell, 2005)

Grounded theory has been the most common way to analyze qualitative data. Grounded theory is defined as theory that has been derived from collected data, which have been analyzed in a systematic way within the research process. (Bryman & Bell, 2005)

Pattern matching is an analytic method, which is to relate empirical information from
one case to some theoretical hypothesis. It therefore compares the empirical patterns with the expected theoretical stands. If the pattern correlates with each other, it will strengthen the validity of the case study, the patterns could also correlate but differently, and therefore the things that differs could give new knowledge within the subject. (Yin, 2007)

2.6.1 The author’s analytic method

The authors selected pattern matching as an analytic method to be able to analyze the collected data and then match it to the theoretical framework that the authors had presented. The presented empirical framework has been made by interviews with the employees, but also by observations of direct method and internal company data. The pattern matching has been the most appropriate method because the chosen theory has been described in order to apply it into empirical data that has been collected.

2.7 Selection of respondents

There are two types of samples. The first is known as probability sampling, which means that a selection has been made in a random way in which everyone in a population has an equally great chance to join in the sample. The second selection method is called non-probability sample and is a sample where some units in a population are more likely to be in the sample. (Bryman & Bell, 2005)

There are two different types of probability samplings. One is called simple random sampling and is based on that everyone has an equal chance to get into the sample and systematic sample is that for e.g. every 20 employed on a list are selected for the sample. It is important that there is no peer or systematic order when using this selection method. (Bryman & Bell, 2005)

There are several different types of non-probability sample. Convenience sample is people who happen to be available to the researcher, those that are easiest to reach. Snowball selection arises when the researcher makes contact with a small number of people that are relevant to the theme of the study and will refer to these individuals for making contact with other persons for research purposes. Quota selection means that it is the researcher himself who stands for the final decision on who should be involved in
the investigation. (Bryman & Bell, 2005)

2.7.1 The authors' selection

The authors selected a non-probability sampling in regard to snowball selections. The interviews the authors conducted were made through the logistic manager within Staples who had the knowledge of the issues the company faced and also referred to other contact persons who had special knowledge within different areas in the company, which the authors made interviews with. The authors also talked to the team leaders and several consignees within the inspection process, regarding what problems they perceive. The list over persons the authors interviewed can be seen in figure 5 below.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simm, Lennart</td>
<td>Logistics manager</td>
<td>Presentation of the problem/Follow up</td>
</tr>
<tr>
<td>Jonsson, Christer</td>
<td>Supply Chain Planning Manager</td>
<td>Purchasing process</td>
</tr>
<tr>
<td>Willman, Per</td>
<td>Inbound department manager</td>
<td>Inspection process</td>
</tr>
<tr>
<td>Salomonsson, Johan</td>
<td>Supply Chain Specialist</td>
<td>How the purchasing system works./Purchasing process</td>
</tr>
<tr>
<td>Tingdahl, Ewha-Maria</td>
<td>Purchaser</td>
<td>Purchasing process</td>
</tr>
<tr>
<td>Karlsson, Ulrika</td>
<td>Incoming delivery coordinator</td>
<td>Inspection process</td>
</tr>
<tr>
<td>Strömgren, Anders</td>
<td>Profiling</td>
<td>Inspection process</td>
</tr>
</tbody>
</table>

*Figure 5: List over persons that the authors interviewed in order to gather information for the thesis.*
2.8 Truth Criteria

When a research must be judged on its quality, the assessment will be based on after a certain number of criteria depending on whether the research it intends to investigate is quantitatively or qualitatively oriented. Some authors argue that qualitative studies should be assessed and evaluated based on different criteria than those quantitative researchers use. (Bryman, 2008) However Yin (2007) means that case studies should focus on specific truth criteria’s which is: Construct validity, internal validity, external validity and reliability.

Construct validity is mainly used in quantitative research. It asks the question whether a concept reflects its designation e.g. "Reflects an intelligence test a person's real intelligence?” Yin (2007) means that the risks for researchers, who using construct validity within case studies, formulate everything for subjective judgments regarding the collection of data. If the researchers formulate to subjectively, the reader would not know if the result were only demonstrating the researcher's impressions and feelings. Thus, the researcher must make clear in advance the important factors or events that are based to a change. (Yin, 2007)

Internal validity explains how a conclusion based on a causal relationship between two or more variables are sustainable or not. E.g. "Affects the X variable Y variable or is there an intermediate variable that affects Y?” This logic does not work for descriptive or exploratory studies, regardless of whether it is a case study, survey research or experiments. (Yin, 2007)

External validity addresses the issue of whether the results of a study can be generalized beyond the specific research context. Critics argue that a single case is a weak basis for generalization within case studies. External validity in a case study is based on analytical generalization where the researcher strives to generalize a particular result in a more general theory. For a result to be generalized, it must first be tested by a replication of a second or third area based on the results. (Yin, 2007)

Reliability means that research can be reproduced and give the same results and conclusions. It will be necessary for the researchers to document the approach in their research. Without this documentation, it becomes difficult to perform the same case
study again and thus become weak reliability. Therefore, a case study must be documented as precisely as possible in order to constitute a strong reliability. (Yin, 2007)

2.8.1 The authors' truth criteria

The author’s choose a case study as a study design and therefore the above truth criteria fit well when focusing on a case study. To validate the construct validity the authors let the logistics manager and the supply chain manager read copies of the thesis during the writing period. This was done in order to make sure that the authors understood the reality of the company in that way it was explained. In order to ensure the internal validity the authors interviewed diverse employees considering if the employees perceives the causes of the problems in the same way, and the authors also did observations of direct method in order to ensure that what was said really happened. This thesis did not have the goal of generalizing the results beyond the specific research context and therefore the authors excluded the external validity in this thesis. The reliability of the thesis was created by that the authors made documentations of the execution of the thesis, and also documented lists of interviewed persons, and the subject of the interviews, which are documented in the appendix. The authors also documented how the measurements of the incoming flows were made, and the measurements of the activities in the inspection process.
2.9 Summary of the authors methodological choices

Below in figure 6 follows a summary over the methodological choices the authors have made.

**Figure 6: Summary over the authors methodological choices in the thesis**
3. Theoretical framework

The theoretical framework presented will be divided as follows by figure 7 below. Chapter 3.1 contains theory about measuring the incoming flow of late and early deliveries. 3.2 contain theory about the purchasing department and how they work, and why information is important in order to have control over the material flow. Chapter 3.3 describes process mapping and the purpose of making them. Chapter 3.4 contains theory about improving processes and measuring the flow time, and how it can be decreased.

Figure 7: Overview over the theoretical framework and its relation to the research questions
3.1 Incoming flows of late and early deliveries

3.1.1 Measuring of late and early deliveries

Measurement makes it easier to know where the business is going. It also makes it easier to steer the organisation towards the goals and identifies problems that could occur in businesses. Creating measures gives clear indicators to suppliers in order to get them to understand what their customer’s goals is. Measures also support the purchasing department in order to better make decisions regarding to their purchasing. Most of all measures motivate organisations to change and get better. (Ljungberg & Larsson, 2001)

3.1.1.1 Number of late deliveries in relation to the total number of deliveries

This measure shows how well the supplier delivers towards the agreed delivery day. For instance the customer chooses a period of time to count the number of orders that have been delivered in the right time in relation to the total number of orders that have been delivered in the chosen period. To refine the measure, the buying company could report whether the delivery has arrived to early or too late and by how much time. (Mattsson, 2002)

3.1.1.2 Supplier reliability

Early deliveries can cause problems due to not having enough stockrooms, and late deliveries can cause problems by not having the products when needed. Consequently this could cause problems with the project planning in the business. Figure 8 below shows which weight factors to take in consideration when measuring the supplier reliability. The weight factors are early deliveries, on time deliveries and late deliveries, and quantities received. Figure 9 is an example of such a calculation. The closer the score gets to 100 the better the supplier reliability is. But in most cases it is not realistic to keep track of the performance of every supplier, therefore it could be appropriate to keep on track of the suppliers that requires most attention. (Van Weele, 2010)
3.2 Control of the incoming flow of deliveries

3.2.1 Purchasing management

“Purchasing management refers to all activities necessary to manage supplier relationships in such a way that their activities are aligned with the company’s overall business strategies and interests” (Van Weele, 2010, p. 11) It is focused on improving the purchasing processes within the organisation and its suppliers. The idea behind purchasing management is that if suppliers are not managed by its customers, the customer relationships will be managed by the suppliers. (Van Weele, 2010)
The purchasing function encompasses the process of buying. It covers specifically activities aimed at:

- Determining the purchasing specifications in terms of required quality and quantities of the goods and services that need to be purchased.
- Selecting the best possible supplier and developing procedures and routines to be able to do this
- Preparing and conducting negotiations with the supplier in order to establish an agreement and to write up the legal contract
- Placing the orders with the selected supplier or to develop efficient purchase order and handling routines
- Monitoring and control of the order to secure supply
- Follow-up and evaluation, settling claims, keeping product and supplier files up-to-date, and supplier rating

(Van Weele, 2010, p. 8-9)

3.2.2 The purchasing process

The input of a purchasing process starts with a business need. The needs and requirements may be defined in a more general way, or in a very detailed manner. The next step is to find a proper supplier who can assure deliveries with the wanted demand. In the purchasing process, there could be some problems, and when they occur, the reason usually depends on deficiencies in previous steps in the process. As an example, quality problems related to purchasing materials usually becomes visible at the end of the purchasing process. This might depend on incorrect or incomplete specifications or incorrect decision in the supplier selection. (Van Weele, 2010)

The responsibility within the purchasing process is not limited to the purchasing department. Other departments usually are involved, which requires good communications and co-operation among the involved. The task, responsibilities and authority of each department should be integrated, to prevent misunderstandings and role conflicts. The role of delivery problems of purchased materials leads to that higher
prices will be paid (extra work, speed of delivery and so on), but also in many cases to higher organizational costs and operational problems. (Van Weele, 2010)

3.2.2.1 The specification phase
In the specification phase, the purchasing requirements are determined. The specifications mainly cover:

- Quality specifications, which describes how the product should be delivered and what technical norms and standards the product should meet.
- The logistic specifications, indicating the quantities needed, the place and time of delivery and the physical conditions to be respected.
- Maintenance specifications, describing how the product will be maintained and serviced by the supplier.
- Legal and environmental requirements
- Target budget, which indicates within those financial constraints the solution to be provided by the prospective supplier, should be found.

(Van Weele, 2010, p. 33)

3.2.2.2 Ordering process
After the terms and conditions of a contract, the order can be placed. When ordering from a supplier, it is very important to be specific about the information and instructions to the supplier. Generally, a purchase order will include the following entities: an order number, a concise description of the product, unit price, number of units required, expected delivery time or date, delivery address and invoicing address. The purchase order can contain several order lines that describe different products that must be delivered. All of these data need to be reflected on the delivery documents and invoice, sent by the supplier in order to facilitate matching. Usually the supplier is requested to send in a confirmation for each purchase order received. (Van Weele, 2010)

3.2.2.3 Expediting
Expediting is a way to put pressure on the supplier to get them to meet the original delivery promise or to speed up delivery of a delayed order (Leenders et al, 2002). The buyer has to make sure that the supplier will live up to their agreements. Expediting therefore demands a lot of the buyer’s attention and is often conducted on the basis of
an overdue list, which records all deliveries that are late. There are two different types of expediting.

- **Exception expediting:** The buyer gets informed by the internal customer that expected deliveries have not arrived. The buyer will have to take immediate action depending on whether this late delivery will cause a disruption on the internal customer’s operational processes.
- **Preventive approach:** Here the buyer will contact the supplier just a few days before delivery with the request to confirm his delivery date again in order to prevent unpleasant surprises.

Quality and delivery problems should be reported daily to the buyer through a supplier complaint procedure. The problems should directly be communicated to the supplier in order to prevent a recurrence in the future. (Van Weele, 2010)

### 3.2.2.4 Follow-up and evaluation of the purchasing process

The last step in the purchasing process is to follow-up and evaluate the purchasing process. If problems occur within i.e. quality or delivery, the buyer must know this as soon as possible so appropriate action can be taken. The follow-up is often done by telephone to immediate take contact with the supplier in order to get information and answers directly. The experience with the individual supplier should be documented carefully. It is recommended that the buyer keep on track of the supplier’s quality and delivery record, competiveness and innovativeness since these data can lead to an adjustment for a so called supplier rating. (Van Weele, 2010; Leenders et al, 2002).

In some large companies the purchasing department only takes care of the purchase order. In such cases a separate expediting takes over the follow up of a delivery, the inspection department is responsible for acceptance, the inbound department takes care of receiving the materials and the accounting department controls the invoices. However the purchasing department is usually involved in all these duties. The purchasing responsibility ends only when the supplier has fulfilled the requirements. If materials are not in accordance with specifications, the purchasing department must make adjustments with the supplier. If there have been troubles in the terms of the shipment from the supplier, the purchasing department has the final responsibility resolving the problems. The first step for the purchasing department is to follow-up to
secure the delivery promises from the supplier according to specifications. (Heinritz et al, 1991) A model of the general purchasing process reconstructed after Jonsson & Mattsson (2005) can be seen in figure 10 below

![Figure 10: Model of the general purchasing process, reconstructed after Jonsson & Mattsson (2005)](image)

### 3.2.3 Control of on-schedule deliveries

On-schedule deliveries are now an important part of many distribution operations serving the retail sector. In order to avoid queues and to smooth their workload many grocery retailers have instituted delivery control systems. These require that the deliveries are made at specific times determined by the retailers. All deliveries must be booked in and any vehicle that arrives earlier or later than the predetermined delivery time, may be refused access to the unloading bay. (Cooper, 1994) However Novack (1993) claims that if a shipment is late due to a storm or something unpredictable, decision makers cannot do anything to prevent this to occur again. On the other hand Novack (1993) argues that if the delay is caused due to that the driver has taken unnecessary decisions which leads to a delay, then decision makers could take action in order to prevent such delays to occur again.
3.2.4 Control of the material flow

Control of the material flow can be defined as the operative administration that is needed to control the flow of materials within a given production or distribution structure. Therefore control of materials contains both planning and control of the activities that generates the flow of materials. The control of materials includes coverage of the flow which means that the material flow activities are executed as planned. Report of the material flow activities means to collect and inform about activities connected to the material flow that are executed or that should have been executed. Further on follow up means to process, compile and analyze the results of executed or default material flow activities and to draw conclusions of the analysis. (Mattsson, 2002) According to Novack (1993) the order cycle is a desirable process to use when beginning with logistical control, due to that most of the companies activities are associated with the order cycle.

3.2.5 Control of information flow

Effective supply chain management needs a cautious coordination of the inbound logistics. The information flow is often the main reason for the management of the inbound logistics. When there is a shortage of integration then inefficiencies will occur with regard to the inventory accumulation or the lack of customer service levels. The information needs to flow fast in both directions for effective coordination (Coyle et al, 1996). Information flow is according to Jonsson (2008) a condition for the efficient flow of materials. Yigitbasioglu (2010) made an investigation on intense information sharing in a buyer- supplier context within 119 Finnish companies and 102 Swedish companies, in order to see if intense information sharing correlate to improve the supplier performance. The results showed a positive relationship between information sharing and better supplier performance. The information sharing reduces the bullwhip effect and relatively swiftly impacts customer satisfaction and on-time deliveries. (Yigitbasioglu, 2010) Having a poor information flow in a buyer- supplier context, leads to uncertainty of early, on-time or late deliveries. Thus receiving late deliveries from a supplier as a buyer company would consequently affect backlogs within its organization, which could result in penalty fees and loss of reputation towards its customers. (Slotnick & Sobel, 2005)
3.2.5.1 Managing the information

The logistics information system provides information that is needed for logistical management. The activities within this system could be order processing, stock status and transportation rate lockups. This kind of interactions could occur as frequently as many times per hour. Operative personnel such as order processing and transportation clerks are typical users within this level. (Ballou, 1978) Novack (1993) states that if the logistics control is to be effective, the data must be examined on its content, and the delay between the data collection and the report compilation must be taken in consideration. There are a number of communication activities both internally and externally within the supply chain. The communication activities are seen as linkages in the supply chain that directs product flows to satisfy the customers. This process requires the management of the stocks and flows, and therefore there is a need for relevant flow of information from the activities that plans and controls the logistic system. (Gattorna & Walters, 1996) According to Novack (1993) one method to measure the control is the logistics audit, which implies to periodically examine the status of the logistic activities, and the results of the audit can be used to correct errors which could be the result of misinformation

3.2.6 Plan-do-check-act

Plan-Do-Check-Action is also referred to as the control circle. Figure 11 below is divided into six categories, and control is to be organized based on these six categories. The control circle must be made to move in the right direction. The six steps are as follows:

- **Determine goals and targets**
- **Determine methods of reaching goals**
- **Engage in education and training**
- **Implement work**
- **Check the effects of the implementation**
- **Take appropriate action**

(PDCA) (Ishikawa, 1985)
• In the *plan* phase, the company identifies and analyzes the problems, and plans the activities to remove the problems; the activities could be order fulfillments, inbound material, physical distribution, production control.

• In the *do* phase, the company does the activities which were planned in the previous plan phase. The purpose in this phase is to experiment with the solution.

• In the *check* phase, the company measures if the improved activities had the effects wanted on the problems.

• And at the last *act* phase, the firm modifies the process to fit the activities that were made to give results. When the company has made the four phases, than the process is believed to be improved. (Handfeld & Nichols, 2002; Ayers & Odegaard, 2008)

![Control circle reconstructed after Ishikawa (1985)](image)

**Figure 11: Control circle reconstructed after Ishikawa (1985)**

### 3.2.6.1 Plan - Determine goals and targets

If policies are not made, then goals cannot be established. The policies must be determined by the top management, however it is the subordinates and the staff that must supply the principles for the policies and assemble supporting data and analyze the data carefully at all times. When making a policy the executive always has to keep an overall picture in mind. Therefore the executive cannot make policies that contradict
each other. Therefore, when making policies it is better to limit the policy to priority items only, and ultimately there should not be more than three to five items only. When the policy is determined then the goals will be obvious. The goals must be expressed to the employees in a way that they understand them. They can be demonstrated by using terms and figures that they understand such as information about personnel, quality, cost, profit, amount of production. (Ishikawa, 1985)

If the goals and targets that are set do not have a method to reach them, then the goals and targets are useless. The method must embrace standardization that includes the whole company. On detecting the presence of abnormal variability, a cause-effect diagram can be used to identify the root cause of the observed variability. A cause-effect diagram shows a chain of cause-effect relationships that ultimately leads to the observed variability.

A simplified cause and effect diagram can be seen below in figure 12. The effect of the causes is illustrated in the right end. (Anupindi et al, 2006)

![Cause and effect diagram](image)

**Figure 12: Cause and effect diagram, reconstructed after Anupindi et al (2006); Ishikawa (1985)**

### 3.2.6.2 Do - Engage in education and training

It is the managers that have the responsibility of educating their subordinates. The work standards and technical standards can be made to good regulations, however the risk
exists that the employees cannot understand the idea behind the regulations. The important thing to do is to educate and inform the people who are going to be affected by the standards and regulations, so that they really understand the true meaning behind. (Ishikawa, 1985)

If everything is done as explained in the previous parts, then implementation should not cause any problems. However one can force subordinates to implement work by giving command, but conditions change constantly and the conditions given by the managers can never keep in pace with the changing conditions. Therefore it is said that standards and regulations are always inadequate, even if they are strictly followed defects and shortages will appear. Problems related to implementation appear at every step of management and control. (Ishikawa, 1985)

3.2.6.3 Check – Check the effects of implementation

In management the most important concern is the exception principle. If things are going as planned and goals set, then things can be let to proceed as they are. However when unusual things happen, then the manager must step in. The purpose with checking is to discover these exceptions. If the task is to be performed efficiently, then the basic goals, policies, and education procedures must all be clearly understood. If they are not clearly stated, and unless there are no reliable standards, then no one can tell what an exception is, and what is not. (Ishikawa, 1985)

3.2.6.4 Act – Take appropriate action

To take correct actions, it is important to take measures in order to prevent repetition of the exceptions. Just to make adjustments to the cause factors involved will not be enough, efforts have to be made in order to remove the cause factors which have been responsible for the exceptions. Adjustment and prevention of repetition are two separate things, both conceptually but also when it comes to the actions that need to be taken. If the causes for exceptions are to be moved, one must go back to the source of the problem to take measures in order to prevent recurrence. It is simple to say prevent repetition, but such prevention is very difficult to practice. Usually temporary measures are used to patch up problems for the time being. (Ishikawa, 1985)
3.3 Mapping processes

3.3.1 Process mapping

Process mapping is a basic tool when the aim is to understand supply chains. A process is defined as “a logical series of related transactions that converts input to results or output” (Handfeld & Nichols, 2002, p.40). A business process is “a chain of logical connected repetitive activities that utilizes the enterprises resources to refine or transform an object, for the purpose of achieving specified measurable results or output for internal or external customers (Handfeld & Nichols, 2002, p.41). Examples of common business processes include; procurement, inbound logistics, production planning and control, outbound logistics. (Handfeld & Nichols, 2002)

Companies that would like to increase the visibility and improve the communication and the understanding of the company should map its processes. Mapping processes often shows how the current work in the business looks like. Analysing the processes that the map represents, could help a company to increase the customer satisfaction by identifying solutions to reduce the cycle times, costs, non-value activities and so on. When mapping the processes a company could get a better overview of the processes and see potential pathways to efficient the processes. (Damello, 1996)

3.3.1.1 Purpose of process mapping

Process flowcharts were originally developed to coordinate large projects involving complex sets of activities and considerable resources. They are also useful for understanding, documenting and analyzing almost any business process, breaking down a process into its component activities, identifying their interrelationship and viewing them graphically gives support to understand the total process. (Anupindi et al, 2006)

In the first phase of the process improvement activity, the process must first be documented. This is the fact because if something is going to be improved, then the current performance must first be determined. If the current performance and the process is not understood, it will be hard to know which improvement activities that could be started or if they will work at all. Documenting the process should therefore
naturally be the first step in any improvement activity. The development of a process map has several purposes:

- It creates a common understanding of the content of the process; its activities, results, and who performs the different steps.
- It defines the extent of the process, but also the boundaries of the process that is relevant to neighboring processes.
- It also provides a base against which improvements to measure in the future.

(Handfield & Nichols, 2002)

3.3.2 The Process Flowchart

A process has five elements namely, inputs, and outputs, flow units, network of activities and buffers, resource allocated to activities, and information structure. A process flowchart is a graphical representation of these five elements. For the purpose of representation, it is useful to separate activities that require a decision from other types of activities. Decisions route a flow unit to one of two or more continuing routes, which results in a splitting of flows. In a process flowchart, various elements are represented by different geometric shapes. (Anupindi et al, 2006) By using a variety of symbols businesses could recognize where waste, delays, rework and so on exists within the processes. Below in figure 13 there are some symbols that companies should expect to see in more complete flowcharts. The descriptions to the symbols are described below. (Damelio, 1996)

- **Operation**, identifies an activity or task in the process which changes an input. Usually the name of the activity or task is written inside
- **Decision**, identifies a decision or branch point in the process
- **Document**, identifies when the output of an activity is recorded on paper
- **Beginning/End**, identifies the beginning or end of a process
- **Database**, identifies when the output of an activity is electronically stored
- **Delay**, identifies when something must wait or is placed in temporary storage
- **Storage**, identifies when an output is in storage waiting for a customer
- *Inspection*, identifies that the flow has stopped in order to evaluate the quality of the output or to obtain an approval to proceed (Anupindi et al, 2006; Damelio, 1996)

![Flowcharts symbols reconstructed after Damelio (1996)](image)

Figure 13: Flowcharts symbols reconstructed after Damelio (1996)

When the process have been documented using the above mentioned symbols, additional information can be included in the process such as:

- Information flows
- Time requirements for process elements
- Distance moved
- Resources required
- Capacity (Handfeld & Nichols, 2002)

### 3.3.3 Initiate the process map

There have to be choices made over the process boundaries. The choices have to contain questions about; when the flow units are completed, is it at the moment its construction is completed, when it is shipped to the customer, or when payment is received? Similarly the starting and exit point of the process needs to be defined. The starting point could be defined as the moment at where all required parts or modules are available for production, or it could also be at the time where work starts on any part of the flow unit. (Anupindi et al, 2006)
When companies chose to make a process map, the company should first choose the processes that have the greatest significance to the business. The functional flowchart is a way to map out the processes. The flowchart shows which activities that exists in the processes and which sequence they are working in, but also whom in the company that performs within the activities. (Mattsson, 2002)

Without the input or output, a process could never be initiated. The input is either coming from an internal or- external supplier. When an input has been processed by activities and resources it triggers the next coming activity and becomes an output. Below in figure 14, an example of how a process flowchart may look like is illustrated.

3.4 Improving the inspection of the incoming flows of deliveries

3.4.1 The inspection process

Receiving products are important flow control activities in the materials management chain. The inspections of received goods are important to be efficient in order to store the goods fast so that the operating units will be supplied satisfactorily. Because the
purchasing and inbound department is normally responsible for the materials until they are ready for use, it is essential that the purchasing managers understands the fundamentals of receiving and storing operations. (Dobler & Burt, 1996)

In the inbound department there are activities that indirectly influence product cost in several ways. There is inventory-carrying cost, damage cost and well related indirect labour costs. There are also direct labour costs, which mean unproductive time of employees who add nothing to the productive effort of the organization. (Dobler & Burt, 1996)

It is during the receiving operations that the most of the problems or errors are detected in relation to the purchasing order. The problems could be; quantity shortage, damaged materials, incorrect items shipped, and so on. If these problems is not discovered at the time within the quality control, it could create problems later on in other departments within the company, where hours will be spent trying to determine what the issue was for the problem the department was experiencing. (Dobler & Burt, 1996)

3.4.2 Inspections of quality

Van Weele (2010) states that the purchasing departments must assure that the supplier meet product specifications and assure that the suppliers will deliver within the agreements. This is also called quality assurance. Quality however can also be explained as; “Quality is the degree in which customer requirements are met. We speak of quality product or quality service when both supplier and customer agree on requirements and these requirements are met” (Van Weele, 2010, p 238). Therefore quality could include delivery agreements and packaging instructions. Many companies have initiated quality programmes in order to better control the quality requirements that have been set by the company.

Quality management is important to assure that the products or services have the desired quality level. First of all an organization has to know the desired quality in order to know which requirements to establish to its suppliers. To know if the suppliers have met the quality requirements, there have to be intensive consultations between the various departments, so that the purchasing department knows if the suppliers have met the
quality requirements. (Van Weele, 2010) The purchasing department must assure to purchase the right materials of the right quality so that the supplier will deliver in accordance with the specifications from the order. In order to know if the supplier has delivered within the specifications, personell in charge within the inspection should guide the buyer if the quality of the delivery is in accordance with the specifications or not. If the quality is not in accordance to the specifications, the purchaser must act and inform the supplier of the issue in concern. (Heinritz et al, 1991)

3.4.3 Steps to take when improving logistic processes

There are many different methods to efficient a logistic process. It is not important to choose a specific model to work from, it is more important to find a well thought out and a structured way of working on when to change and efficient a process.

Figure 15 below shows a figure that Oskarsson et al (2004) suggest businesses to choose when they want to change in their logistic processes.

To start a project, the company that wants change their processes has to **clarify the conditions**. This means that the business have to clarify for example cost targets, lead time goals, and which parts of the company or flows is concerned and so on.

In order to know exactly how the company is managed today it is important to **describe and analyse the current situation**. This could be done by doing a process map, which shows how the information- and material flows look like.
In the next step the company should suggest alternative solutions to organise and steer the business and this could be done by looking into relevant litterateurs or by benchmarking from other successful companies.

The next step is comparing the current situation with alternative proposals. Comparing the predicted solutions with how the current situation looks like by identifying the advantages and disadvantages within each alternative. When the analysing has been done, the company should select a solution that fits with the companys vision and strategy. They should also investigate if the solution is reasonable to implement.

When a solution has been chosen the company will implement the change where routines also will be changed so the company will work it that way the solution is formed. When the solution is implemented the company should follow up the results in order to see if the new solutions are working. A comparison with the initial position would be appropriate in order to see if the expected affects have been realized. (Oskarsson et al, 2004)

3.4.4 Improving inspections by examination

When the process map is completed, there are some ways to consider in improving the process.

1. Examine each decision symbol
   - Is this a checking activity?
   - Is this a complete check, or do some errors go undetected?
   - Is this an overflow/redundant check?

2. Examine each rework loop
   - Would we need to perform these activities if we had no failures?
   - How “long” is this rework loop (steps, time lost, resources, consumed etc.)?
   - Does this rework loop prevent the problem from reoccurring

3. Examine each delay symbol
   - What causes the delay?
   - What problems occur as a result of the delay?
• How long is the delay?
• How could we reduce the delay or its impact?

4. Examine each activity symbol
• Is this a redundant activity?
• What is the value of this activity relative to its cost?
• How have we prevented errors in this activity?

5. Examine each document or database symbol
• Is this necessary?
• How is this kept up to date?
• Is there a single source for this information?
• How can we use this information to monitor and improve the process?

(Handfield & Nichols, 2002, p.46)

The purpose of why companies should ask their self these questions is to try to eliminate, combine, change or simplify the different activities (Mattsson, 2002).

3.4.5 Value analysis

Each activity or sub-process can be classified as value-added activities, non-value adding activities or waste.

Value-adding activities are activities that add value to the customers products, which is usually what the customer requests. Usually it is the activities the customer is willing to pay for and activities companies should focus on developing.

Non-value adding activities are activities that do not create value for the customer but are necessary to have in order to keep the process in work. This could be the storage, handling or control of the product. Activities of this nature should be minimized.

Waste are activities that do not create value for the customer, the own organization, or for anyone else. Waste should be eliminated when it is discovered or should be reorganized so the waste won’t occur. (Ljingberg & Larsson, 2001) Examples of these activities could be;
Waiting – In many multi step processes, usually more time is spent in waiting between the process steps than is spent in all of the processing steps combined. The things to do in these cases is to find out where the longest waiting times occur in the process, further on to find out what causes these delays, and at last what actions that can be taken to reduce or eliminate the time spent waiting.

Lack of Synchronization in Materials Movement – The questions to be asked here are if the product movements across the supply chain are managed to ensure that the right quantity of the product is getting to the right location at the right time? Or are the materials arriving at the customer’s location too early, causing additional storage and material handling activities, or too late which can affect the customers operations.

Lack of information – The crucial thing within a company is for the decision makers to have the information needed when needed. (Handfield & Nichols, 2002)

3.4.6 Quality measurement

Quality measures are statistically reported by counting how much problems there have been in relation to the incoming deliveries. The problems should be assembled statistically in order to report to the supplier which problems that have occurred from their deliveries. (Aronsson et al, 1988) A good quality percentage measure of logistics performance is the perfect order percentage. A “perfect order” is logistically perfect when its:

- Perfectly entered: The entry is exactly what the customer wants, telephone or direct entry
- Perfectly fillable: The exact quantity of each item is available for delivery within the customer-specified delivery window
- Perfectly picked: With the correct quantities of the correct items
- Perfectly packaged: With the customer-designated packaging and labelling
- Perfectly shipped: Without damage
- Perfectly delivered: In the customer-designated time window and to the customer designated location
- Perfectly communicated: With order status reports available 24-hours a day
• Perfectly billed: With on-time payment and
• Perfectly documented: With customer-specified documentation means, including paper, fax, EDI (Blanchard, 2004)

3.4.7 Flow time

Processes transform flow units through networks of activities and buffers. Therefore when a flow unit moves through the process, one of two things happen to it

1. It undergoes an activity
2. It waits in a buffer to undergo an activity

The total time spent by a flow unit within process boundaries is called flow time. Some flow units move through the process without any delay, this could be the case when they require resources that are available in great quantities, or the flow units perhaps arrive at times when no other flow units are present. Other flow units may spend a long time in the process, normally waiting for resources to become available. Generally flow time varies, sometimes considerably from one flow unit to another. The flow times indicates the time needed to convert inputs to outputs and includes the time spent by a flow unit waiting for processing activities to be performed. (Anupindi et al, 2006)

The flow time of a given flow unit is the total amount of time required by that unit to flow through the process from entry to exit. The flow time of different units varies substantially for any given process. The average flow time of a process is determined by looking at all flow units that flow through the process during a specific period of time and taking their average.

Process flow time is a valuable measure of process performance for several reasons. Some of the advantages of a shorter flow time are that it results in fast feedback and correction of quality problems. Further on it may show that a process with quality problems would typically display the longer flow times required for inspections, rework, and so on. It could also be worsening of process performance regarding delays and queue, which occurs because of high-unsynchronized variability in arrival and processing rates and high capacity utilization. (Anupindi et al, 2006)
3.4.7.1 Measurement of the flow time
The average flow time of a given process can be determined by direct measurement, the measurement can be made as follows:

1. Observe the process over a specified, extended period of time.
2. Take a random sample of flow units over the specified period.
3. For each flow unit in the sample, measure its flow time from entry to exit.
4. Compute the average flow times measured. (Anupindi et al, 2006)

The flow time of a process could also be broken into two components as follows:
Flow time = Value adding flow time + Non value-adding flow time. Waiting is usually non-value adding. The process itself can have other non-value-adding activities that could further be eliminated in an improved process. For instance, if the present process involves rework of some flow units at certain activities, a reduction in the amount of rework clearly decreases the process flow time. (Anupindi et al, 2006)

3.4.8 Improving the flow time
The flow time of a process can be reduced if the right actions are taken. The flow time of the process is the sum of two components, activity time and waiting time. Since these components are so different, the devices to control each of them are naturally different. However since waiting time is often a significant part of the total flow time, it is critical to also examine ways to reduce waiting. The basic approaches to reduce the work content of a critical path are:

**Eliminate** – Reduce the work content of a critical activity

**Work in parallel** – Move some work content off the critical path

There are major differences between these approaches. The first one that includes elimination involves reducing the total amount of work required per unit. The second approach is working in parallel which leaves the total amount of work per unit unaffected but manages the timing of the various activities in order to reduce the length of the critical path. (Anupindi et al, 2006)

3.4.8.1 Eliminate
The idea of that work should be optimized and that some of its components eliminated is not new. Originally, the approach was used for optimizing the speed of work by
individual workers. However, the core ideas of this approach are still useable today in the much broader context of a general business process, both in service and manufacturing. The work content of any activities can be reduced by any combination of the following actions:

1. Eliminate non-value adding aspects of the activity – “work smarter”
2. Reduce the number of repetitions of the activity - “do it right the first time”
3. Increase the speed at which the activity is performed – “work faster”

It is a common observation that some of the work done by individuals and organizations is not necessary. Therefore it is natural for managers to examine the various processes under their control in order to identify and eliminate unnecessary steps. Defining which steps that add value to the process lies within the answer of what the customers of the process considers important. Typically activities such as moving, inspecting, sorting, counting, filling out forms, delays, queues and obtaining approvals are prime candidates for elimination. Worsening of process performance because of high-unsynchronized variability in arrival time could be a main concern why such activities occur. One regulator to improve variability in inter-arrival and processing times in order to decrease the average length and waiting time, is to plan for more regular arrival patterns in order to reduce the variability in arrival times.

Decreasing the amount of repeat work reduces the average number of visits to an activity and therefore decreases work content. Reductions are often achieved by process improvements techniques such as statistical process control, design for manufacturability and workforce training. In environments where there are a lot of data involved, the key principle is to strive towards a process that touches any particular data input just once. (Anupindi et al, 2006)

3.4.8.2 Work in parallel

Another way to reduce the flow time is to move work off the critical path and into paths that do not affect the process flow time. This mission can be accomplished in one of two ways:

1. Move work off the critical path to a noncritical activity
2. Move work off the critical path to the “outer loop” (to some stage pre- or post processing)
Moving work from a critical to a noncritical path means redesigning the process so that critical activities that are performed sequentially will be done in parallel. This can be performed in activities such as product design, process planning, and manufacturing. Allowing coordination of such activities to be synchronized reduces the total time, cost and rework necessary to design, produce, and deliver new products to the market.

Moving activities to the “outer loop” means that the activities are performed before the countdown for the process starts or after it ends. This approach is also called pre- or post-processing. The work must still be done even if the activities are moved to the “outer loop” however the critical path is shortened. For example in the case of hospital admission process, it is often possible to accomplish work such as verifying insurance, preparing and signing consent form before the patient shows up. This could also be the case when assembling a complete hamburger, instead of preparing it after a received order, it could be made before the order is received. (Anupindi et al, 2006; Handfield & Nichols, 2002)
4. Empirical findings

The empirical findings presented will be divided as follows by figure 16 below. The arrows show how the research questions are connected to the empirical findings. The first part (4.1) of the empirical findings illustrates the incoming flows of late and early deliveries. The second part (4.2) describes how Staples works with the control of the incoming flow of deliveries. The third part (4.3) describes the inspection process and the measurements of the inspections.

Figure 16: Overview over the empirical framework and its connection to the research questions
4.1 Incoming flows of late and early deliveries

Figure 17 below illustrates the incoming flow of deliveries, which treats the first research question, and the empirical findings for research question 1 are presented below.

![Diagram](image)

**Figure 17: Illustrates the focus of chapter (4.1), which is the incoming flow of deliveries (late and early)**

4.1.1 Measuring of the incoming flows of late and early deliveries

This chapter shows the results of the measuring’s of the incoming flow of deliveries that were made during the period 2/4 – 5/4 (week 14) and 10/4 (week 15). The measurements were made on the total incoming flow of deliveries in order to highlight how many of the deliveries that arrived too late or too early. In order to know how many of the suppliers that arrived too early or too late, the authors used the incoming delivery list which is derived from the SAP system based on the suppliers confirmed delivery dates. The incoming delivery coordinator makes the incoming delivery list every Friday at the end of the week. The incoming delivery coordinator makes the list based on the confirmed delivery dates for each day of the upcoming week. (Incoming delivery coordinator, 2012)

The delivery list contains besides the delivery date, also the name of the suppliers and the purchasing number. An example of how the list looks like is illustrated below in figure 18, which is an abstract of the incoming delivery list for week 14, made Friday 30/3, showing some of the expected deliveries for Monday 2/4. The value of the delivery is hidden due to that the company does not want to share this information further than to the authors.
Incoming delivery list (Week 14)

<table>
<thead>
<tr>
<th>Supplier Name 1</th>
<th>PO-number</th>
<th>Nettovalue SEK</th>
<th>Delivery date</th>
<th>Created</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSELTE SVERIGE AB</td>
<td>4501523885</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-14</td>
</tr>
<tr>
<td>ESSELTE SVERIGE AB</td>
<td>4501528531</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-26</td>
</tr>
<tr>
<td>DUNI AB</td>
<td>4501529263</td>
<td>417,44</td>
<td>2012-04-02</td>
<td>2012-03-27</td>
</tr>
<tr>
<td>HEDLUNDS PAPPERSIND</td>
<td>4501528574</td>
<td>417,44</td>
<td>2012-04-02</td>
<td>2012-03-26</td>
</tr>
<tr>
<td>CEDERROTH AB</td>
<td>4501528638</td>
<td>417,44</td>
<td>2012-04-02</td>
<td>2012-03-26</td>
</tr>
<tr>
<td>DURABLE SCANDINAVIA</td>
<td>4501527368</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-22</td>
</tr>
<tr>
<td>DURABLE SCANDINAVIA</td>
<td>4501523203</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-23</td>
</tr>
<tr>
<td>DURABLE SCANDINAVIA</td>
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<td>2012-04-02</td>
<td>2012-03-21</td>
</tr>
<tr>
<td>DURABLE SCANDINAVIA</td>
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<td>2012-04-02</td>
<td>2012-03-13</td>
</tr>
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<td>2012-04-02</td>
<td>2012-03-15</td>
</tr>
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<td>2012-03-22</td>
</tr>
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<td>DURABLE SCANDINAVIA</td>
<td>4501526209</td>
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<td>2012-04-02</td>
<td>2012-03-20</td>
</tr>
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<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-02-21</td>
</tr>
<tr>
<td>DURABLE SCANDINAVIA</td>
<td>4501521250</td>
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<td>2012-04-02</td>
<td>2012-03-08</td>
</tr>
<tr>
<td>DURABLE SCANDINAVIA</td>
<td>4501519131</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-05</td>
</tr>
<tr>
<td>JOWEMA AB</td>
<td>4501528642</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-26</td>
</tr>
<tr>
<td>SCA HYGIENE PRODUCTS</td>
<td>4501528646</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-26</td>
</tr>
<tr>
<td>STIGA SPORTS AB</td>
<td>4501522219</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-09</td>
</tr>
<tr>
<td>POLYNova NISSEN AB</td>
<td>4501529524</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-27</td>
</tr>
<tr>
<td>METSÄ TISSUE AB</td>
<td>4501530427</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-29</td>
</tr>
<tr>
<td>METSÄ TISSUE AB</td>
<td>4501524620</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-15</td>
</tr>
<tr>
<td>METSÄ TISSUE AB</td>
<td>4501530435</td>
<td>1 417,44</td>
<td>2012-04-02</td>
<td>2012-03-25</td>
</tr>
</tbody>
</table>

Figure 18: Shows an abstract of the incoming delivery list week 14

Comparing the purchase order numbers from the incoming flow of deliveries with the incoming delivery list revealed which suppliers that were not intended to deliver that specific day. All the incoming flow of deliveries that arrived could however not be found in the incoming delivery list for W. 14. The reason of why all the incoming flow of deliveries not was found was because of that the incoming delivery list for week 14 not captured all the purchase order numbers. Therefore an updated incoming delivery list was created 2012-04-04 by the incoming delivery coordinator for the W. 10 - W.15 in order to find the actual delivery dates to all the incoming flow of deliveries. An abstract of the list can be seen below in figure 19.
4.1.2 Late and early deliveries during week 14 and 15

The results on how many of the suppliers that arrived late or early based on the incoming delivery list can be seen in figure 20 below. The figure shows the day on which the supplier arrived and which PO-number the delivery had. Some deliveries had more than one PO-number but these are not written due to that it does not bring any important information. The fourth column shows which day that the delivery according to the incoming delivery list for week 14 should have arrived, and if the PO-number could not be found on the incoming delivery list for week 14, then the updated list for week 10-15 was used which, are marked with a *.

**Late and early deliveries during the period Monday 2/4 – Tuesday 10/4**

<table>
<thead>
<tr>
<th>Day</th>
<th>Supplier</th>
<th>PO-Number</th>
<th>Confirmed delivery day</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 2/4</td>
<td>Sommenkerta</td>
<td>4501526770</td>
<td>Tuesday 3/4</td>
<td>Early</td>
</tr>
<tr>
<td></td>
<td>Ejendals</td>
<td>4501530120</td>
<td>Wednesday 4/4</td>
<td>Early</td>
</tr>
<tr>
<td></td>
<td>Lekohoi</td>
<td>4501527016</td>
<td>Friday 30/3*</td>
<td>Late</td>
</tr>
<tr>
<td></td>
<td>Nilfisk</td>
<td>4501529817</td>
<td>Friday 30/3*</td>
<td>Late</td>
</tr>
<tr>
<td></td>
<td>Alpha</td>
<td>4501528597</td>
<td>Friday 30/3*</td>
<td>Late</td>
</tr>
<tr>
<td></td>
<td>Kimberly Clark</td>
<td>4501526457</td>
<td>Tuesday 27/3*</td>
<td>Late</td>
</tr>
<tr>
<td></td>
<td>Togu</td>
<td>4501521505</td>
<td>Thursday 5/4</td>
<td>Early</td>
</tr>
<tr>
<td></td>
<td>Esselte</td>
<td>4501516942</td>
<td>Tuesday 3/4</td>
<td>Early</td>
</tr>
<tr>
<td></td>
<td>Abena</td>
<td>4501529551</td>
<td>No confirmed date</td>
<td>-</td>
</tr>
<tr>
<td>Company</td>
<td>Phone Number</td>
<td>Date</td>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------</td>
<td>------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Sterisol</td>
<td>4501529266</td>
<td>Tuesday 3/4</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Pelikan</td>
<td>4501526750</td>
<td>No confirmed date</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Tuesday 3/4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lekohoi</td>
<td>4501527054</td>
<td>Wednesday 4/4</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Omikron</td>
<td>4501518564</td>
<td>Friday 30/3*</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Terapima</td>
<td>4501528099</td>
<td>Wednesday 4/4</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Povl Klitgaard</td>
<td>4501530037</td>
<td>Friday 30/3*</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td><strong>Wednesday 4/4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Esselte</td>
<td>4501527991</td>
<td>Friday 30/3*</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>International paper</td>
<td>4501521268</td>
<td>Tuesday 3/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Henkel</td>
<td>4501529214</td>
<td>Monday 2/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Mintec</td>
<td>4501529422</td>
<td>Tuesday 3/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Vindspelet</td>
<td>4501530360</td>
<td>Monday 2/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Nilfisk</td>
<td>4501531099</td>
<td>Tuesday 3/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Brother</td>
<td>4501531542</td>
<td>Wednesday 4/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ketonic</td>
<td>4501515999</td>
<td>Friday 30/3*</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Formatwerk</td>
<td>4501503502</td>
<td>Thursday 5/4</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Bic</td>
<td>4501530692</td>
<td>Tuesday 3/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Fastplast</td>
<td>4501529305</td>
<td>Tuesday 3/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Hamelin</td>
<td>4501529253</td>
<td>Tuesday 10/4*</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Siam</td>
<td>4501526213</td>
<td>Wednesday 4/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Nordiska plast</td>
<td>4501531674</td>
<td>Wednesday 4/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Acco</td>
<td>4501519937</td>
<td>2012-03-14*</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Alpha</td>
<td>4501528576</td>
<td>Friday 30/3*</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td><strong>Thursday 5/4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stora Enso</td>
<td>4501531559</td>
<td>Thursday 5/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3M</td>
<td>4501520304</td>
<td>No confirmed date</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Stora Enso</td>
<td>4501533961</td>
<td>Thursday 5/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Gss, Deflecto</td>
<td>4501529430</td>
<td>Tuesday 10/4*</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Bong</td>
<td>4501530456</td>
<td>No confirmed date</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Frode Laursen</td>
<td>4501531600</td>
<td>Tuesday 10/4*</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Polynova</td>
<td>4501531725</td>
<td>Thursday 5/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Omikron</td>
<td>4501506999</td>
<td>Tuesday 3/4 and Friday 30/3*</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Duni</td>
<td>4501531463</td>
<td>Monday 2/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Specialplast</td>
<td>4501524846</td>
<td>Thursday 5/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Nilfisk</td>
<td>4501531555</td>
<td>Thursday 5/4*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Specialplast</td>
<td>4501489962</td>
<td>Monday 2/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Leman</td>
<td>4501528091</td>
<td>Tuesday 10/4*</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Lohman &amp; Roscher</td>
<td>4501532009</td>
<td>No confirmed date</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>ECM Office</td>
<td>4501524874</td>
<td>Wednesday 4/4</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>Avery Dennison</td>
<td>4501530955</td>
<td>Friday 13/4*</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>System Care</td>
<td>4501529824</td>
<td>Friday 13/4*</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Hamelin</td>
<td>4501499223</td>
<td>Tuesday 10/4*</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>Anton Debatin</td>
<td>4501529327</td>
<td>Tuesday 3/4</td>
<td>Late</td>
<td></td>
</tr>
</tbody>
</table>
4.1.3 Late and early deliveries from the six suppliers

This part illustrates the deliveries that have occurred from the six suppliers (Metsä Tissue, Stora Enso, Esselte, Polynova, Staples EUR Import and Nilfisk) during the time period 30/1 – 2/3 - 2012. The results illustrate the deliveries made during 25 working days. The first column illustrates the purchasing order number, and the numbers can be repeated in the same column. This is because one PO-number could include different items and different delivery dates. The second column illustrates the confirmed delivery dates that have been agreed on between the purchaser and the supplier. The third column illustrates when the order got registered within the inspection process. The fourth and fifth column illustrates the amount of early or late days, The lists are attached in appendix 6. Below in figure 21 an example of how the data looks like is illustrated.

<table>
<thead>
<tr>
<th>PO-number</th>
<th>Confirmed delivery date</th>
<th>Received in day</th>
<th>Days early</th>
<th>Days late</th>
</tr>
</thead>
<tbody>
<tr>
<td>4501502714</td>
<td>2012-02-01</td>
<td>2012-01-31</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>4501503465</td>
<td>2012-02-02</td>
<td>2012-02-01</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>4501503466</td>
<td>2012-02-02</td>
<td>2012-02-06</td>
<td>-</td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 21: Abstract of the six suppliers delivery days compared to the confirmed delivery date
4.2 Control of the incoming flow of deliveries

*Figure 22 below illustrates the purchasing process, which treats the second research question, and the empirical findings for research question 2 are presented below.*

![Diagram of purchasing process](image)

*Figure 22: Illustrates the focus of chapter (4.2), which is the control of the incoming flow of deliveries*

4.2.1 The purchasing process

4.2.1.1 Need of items

The Purchasing process within Staples begins with that AVR, the purchasing system indicates that the company has a need of some items. In the system there is a forecast setting that the purchaser makes use of when a purchase is made. The system is based on both a reorder point and a forecast and indicates the purchasers when they need to buy the products to the warehouse. When a purchaser receives a purchase proposal generated by AVR, it also identifies who the supplier is, supplier number, proposed orders, and how much it will cost. (Supply chain specialist, 2012)

4.2.1.2 Check the proposal

The purchaser then check on the proposal that the system has indicated and compare this to how many articles there are included in the inventory, the number of backorders that appears on the item, and the previous order on the article, if not yet arrived. The buyer can also examine the forecast and see how the past sales have been like, and if the sale is in line with the forecast, or if it deviates in any way. Based on various assessments made, the buyer could change the purchasing proposals that were proposed from the AVR. (Purchaser, 2012)
4.2.1.3 *Purchase minimum number of items*

Some suppliers have requirements that Staples must purchase a certain minimum number of items when placing an order. This means that the buyer cannot always buy the exact quantity they want because the system indicates that the minimum number of items is not reached. The purchaser can then choose to purchase the minimum number of items if the purchaser considers it necessary to do, or wait to buy until the article has reached a lower inventory status and then purchase the minimum number. One of the largest suppliers, Metsä Tissue delivers products almost every day to Staples, where Staples only sends the information of their inventory and then Metsä Tissue themselves triggers the order. (Purchaser, 2012)

4.2.1.4 *Make the purchase*

When an assessment has been made, a purchase will be made. The purchase is made by sending the purchase order from the AVR to the SAP system, the purchaser then goes into SAP and sends the purchasing order to the supplier. In this order, there are quality specifications on how the goods will be delivered by a multiple principal. The template shows how the goods should be packaged by either pallet, carton, pack goods or packaging. This is done to simplify the sale to Staples customers when the different packages do not have to be re-processed in the warehouse. Regarding the quality specifications in the purchase order, the buyer assumes that the specifications included in the system are correct and therefore makes no changes to them. (Purchaser, 2012)

4.2.1.5 *Confirm the order*

When the purchaser has made a purchase, the purchaser awaits a confirmation of the order by the supplier. The supplier can change the purchase order if they are not able to deliver the amount of items the date the purchaser has suggested. If the supplier wants to deliver in another date, the purchaser must remake the delivery date in SAP, or if the proposed delivery date is not suitable for Staples, the purchaser calls the supplier to inform this. But the confirmed delivery date could according to the purchaser (2012) be perceived differently to the supplier. For example the supplier could perceive the date as the day the carrier should deliver the goods from their own warehouse, which could take several days to that the delivery have reached Staples warehouse. However in the purchasing order the confirmed delivery day of the delivery is described to the supplier as the date when the delivery should arrive to Staples.
4.2.2 Delivery control

The purchasers do today not know if the deliveries will arrive on the confirmed delivery days. However, each day, the purchaser’s checks if the orders have either been confirmed which means that the order is accepted and thus have a set date that deliveries will take place on. Not confirmed, which means that the order is placed, but the order has not been confirmed. The purchaser must also check previous confirmed orders from the SAP system if they have been INGR, which means that an order has arrived and is registered in the SAP system, or if there is an overdue, which means that the order has not been registered on the confirmed delivery date. When this happens, the purchaser searches for the reason of why the overdue has occurred, which often depends on that the supplier in charge has exceeded the confirmed delivery date.

In the current situation there is no delivery control regarding if deliveries will arrive on the confirmed delivery day. Delivery control takes place only after the confirmed delivery date, and that is when the purchasers notices that a delivery has not arrived on the confirmed delivery day, which is shown by the overdue list. In the current situation there is no real statistics on how the suppliers perform with their deliveries. (Supply chain specialist, 2012)

4.2.2.1 Routines regarding the control of the incoming flows

When the ordered deliveries arrive to Staples, the incoming delivery coordinator is the one who meets the carrier that has arrived. The coordinator receives the consignment note from the supplier to see which supplier that has arrived, however the coordinator never controls the incoming delivery list to see if the delivery has arrived on the right day or not. Even if she would know that a delivery is late or early, no actions would be taken due to that the incoming delivery coordinator does not have any routines regarding how these suppliers should be managed. Further, the incoming delivery coordinator does not share any information with the purchasers regarding if suppliers have arrived late or early, due to that the purchasers themselves does not have any control, if the suppliers will deliver on the confirmed delivery day or not. (Incoming delivery coordinator, 2012)
4.2.3 Overview over the purchasing process

1. (Start) The AVR system generates a purchasing proposal.
2. (Decision) The purchaser's make a decision based on the proposal from AVR by either accepting or making a correction.
3. (Inspection) Check on previous orders if they have arrived or if an overdue has occurred.
4. (Operation) The purchaser makes an expedition to the supplier in charge of an order that has not arrived on the given delivery day.
5. (Operation) The purchaser sends the purchase order from the AVR system to the SAP system. From the SAP system the purchaser then sends the order to the supplier.
6. (Database) The purchase is now integrated in the SAP database and the supplier would either accept the proposal from the purchase order or change the order.
7. (Decision) The purchaser will make a decision based on the new proposal and either confirms or changes the new proposal.
8. (Operation) The purchaser does not confirm the order and calls the supplier to discuss an agreement for a suitable delivery date.
9. (End) The order is confirmed

Below in figure 23 an overview over Staples purchasing process is illustrated.

---

**Figure 23: Overview over Staples Purchasing Process**
4.3 Inspection of the incoming flow of deliveries

*Figure 24 below illustrates the inspections process, which treats the third research question, and the empirical findings for research question 3 are presented below.*

![Flowchart Illustrating the Inspection Process](image)

*Figure 24: Illustrates the focus of chapter (4.3), which is the inspection of the incoming flow of deliveries*

4.3.1 The inspection process

4.3.1.1 Supplier signs up

The inspection process begins with that the carrier from the supplier signs up at the incoming delivery coordinator. Thereafter the delivery coordinator finds out how many pallets the supplier has within the upcoming delivery. The delivery coordinator guides the carrier to a certain gate. Depending on whom the supplier is results in which gate the carrier will be guided to. Gate 1-8 is referred to suppliers who provide piece goods, and the remaining gates are referred to suppliers who bring large shipments of goods. (Inbound manager, 2012)

4.3.1.2 Unload the goods

When the carrier has been routed to a gate, the carrier must unload the goods and bring the delivery note, which often is attached to the load. The consignee will then verify the number of pallets and if the pallets are of EUR pallets, nothing else will be acceptable. The consignee will also control if there are any visible damages on the goods or if the plastic is broken in some way, and takes then care of the delivery note. On the delivery note the consignee will note the day of delivery, which gate the delivery came at and signs its name and thereafter leaves the delivery note in a certain basket so the team leader can book the delivery into the SAP system. (Inbound manager, 2012)
4.3.1.3 Book the delivery note
The team leader who is responsible for the booking of the delivery lists in the SAP system takes the delivery note from the basket and controls if the delivery note matches the purchasing order. If it does match the team leader will book the delivery into the SAP system, which verifies the purchasing order. In Staples, they call this as “103”. This term means that the goods have been received but not as registered in storage. When the team leader has booked the order, the labels for the order are printed out and put together with the delivery note in a certain basket for the consignees to know where to start the work for the handling of the goods. On the delivery note the team leader also notes at which gate the goods are located. (Inbound manager, 2012)

4.3.1.4 Handling the goods
Within the handling the consignee controls if the purchasing number matches with the numbers on the labels, the physical goods and with the delivery note. Thereafter the consignee controls if the goods are damaged and if the quantity is in line with the specifications so the consignee could validate the delivery. When the handling is done, the consignee signs the date, time and its own signature on the delivery note and put it into a certain box in order to move on to handle the next delivery. The pickers are now ready to collect the goods and lay it to a destined buffer or directly into the warehouse and are able to register the goods as a “105” into the SAP system. This means that the goods are registered in the storage. (Inbound manager, 2012)

4.3.1.5 Abnormalities
Sometimes abnormalities occur in the inspection of the incoming deliveries. This could be if there are for example some damaged goods or mismatching quantities. For these reasons the consignees has a formula, which also is called as a deviation report which the consignees use. Within this formula the consignee notes down the purchasing number, article number, date and for instance how many quantities is missing etc. This deviation report will together with the delivery list be sent to the incoming delivery coordinator. The incoming delivery coordinator then sends this report to the responsible supplier in charge, and a copy is also sent to the purchaser in charge of the supplier.
4.3.2 Quality specifications within the inspection process

There are different quality specifications imposed on the suppliers of how they should pack the goods on the pallets. It is important that the suppliers deliver within these specifications in order to simplify the work inside the warehouse so the goods can be directly put into storage without re-processing. Sometimes the suppliers do not deliver within the specifications which leads to that the consignees must process the goods according to the specifications required which is an undesirable job. The specifications within Staples regarding the quality inspections are called YAM. YAM is according to the Profiler (2012) the amount of goods that can be stored on the pallet, which mainly is about height and volume.

The concern within the inspection process is when the goods within the deliveries are not in line with YAM specifications, which leads to that it takes a lot of time to handle these deliveries. The consignees within the inspection process want to have the right amount of collected goods on the pallet with the right height so the pallet can be taken directly to the storage place without any reprocessing. Problems according to the height are that the consignees must half the quantities on the pallet and redeploy them into another pallet. Problems according to the amount of quantities are that the consignees must redeploy the excess amount of quantity to another pallet. Another problem that occurs is if a pallet has a mixture of different goods, which leads to that the consignees must redeploy the different goods on different pallets. Examples can be seen in the figures (25-27) below.

![Figure 25: Shows pallets that are in line with the YAM specifications](image)

These pallets are single-item pallets and are align to the YAM specifications which leads to that the consignees easily can label and validate the pallets without any reprocessing
4.3.3 Inspections during the period 3/4 – 5/4 & 10/4

The delivery inspections from Tuesday 3/4 to Thursday 5/4 and Tuesday 10/4 shows how inspections were done on specific deliveries from different suppliers in the inspection process. The concerned suppliers were Nilfisk, Esselte, Metsä Tissue, Staples EUR Import and Stora Enso. The figures (28-33) below are summaries of the measures on each supplier, and below every figure there are further explanations on how the inspections and handling of the deliveries were made.
4.3.3.1 Inspections on Nilfisk

<table>
<thead>
<tr>
<th>Supplier: Nilfisk</th>
<th>Measurement</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival time: 07:00</td>
<td>Unloading</td>
<td>14 min</td>
</tr>
<tr>
<td></td>
<td>Delay</td>
<td>1 h</td>
</tr>
<tr>
<td>Pallets: 22</td>
<td>Booking</td>
<td>15 min</td>
</tr>
<tr>
<td>Gate: 2</td>
<td>Handling:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Re-movement of pallets</td>
<td>1h 30 min</td>
</tr>
<tr>
<td></td>
<td>Dividing of mixed pallets:</td>
<td>1 h 50 min</td>
</tr>
<tr>
<td></td>
<td>Labelling:</td>
<td>1h 40 min</td>
</tr>
</tbody>
</table>

**Total 6h 30 min**

*Figure 28: Results of the measures on the Nilfisk delivery Tuesday 3/4*

The 22 pallets that had arrived from Nilfisk Tuesday 3/4, was about to be sorted out. 7 of the 22 pallets that were delivered, was mixed pallets and the rest were single-item pallets. It took approximately 14 minutes to unload the goods, and it took approximately 1 hour and 15 minutes until goods were booked into the SAP system. But the consignees could not directly work with the delivery because they already had a delivery to validate. It was a delivery from the supplier “Helit” that was delivered the day before (Monday 2/4) the Nilfisk delivery and was unloaded at the same gate but had not yet been validated. The reason to why the consignees did not handle the Nilfisk delivery directly, was mainly because there were so many deliveries that had been delivered the day before (Monday 2/4), which yet not had been handled.

After that the team leader booked the goods into the SAP system it took approximately five hours to validate the Nilfisk delivery. This was mainly because the “Helit” delivery occupied the spot place where the Nilfisk delivery was meant to be handled, so the Nilfisk delivery had to be handled on another spot. Therefore the pallets were brought with forklift one by one to be sorted and labeled. This led to that the consignee who were handling these pallets had to go and pick up the pallets and get them to the other work station, to open up the boxes and sort out the items that were to be labeled in order to validate the goods. The re-movement of the pallets took approximately 1 hour and 30 minutes.

7 pallets within the delivery were mixed goods, and had to be divided an assorted to different pallets, which took approximately 1 hour and 50 minutes. The process from
that the carrier unloaded the goods to that the pallets got labelled took approximately 6 hours and 30 minutes.

### 4.3.3.2 Inspections on Esselte

<table>
<thead>
<tr>
<th>Supplier: Esselte</th>
<th>Measurement</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival time: 09:35</td>
<td>Unloading</td>
<td>5 min</td>
</tr>
<tr>
<td></td>
<td>Delay</td>
<td>45 min</td>
</tr>
<tr>
<td>Pallets: 10</td>
<td>Booking</td>
<td>15 min</td>
</tr>
<tr>
<td>Gate: 6</td>
<td>Handling:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dividing of mixed pallets:</td>
<td>60 min</td>
</tr>
<tr>
<td></td>
<td>Labelling:</td>
<td>20 min</td>
</tr>
<tr>
<td></td>
<td><strong>Total 3 h 25 min</strong></td>
<td></td>
</tr>
</tbody>
</table>

Figure 29: Results of the measures on the Esselte delivery Tuesday 3/4

The carrier unloaded the goods which took approximately five minutes. 8 pallets were single-item pallets and 2 pallets were of mixed goods. It approximately 60 minutes until the goods got booked into the SAP. The 2 mixed pallets had to be divided and assorted into different pallets, which took approximately 60 minutes. The labelling and validation of the pallets took approximately 20 minutes extra. The whole process took approximately 3 hours and 25 min.

<table>
<thead>
<tr>
<th>Supplier: Esselte</th>
<th>Measurement</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival time: 08:50</td>
<td>Unloading</td>
<td>5 min</td>
</tr>
<tr>
<td>Pallets: 17</td>
<td>Booking</td>
<td>-</td>
</tr>
<tr>
<td>Gate: 1</td>
<td>Handling:</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Dividing of mixed pallets:</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Labelling:</td>
<td>-</td>
</tr>
</tbody>
</table>

Figure 30: Results of the measures on the Esselte delivery Thursday 5/4

The delivery note had not been delivered in connection with this delivery. This resulted in that the team leader not could book the goods into the SAP system but also that the goods occupied a spot and prevented other deliveries to be unloaded at the same gate. No measures could be done on the delivery due to that the delivery note was missing, and therefore the delivery could not be handled.
4.3.3.4 Inspections on Metsä Tissue

<table>
<thead>
<tr>
<th>Supplier: Metsä Tissue</th>
<th>Measurement</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival time: 07:00</td>
<td>Unloading</td>
<td>60 min</td>
</tr>
<tr>
<td>Pallets: 170</td>
<td>Booking</td>
<td>-</td>
</tr>
<tr>
<td>Gate: 19 and 21(Two trucks)</td>
<td>Handling:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dividing of mixed pallets:</td>
<td>40 min</td>
</tr>
<tr>
<td></td>
<td>Labelling:</td>
<td>40 min</td>
</tr>
<tr>
<td></td>
<td><strong>Total 2 h 20</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 31: Results of the measures on the Metsä Tissue delivery Wednesday 4/4*

The unloading of the 170 pallets took approximately 60 minutes, due to that there were 2 carriers within the same delivery. 6 pallets were divided into different pallets which took approximately 40 minutes, the rest were only single-item pallets. The delivery note had been delivered the day before by e-mail and therefore the team leader could book the incoming goods into the SAP system in advance and print out the labels before the delivery arrived. At the same time as the carrier unloaded the goods from the truck, the consignees could label the goods on the pallets so that the pickers could deliver the pallets into the storage place. Overall the whole process took approximately 2 hours and 20 minutes.

4.3.3.5 Inspections on Stora Enso

<table>
<thead>
<tr>
<th>Supplier: Stora Enso</th>
<th>Measurement</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival time: 07:00</td>
<td>Unloading</td>
<td>30 min</td>
</tr>
<tr>
<td>Pallets: 60</td>
<td>Booking</td>
<td>-</td>
</tr>
<tr>
<td>Gate: 21 and 22</td>
<td>Handling:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dividing of mixed pallets:</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Labelling:</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td><strong>Total 45 min</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 32: Results of the measures on the Stora Enso delivery Thursday 5/4*

The booking of the goods had been done the day before this delivery, and therefore the labels had been printed out so the consignees were prepared for the delivery. This is because the delivery note had been sent the day before by e-mail. It took approximately
30 minutes to unload the goods and at the same time the consignees could label the goods which took 15 minutes. The whole process took approximately 45 minutes.

4.3.3.6 Inspections on Staples EUR Import

<table>
<thead>
<tr>
<th>Supplier: Staples EUR</th>
<th>Measurement</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival time: 12:10</td>
<td>Unloading</td>
<td></td>
</tr>
<tr>
<td>Pallets: 16</td>
<td>Booking</td>
<td></td>
</tr>
<tr>
<td>Gate: 2</td>
<td>Handling:</td>
<td>9-12 h (Estimated)</td>
</tr>
<tr>
<td></td>
<td>Dividing of mixed pallets:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labelling:</td>
<td>9 – 12 h</td>
</tr>
</tbody>
</table>

Figure 33: Results of the measures on the Staples EUR delivery Tuesday 10/4

Staples Europe import is Staples own internal supplier, however they experience troubles with the supplier regarding the inspections. This delivery contained 16 pallets, where all the pallets were mixed. The team leader made an estimation that all packages will be assorted to approximately 50 differently pallets, and the time to do this was approximated to 9-12 hours.

4.3.4 Overview over the inspection process

1. (Start) The carrier signs up at the incoming delivery coordinator and brings up the consignment note and tells how many pallets there are to be unloaded.
2. (Decision) The delivery coordinator gets information on how many pallets there are to be delivered and contacts the most appropriate team leader by com- radio in order to know which gate that is most appropriate for the carrier to unload the goods.
3. (Operation) The carrier unloads the goods.
4. (Inspection) A consignee controls if the pallets are of EUR pallet, any visible damages on the goods or if the plastic around the delivery is broken in some way. The consignee will thereafter sign the consignment report. If the delivery note has not yet been shown, the consignee also has to search for it on the pallets.
5. (Delay) If the delivery note is missing, the delivery has to temporary be kept in the inspection process without that the consignees could do anything with it until they have the delivery note.
6. (*Operation*) The team leader books in the delivery note by first checking if the delivery note matches the purchasing order. If it does not match, he has to redefine the order in the SAP system or if it does match he could verify the order into the SAP system. When this is done, the labels will be out printed from the AVR system.

7. (*Decision*) The decision here will be based on what kind of delivery there is to be handled and how many deliveries there are already to be handled.

8. (*Delay*) If this point occur it is mainly because that there is a lot of other deliveries that needs to be handled first and therefore there is not enough manpower to handle the specific delivery.

9. (*Inspection*) The consignees controls what there are to be done in order to label the pallets.

10. (*Operation*) The consignees divide the pallets, resort the items into different pallets.

11. (*Inspection*) The consignee controls if the item numbers conform to the labels that have been printed out, count boxes, number of quantity in the boxes and compares with the delivery note if they are in line with the specifications.

12. (*Operation*) Abnormalities have occurred and a deviation report will be written

13. (*Operation*) The deviation report will be sent to the delivery coordinator who will forward the report by e-mail to the supplier in charge and to the concerned purchaser.

14. (*Database*) The concerned supplier and purchaser have the copy of the deviation report in their e-mail. The delivery coordinator awaits a reply from the supplier for further actions to take.

15. (*End*) The consignees labels the pallets in order to validate them so the pickers could take them into storage.

Figure 34 below illustrates Staples inspection process.
Figure 34: Shows an overview over Staples inspection process

1. Carrier arrives
2. Gets directions to which gate to unload
3. Unloads the goods
4. Delivery is not handled
5. Temporary delay of delivery
6. Booking of the delivery
7. Decision of which delivery to handle
8. Consignee controls any visible damage
9. Control of what needs to be done
10. Divide multi item pallets/single item pallets.
11. Control item numbers and quantity
12. Abnormalties have occurred, report is written
13. Deviation report is sent to coordinator
14. Coordinator sends e-mail to supplier and purchaser
15. Pallets/items are labeled
5. Analysis
The analysis will be divided into three analysis parts, where each part analyses the respective research question.

1. To what extent is the incoming flow of deliveries late or early?

2. How could Staples improve the control over the incoming flow of deliveries?

3. How could Staples improve the inspections of the incoming flow of deliveries?

The first part (5.1) of the analysis aims to answer the first research question. The analysis illustrates the identified results of the late and early incoming flow of deliveries during the period 2/4 - 5/4-12 and 10/4-12. Further on problems are illustrated with the incoming delivery list, which was connected to the measuring of the late and early incoming flow of deliveries. The six suppliers will also be analyzed regarding how well they managed to meet the confirmed delivery dates during the time period of 30/1 - 2/3-12. And the results of the measures on the six suppliers will be presented.

The second analysis part (5.2) aims to answer the second research question on how Staples could improve their control of the incoming flow of deliveries. The work connected to the control of the incoming flow of deliveries, which is the purchasing department and the incoming delivery coordinator is presented and analyzed.

The third analysis part (5.3) aims to answer the third research question on how Staples could improve the inspections of the incoming flow of deliveries. The inspection process is analyzed with regard to the inspections made on the incoming flow of deliveries, and the measures connected to these inspections.

Figure 35 below shows how the analysis is built up.
Figure 35: Shows the overview of how the analysis is built up with consideration to the research questions.
5.1 Incoming flows of late and early deliveries

5.1.1 Late and early deliveries during 2/4-5/4 & 10/4

5.1.1.1 Results based on the incoming delivery list

The results of the measures regarding the incoming flows of late and early deliveries are shown in figure 36 below. The red stack illustrates the percentage of late deliveries. The blue stack illustrates the percentage of early deliveries. The summary table within the figure shows the total deliveries made the specific day, and how many deliveries the percentage rate corresponds to, which are bold marked.

![Figure 36: Shows the percentage of late and early deliveries in relation to the total amount of deliveries made the specific day.](image)

Figure 37 below shows a summary of the measures above which shows the percentages of the total early and late deliveries with regard to the incoming delivery list. According to Mattsson (2002) the measures to use in order to measure the late deliveries, is the number of late deliveries during a time period, in relation to the total number of orders that have been delivered in the time period. This measure was also used to calculate the amount of early deliveries.
<table>
<thead>
<tr>
<th>Day</th>
<th>Monday 2/4</th>
<th>Tuesday 3/4</th>
<th>Wednesday 4/4</th>
<th>Thursday 5/4</th>
<th>Tuesday 10/4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Late</strong></td>
<td>13 %</td>
<td>9%</td>
<td>45%</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Early</strong></td>
<td>13%</td>
<td>9%</td>
<td>13%</td>
<td>34%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>26%</td>
<td>18%</td>
<td>58%</td>
<td>64%</td>
<td>35%</td>
</tr>
</tbody>
</table>

*Figure 37: Shows the percentage of late and early deliveries in relation to the total amount of deliveries for the specific days.*

As seen on the figure above, if Wednesday 4/4 is taken as an example 45% of the suppliers that arrived too late is actually suppliers that according to the incoming delivery list should have delivered earlier than Wednesday 4/4, and 14% should have delivered later than Wednesday 4/4. Summing this up, 58% of the deliveries that were made on Wednesday 4/4 should not have delivered on the specific day. This means that the 58% of the deliveries that were made Wednesday 4/4 are deliveries that should have been delivered either earlier or later than that specific day. Taking the average of the total percentage rate for all the five days gives an average of 40.8 percent of both late and early deliveries.

### 5.1.1.2 Unjust information from the delivery list

The measuring of the late and early deliveries were based on the deliveries from the incoming delivery list for week 14. However all the incoming flow of deliveries could not be taken into consideration in the measuring of the incoming flow of deliveries. The problem lied in finding all the suppliers that arrived to Staples in the incoming delivery list to check if they arrived on the correct day. 9 suppliers could not be found in the incoming delivery list regarding if they have arrived on the correct delivery day, however on the updated incoming delivery list these suppliers were registered to deliver. As an example the delivery from the supplier Brother with the PO-number (4501531542) that arrived Wednesday 4/4 could not be found in the incoming delivery list for week 14, which is illustrated in figure 38 below.
However in the updated incoming delivery list that was made Monday 2/4 this delivery could be found, and was registered to deliver Wednesday 4/4 as seen on figure 39 below. Therefore if taking the ordinary incoming delivery list in consideration, it does not give a correct view of which suppliers that should deliver the specific days.

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**Figure 38:** Shows an abstract of the incoming delivery list for week 14 made Friday 30/3

**Figure 39:** Shows the deliveries that arrived and could not be found on the original delivery list, they were instead found on the updated incoming delivery list made Monday 2/4
On the other hand if the “Brother” order would have been made on Tuesday 3/4 instead then this would not have been found due that the list was updated Monday 2/4. This means that orders that are made after that the incoming delivery list is updated will not be presented in the incoming delivery list.

5.1.1.3 Incorrect information about deliveries
Some deliveries were found in week 14 which contained purchase order numbers with different confirmed delivery dates. One example of this can be taken with the Esselte delivery that arrived Wednesday 4/4. The delivery contained 4 po-numbers, which are shown in figure 40 below. The right column within the circle shows the day of the purchase, and the left shows the confirmed delivery day. The po-numbers that are shown in the figure below were not registered to be delivered 2012-04-04.

![Figure 40: Shows po-number, confirmed delivery dates, and dates when purchase was made for the Esselte delivery that arrived Wednesday 4/4.](image)

The actual po-numbers that were registered to be delivered 2012-04-04, as seen in figure 41 below, were not delivered within this delivery.

![Figure 41: Shows the deliveries that according to the incoming delivery list should have been delivered Wednesday 4/4.](image)

5.1.2 Late and early deliveries from the six suppliers
In order to measure the amount of late and early deliveries Mattsson (2002) recommends to count the number of late deliveries in relation to the total number of deliveries, however Mattsson (2002) imposes that the measures also could be used to measure early deliveries. Figure 42 below presents a mean value of each of the six suppliers, including both late and early deliveries. The mean value per supplier is based
on the total number of early- and late deliveries divided by the total deliveries that have been made during the period 30/1 – 2/3 (2012).

As seen on figure 42 Staples EUR import differs among the other suppliers regarding too late deliveries with a mean value of 8 late days per delivery, which is very high in comparison to the other suppliers. When it comes to early deliveries, Polynova resulted in the highest mean value of 5.6 days per delivery but Staples EUR Import is not far away with a mean value of 4.36 days per delivery. Suppliers that have mean values near to zero are clearly the suppliers Stora Enso and Metsä Tissue and seem to be the best suppliers of the six measured, by holding on to the fixed delivery dates.

Another measure that is recommended by Wan Weele (2010) is the supplier delivery index. This index takes both delivery times and amount of quantity in consideration when measuring the supplier’s reliability. However only the delivery times is taken in consideration with the aim to only measure the six suppliers’ reliability concerning the total late- and early deliveries in a percentage rate which is presented in figure 43 below.
Within the index Stora Enso is the closest to 100 %, which means they often deliver in time, which also reflects the results above in figure 42, where Stora Enso had a low mean value of average late and early days. Next to Stora Enso, Metsä Tissue also delivers well according to the index, but a majority of their early deliveries lowered the index value. Polynova that clearly have a high mean value regarding early deliveries in comparison with the other suppliers shown in figure 42, however has the third best index value. The high mean value of Polynovas early deliveries mostly depends on the purchasing order number (4501515064) which is shown in appendix 6, and displays that the delivery was 74 days early, which increased the mean value of the early deliveries. Nevertheless this specific purchasing order number did not affect the supplier delivery index in the same way because all late or early deliveries more than three days gives a index value of zero. Therefore one purchasing order number cannot affect the overall index value in the same way as in figure 42.

Four out of the six suppliers scores more close to 50 % in the index value which also was estimated by the logistic manager, who estimated that 50 % of all deliveries arrived too late or too early. Taking all the suppliers percentage rate, from the supplier index, and then dividing it by six, gives the mean value of 60.42 %. This means that the six
suppliers together has reliability of 60.42% when it comes to deliver on time. Clearly Stora Enso and Metsä Tissue uplift this percentage rate.

5.2 Control of the incoming flow of deliveries

5.2.1 Clarify the delivery day

As shown on the results of the first part of the analysis the inflow of deliveries arrives both earlier and later than the confirmed delivery day. When the purchasing department makes their orders today the confirmed delivery day of the delivery is described in the purchasing order as the date when the delivery should arrive to Staples. This is in accordance to one of the logistic specifications that Van Weele (2010) means indicates the date of delivery and that these conditions need to be respected from the supplier. However according to the Purchaser (2012) the case could be so that the day of shipment is not clear enough to the suppliers and that they may perceive this date as the date when the shipment should be sent, which leads to that the delivery will arrive later than expected. Heinritz et al (1991) argues that it is the purchasing department’s responsibility to secure the delivery promises from the suppliers according to specifications. However Staples do not require the suppliers to deliver on certain times, noír they only want the deliveries on the confirmed delivery dates as agreed between the purchaser and the supplier. Therefore Staples could make the logistic specification more clearly to the supplier that the confirmed delivery day is the day when the delivery should be physically present at Staples warehouse. Therefore the purchasing order could be more distinct regarding the date of the promised delivery. The purchasing order could also contain a notice to the suppliers that if the delivery date cannot be met, the supplier should contact the purchasing department ahead. Figure 44 below shows a summary of the discussion.
5.2.2 Control the delivery

Today the purchasing department only knows when a delivery is late due to the overdue list. The overdue list shows which deliveries that has outpaced the confirmed delivery date and not been registered in the inspection process. The purchasing department then informs the suppliers that the delivery is late and make them speed up the delivery. According to Leenders et al (2002) this is called expediting which is a way to speed up the delivery of a delayed order. Van Weele (2010) further argues that there are two kinds of expediting. The first one is exception expediting which is the form of expediting that the purchasers at Staples uses today, when taking action towards the supplier who has not managed to deliver in time, and the other is preventive approach expediting. Preventive approach expediting means that the purchaser contacts the suppliers a few days before a delivery to confirm the delivery date in order to prevent unpleasant surprises (Van Weele 2010). This means that the purchasers at Staples could use a preventing approach to make sure that the suppliers will meet the confirmed delivery dates. According to a study from Yigitbasioglu (2010) intense information sharing results to better supplier performance and more on-time deliveries. According to Leenders et al (2002) information sharing could be done by telephone to immediate take contact with the supplier in order to get information and answers directly. The purchasers could therefore systematically call the suppliers to acknowledge if the delivery date will be held as promised, or if the delivery would for some reason not arrive on the agreed delivery date. Besides getting more updated information from the suppliers by the preventive approach, the purchasing department could be more aware of the deliveries actual delivery date. This could lead to that the purchasers could update the new information in the SAP system and thereby get more accurate information.
regarding when the deliveries will occur, which also would be updated in the incoming delivery list. This could also lead to that the amount of deliveries in the overdue list would decrease, due to that the actual delivery date would be updated in SAP. Figure 45 shows a summary of the discussion.

![Figure 45: Shows a summary of the analysis of the delivery control, and the continued parts of the analysis](image)

### 5.2.3 Justify the information of late and early deliveries

#### 5.2.3.1 Update of the list

The incoming delivery list is proven in the first part of the analysis (5.1.2) that it not shows all the incoming deliveries that arrives to Staples. Novack (1993) states that if the logistics control is to be effective, the data must be examined on its content, and on the delay between the data collection and the report compilation. The data collection is today made once a week in form of the incoming delivery list. Therefore in order to get an accurate image of which suppliers that will deliver, the incoming delivery coordinator could update the list at the end of the day for the next upcoming day instead of once a week for the next upcoming week. This could lead to a better information flow, which according to Jonsson (2008) is a condition for an efficient flow of materials. The reason why this could be done is that as shown on the first part of the analysis all the orders were not captured by the incoming delivery list due to that orders were made and delivered after that the incoming delivery list was updated.

If the incoming delivery list would be updated once a day, and the purchasers did a preventive approach expediting two days ahead a confirmed delivery date, could lead to that the incoming delivery list first of all could show all the orders that would be made. However the incoming delivery list could also capture all the changes that would be
made for the deliveries in connection to the preventive approach expediting, which could improve the information about the deliveries that will arrive, which was discussed in (5.1.1.3). If a delivery has a confirmed delivery day on a Wednesday, then the purchaser could make a prevention approach expediting at Monday. And if the supplier responds with that changes will occur in comparison to the order, then the purchaser could implement the changes in the SAP system. This information would then be updated in the incoming delivery list for Wednesday which could be updated by the incoming delivery coordinator at Tuesday as seen on figure 46. This could then lead to that the control over the flow would be improved due to that the information over the incoming flow of deliveries would be updated. This could then be in accordance to Coyle et al (1996); Jonsson (2008) who claims that the information flow is the main reason for the management of the inbound logistics, and that the information needs to flow fast in both directions for effective coordination. The information on the incoming delivery list could also be more accurate and the control over the incoming flow of deliveries could be improved.

Figure 46: Shows when the purchasers could call the suppliers, which is based on the confirmed delivery dates, and when the incoming delivery list could be updated, in order to capture the changes of an order.
Figure 47 below shows a summary of the discussion.

5.2.4 Implement routines towards arriving suppliers

The incoming delivery coordinator is the one who receives the carriers when they arrive with the deliveries. Today the coordinator has no control over which suppliers that has arrived in time or which suppliers that are late or early. The main reason for this is that there have not been any routines made regarding on how these late or early suppliers should be handled. However routines could be implemented when having better control of the information flows, which according to Ballou (1978) is needed for the logistical management. The routines could be performed in relation to when the suppliers arrives, where the incoming delivery coordinator could first check the suppliers consignment note and look in the incoming delivery list to see if the supplier is registered in the list to deliver the actual day. If the supplier is registered to deliver the coordinator could note this down under the column “status”, and then give the supplier access to the unloading bay. This could be done in order to get an overview over how many of the suppliers that is meant to deliver has arrived, and to collect information about the incoming flow of deliveries. According to Mattsson (2002) collected information can be used to follow up and analyze the results of the outcome, which could be to take action against suppliers that do not arrive on the right delivery day even if preventive approaches has been used against them. Figure 48 below gives an example of how the incoming delivery list could look like and what could be registered in the list.
Figure 48: Shows an example of how the incoming delivery list could look like when managing the incoming flow of deliveries

If a supplier arrives and the coordinator cannot find the supplier in the list, then the coordinator could search for the supplier in the SAP system to see what the actual date of the delivery is. If the coordinator finds out that the delivery has arrived earlier than the confirmed delivery date, that is registered in the SAP system, then the incoming delivery coordinator could according to Cooper (1994) refuse the supplier that has not arrived in accordance to the agreed delivery day, to access the unloading bay. If this is done, the coordinator could note down that the specific supplier has arrived too early and also what day the actual supplier was intended to deliver. According to Van Weele (2010) delivery problems should be forwarded daily to the purchaser through a supplier complaint procedure. Therefore the information could then directly be sent to the purchaser in charge of the supplier, so that the purchaser could forward this information to the supplier and inform the supplier that the delivery has been refused to deliver due to that the day of delivery is not met. As a result of the extended information flow Yigitbasioglu (2010) argues that this could lead to an improved supplier performance. However late deliveries, could according to Slotnick & Sobel (2005) lead to backlogs within an organization. Refusing late deliveries may lead to lack out of items and could worsen the backlogs within Staples, and therefore should all late arrivals be accepted. However any possible late arrivals would already be known by the purchasing department, due to the overdue list, and would therefore not be an issue for the incoming delivery coordinator. Figure 49 below shows the possible routines that could be taken regarding the arriving suppliers.

<table>
<thead>
<tr>
<th>Supplier Name</th>
<th>PO-Number</th>
<th>Nettovalue</th>
<th>Delivery day</th>
<th>Ordered</th>
<th>Status</th>
<th>Actual delivery day</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINTEC PAPER AB</td>
<td>4501532725</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td>Delivered</td>
<td></td>
</tr>
<tr>
<td>ESSELTE SVERIGE AB</td>
<td>4501532586</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESSELTE SVERIGE AB</td>
<td>4501531564</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESSELTE SVERIGE AB</td>
<td>4501518035</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUNI AB</td>
<td>4501532914</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-05</td>
<td>Delivered</td>
<td></td>
</tr>
<tr>
<td>Denny Sverige AB</td>
<td>4501532036</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEDERROTH AB</td>
<td>4501532596</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DURABLE SCANDINAVIA AB</td>
<td>4501528848</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-28</td>
<td>Early</td>
<td>2012-04-13</td>
</tr>
<tr>
<td>SCA HYGIENE PRODUCTS AB</td>
<td>4501532999</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRA SPORTS AB</td>
<td>4501526417</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-20</td>
<td>Delivered</td>
<td></td>
</tr>
<tr>
<td>POLYNOVA NESSEN AB</td>
<td>4501515064</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-02-23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLYNOVA NESSEN AB</td>
<td>4501532769</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td>Delivered</td>
<td></td>
</tr>
<tr>
<td>MÆRX TEAM AB</td>
<td>4501532919</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>METSA TISSUE AB</td>
<td>4501532525</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>METSA TISSUE AB</td>
<td>4501531992</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>METSA TISSUE AB</td>
<td>4501532924</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARVID NORDOVIST H.A.B.</td>
<td>4501532620</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-05</td>
<td>Delivered</td>
<td></td>
</tr>
<tr>
<td>ARVID NORDOVIST H.A.B.</td>
<td>4501532868</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-26</td>
<td>Delivered</td>
<td></td>
</tr>
<tr>
<td>MATING AB</td>
<td>4501518043</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HENKEL NORDEN AB</td>
<td>4501532518</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-04-04</td>
<td>Early</td>
<td>2012-04-12</td>
</tr>
<tr>
<td>SPECIALPLAST WENSBO AB</td>
<td>4501509856</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPECIALPLAST WENSBO AB</td>
<td>4501514530</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-02-22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPECIALPLAST WENSBO AB</td>
<td>4501524846</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BO ERHLANDER AB</td>
<td>4501527037</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-21</td>
<td>Cancelled</td>
<td></td>
</tr>
<tr>
<td>CREATIVE TEXTIL AB</td>
<td>4501511125</td>
<td>12 598,35</td>
<td>2012-04-11</td>
<td>2012-03-30</td>
<td>Early</td>
<td>2012-04-12</td>
</tr>
</tbody>
</table>
5.2.5 Plan, do, check & act to control the incoming flow of deliveries

To show how Staples could proceed with the control of the incoming flows, the PDCA cycle could be used, which according to Ishikawa (1985) is a way to organize control based on four categories. The categories are plan, do, check and act:

5.2.5.1 Plan – “Improve the control of the incoming flows”

Beginning with the plan category, this entails according to Handfeld & Nichols (2002) that the company identifies and analyzes the problems, and plans the activities to improve the activities, which could be order fulfillments, inbound material and physical distribution. The problems in Staples case is the poor control of the incoming flow of deliveries, which have been identified in the first chapter and analyzed in this chapter.

According to Ishikawa (1985) if policies are not made, then goals cannot be established. Ishikawa continues with that when making the policies it is better to limit the policy to priority items only. In Staples case the policy could instead of being limited to items, reasonably be limited to the six suppliers, which means that the activities concerning the improvement of the control could at a beginning only include the six suppliers to see how the activities works out. Further on Ishikawa (1985) states that the goal must be obvious. The goal for Staples is to improve the control of the incoming flow of deliveries. And the goals could according to Ishikawa (1985) be demonstrated to the concerned personnel by using information about cost, profit, or amount of products. Staples could show the purchasing department and the inbound department the results of the measures that were shown in part (5.1 and 5.2) of the analysis. This could be done to demonstrate the extent of the late and early deliveries within Staples.
“Which methods to use?”

Ishikawa (1985) states that if the goals and targets that are set do not have a method to reach them, the goals and targets are useless. The methods which Staples could use are described above in (5.2.1-5.2.4). Anupindi et al (2006) states that to find the cause to a problem, discussion and brainstorming may help to generate hypotheses about possible causes. The causes for the problems are already known, so the “causes” are shown that could lead to an improvement of the control which are shown in a cause-effect diagram in figure 50 below, which according to Ishikawa (1985) shows a chain relationship of the causes that ultimately leads to the effect. The effect in this case is the improvement of the control over the incoming flow of deliveries.

![Figure 50: Cause and effect diagram over the “causes” that could lead to an improvement on the control of the incoming flows.](image)

5.2.5.2 Do – “Engage concerned personnel in the changes that are to be made”

According to Ishikawa (1985) the important thing to do is to engage the people who are going to be affected by the changes, so that they really understand the true meaning behind it. Staples could therefore make a policy on how the purchasing department and
the incoming delivery coordinator have to work in order to accomplish these changes of the activities that are going to affect them. The changes that are proposed above (5.2.1-5.2.4) could be done in order to improve the control. However the activities regarding to control the delivery and the routines regarding the arriving suppliers could at a beginning only include the six suppliers, in order to see what results it could give.

“Problems related to the implementation of the changes”
Ishikawa (1985) states that problems related to implementation appear at every step of management and control, and that even if the regulations are followed problems still will occur. This will be something that Staples will have to count on during the possible implementation, and will have to be solved based on what problems that may occur. However if the changes are only practiced on the six suppliers, then these possible problems could be taken as improvement factors, if the next step then is to comprise more suppliers.

5.2.5.3 Check – “Is the control improved?”
In the check phase, the company measures if the changed activities had the effects wanted on the problems. (Handfeld & Nichols, 2002) Staples could measure the effects of the implementation, by continuously measuring the possible late and early arrivals of the six suppliers. To calculate the results of the late and early deliveries, Staples could use the same calculation method as shown in part (5.1.2) of the analysis. The results that Staples gets from their measures of the six suppliers could then be compared to the results shown in the part (5.1.2) of the analysis. The time period for the measurements could be the same as used in part (5.1.2) of the six suppliers.

5.2.5.4 Act – “How to proceed?”
In the act phase the company could according to Ayers & Odegaard (2008) modify the processes to fit the activities that were changed in order to give the results wanted. If Staples results of the measurements show that improvements are made after the changes made in the processes, then Staples could start to expand the amount of suppliers that will be integrated in the project of controlling the incoming flows. Staples could then continuously follow-up the suppliers delivery record since these data can lead to an adjustment for a so called supplier rating (Van Weele, 2010). Novack (1993) argues that feedback is necessary from the measuring so that changes can be made if necessary. The
measures could then be used as a foundation to have when following-up the suppliers in order to make them aware of their delivery records. However if the results does not give the effects wanted then Staples could according to Ishikawa (1985) make adjustments of the cause factors, depending on what factors that perhaps may not to give the results wanted. This could depend on that everything is not executed the way it should, or that problems may appear in some steps, which may have to be solved based on what problems it may be. Therefore if something is not working out the way it should, these problems have to be taken up and discussed in order to find a solution on how to proceed with them, figure 51 below is a summary on the control circle which shows the way Staples could proceed to improve the control of the incoming flows.

---

**Figure 51: Control Circle over how Staples could proceed with the control the incoming flow of deliveries, reconstructed after Ishikawa (1985)**

- **Goal** – Control of the incoming flow of deliveries
- **Method of reaching the goal** – Doing the changes as described in (5.2.1-5.2.4)
- **Engage** – Engage the concerned personnel in what changes that is to be made
- **Implement** – Start with the work of implementing the changes
- **Act**
  - Not the results wanted? – Is everything executes the way it should?
  - Improvements are made? – Expand the amount of suppliers and start to follow up their delivery record
- **Check**
  - Effect of implementation – Measure the effects of the implementation
- **Do**
  - Effect of implementation – Measure the effects of the implementation
  - Implement – Start with the work of implementing the changes
5.3 Improving the inspections of the incoming flow of deliveries

When companies want efficient logistic processes, it is recommended by Oskarsson et al. (2004) to first clarify the conditions of what there is to improve. In this analytic chapter, the clarifying conditions is to improve the inspection of the incoming flow of deliveries, with the aim to reduce the flow time of the inspection process. The following steps to take within a process change can be seen in figure 52 below.

In order to know how to efficient the logistic process, Oskarsson et al. (2004) means that companies must know how the process is managed today, and therefore describe and analyse the current situation in order to find alternative solutions, which is shown in figure 53.
5.3.1 The current situation

In order to improve the inspection process, a process mapping has been done in order to know how the inspection process is managed today. There have also been observations on how exactly the inspections are made on different suppliers.

Based on the investigations on the six suppliers (Polynova was omitted) over the time period of 3/4 – 5/4 and 10/4, time measures have been made within the inspections, which simplified the discovery and understanding of possible causes to the inspection problems that leads to an increased flow time into storage. Based on the measurements, three “causes” were identified for an improvement possibility.

5.3.2 Deliveries that have arrived too early or too late creates waiting time

Sometimes deliveries overpower the inspection process, which creates waiting time for deliveries that are not handled, when the manpower are not able to handle everything. Anupindi et al (2006) means that delays and queue occurs because of variability in arrival and processing rates. As an example of the variability in arrival time was when 31 deliveries arrived Monday 2/4, of which 8 (26 %) of them were not meant to arrive, which created an overflow of incoming deliveries. The early and late deliveries for Monday 2/4 is illustrated with a black circle below in figure 54.

![Figure 54: Shows the percentages of deliveries that were not meant to be delivered Monday 2/4, at a total 8 deliveries, and created an overflow of deliveries in the inspection process.](image-url)
All the deliveries could not be handled Monday 2/4, instead some deliveries had to be handled the day after. This could seem as lack of synchronization according to Handfield & Nichols (2002) which means that too early or too late deliveries cause additional storage and material handling activities. As a result of this the handling of the incoming deliveries in Tuesday 3/4 were postponed, which created queues for other deliveries to be handled, which was the case for the Nilfisk delivery. Anupindi et al (2006) means that when decreasing the variability in inter arrival times prevents further delays and queue situations.

Further on the Nilfisk delivery had to be moved to another spot in order to be handled elsewhere when unhandled deliveries that arrived Monday 2/4 occupied the spot where the Nilfisk delivery were supposed to be handled. This created according to Ljungberg & Larsson (2001) waste activities because the re-movement activity did not create any type of value for the own organization, thus it only created more time of waiting for the consignees in order to handle the Nilfisk delivery. In other words these activities resulted in slowing down the flow into the storage.

5.3.2.1 Improving the activity
Anupindi et al (2006) means that activities should be performed right the first time in order to avoid waste activities, such as re-movement of the pallets. The variability in the inter-arrival times, consequently created difficulties to handle all the incoming flow of deliveries, due to knowing what will arrive, and in which sequence they will be handled. When reducing the inter-arrival times, better preparations could be created and therefore the waste activities could be minimized in the inspection process, due to that the incoming flows could be handled directly, instead of postponing the handling, which increases the flow time. Having the right deliveries on the right day, could remove the waste activities, but also minimize delay situations as illustrated on the black circle on figure 55 below.
7*: (Decision) The decision here will be based on what kind of delivery there is to be handled and how many deliveries there are already to be handled.

8*: (Delay) If this point occurs it is mainly because that there is a lot of other deliveries that are needed to be handled first and therefore there is not enough manpower to handle the specific delivery.

The decisions could be easier to handle if the consignees would be better prepared as a result of knowing how many, and what kind of deliveries that would arrive to Staples. Therefore the consignees would not have to spend time on waste activities such as re-movement of pallets, and postponed handlings would also be prevented, which increases the flow time. In order for these improvements to be realized, Staples needs to have control of the incoming flow of deliveries which have been analysed in the previous analytic chapter.

5.3.3 Delivery notes create waiting time

Sometimes the consignees have to wait before they can start handling a specific delivery even though the delivery is physically present in the inspection process. This is because the consignees have to wait on the team leader to book the delivery note into the SAP system. This is something Dobler & Burt (1996) refers to as a direct labour cost, which means unproductive time of employees who add nothing to the productive effort of the organization.
In the current situation the majority of the delivery notes are attached somewhere on the pallets within the deliveries that arrives to the inspection process, but sometimes the delivery notes are not attached on the pallets which leads to three different situations:

1. A waiting situation will occur when the consignees cannot handle the specific delivery, without having the delivery note.
2. An overdue could appear as the purchaser in charge only notices deliveries that have been booked into the SAP system.
3. The delivery could occupy a spot place and prevent other deliveries to be unloaded at the same gate, which would cause queues.

5.3.3.1 Improving the activity
Anupindi et al (2006) suggest moving work of the critical patch to paths that does not affect the process flow time. In order to do this Anupindi et al (2006) suggest moving activities to the “outer loop” and perform activities before the process starts. The approach is called post-processing, which in turn reduces the time of the critical patch. This could be done if the team leaders were more prepared by first knowing which day’s the delivery would occur on, and by that book the delivery notes the day before deliveries would arrive which could create better preparation. In order to realize this, the team leaders must first have access to the delivery notes in advance in order to book the deliveries into the SAP system before the delivery arrive, which would enable the consignees to directly handle deliveries when they arrive.

However in order to have the delivery notes in advance, Staples could require from their suppliers to send the delivery note in advance by e-mail or fax. Because the purchasers are in constant contact with the suppliers, it would be naturally that they could require the delivery note from the specific suppliers in conjunction with their purchases. The delivery notes could then be sent from the suppliers to the team leaders in advance. Therefore having the delivery note in advance would increase the preparations and therefore reduce the average flow time.

The black circles in figure 56 below show the activities that could be redundant when having delivery notes in advance.
Figure 56: Illustrates which activities* and delay* situations that could be removed, by receiving the delivery note in advance.

4*: (Inspection) A consignee controls if the pallets are of EUR pallet, any visible damages on the goods or if the plastic around the delivery is broken in some way. The consignee will thereafter sign the consignment report. If the delivery note has not yet been shown, the consignee also has to search for it on the pallets.

5*: (Delay) If the delivery note is missing, the delivery has to temporary be kept in the inspection process without that the consignees could do anything with it until they have the delivery note.

6*: (Operation) The team leader books in the delivery note by first checking if the delivery note matches the purchasing order. If it does not match, he has redefined the order in the SAP system or if it does match he could verify the order into the SAP system. When this is done, the labels will be out printed from the AVR system.

Having the delivery notes in advance could remove the activity of searching for the delivery note attached on the pallets. It could also remove the delay situation when the delivery note is missing. The booking of the delivery notes into the SAP system would however not be removed, thus it would instead be post-processed and therefore the consignees would not have to spend time waiting for the deliveries to be booked to the SAP system, instead they could directly handle the pallets which could reduce the flow time into storage.

5.3.4 Pallets that is not consistent with the YAM specifications causes non-value activities

When the consignees handle the pallets such as dividing and sorting them, it takes a lot of time. This is because all deliveries do not embrace with the YAM specifications. An example of such delivery is Staples EUR Import that arrived Tuesday 10/4 and only consisted of mixed pallets and was estimated to be handled within the time interval of 9
to 12 hours. Unfortunately these types of non-value activities are necessary to do in order to be able to store the items, but according to Ljungberg & Larsson (2001) these activities should be minimized. The non-value activities could embrace inspections, sorting and dividing of pallets. Activities such as inspecting and sorting are prime candidates for elimination, according to Anupindi et al (2006).

5.3.4.1 Improving the activity

Having more deliveries within the YAM specifications, could reduce the time for inspections, sorting and dividing of pallets within the inspection process and therefore reduce the flow time into storage. In order to be more effective, Aronsson et al (1988) suggest that customers should count how much of the problems there have been in relation to the incoming flow of deliveries and further suggest that these problems should be assembled statistically and then report them to the supplier in charge. Mattsson (2002) recommends counting the number of orders without remarks in relation to the total number of orders. Regardless which measurement system Staples take use of, it must according to Van Weele (2010); Heinritz et al (1991) be a constant integration between the purchasers and the inbound department (inspection process). This must be done in order for the purchasers to keep track of the supplier´s quality and follow-up and evaluate the supplier’s quality assurance. Therefore it is important that the consignees and the team leaders guides the purchasers, if the deliveries are in accordance with the specifications or not, because it is the purchaser’s responsibility to assure good quality standards. Furthermore Van Weele (2010) states that it is important that the suppliers are fully informed of the quality requirements stated by the purchaser’s. That is why the purchasers within Staples have to be detailed towards their suppliers when doing the maintenance specification, of how the suppliers should pack the items on the pallets. Deliveries in conformance with the maintenance specification will be acceptable, otherwise according to Heinritz et al (1991) the purchaser must act and inform the supplier regarding the delivery specifications.

Thus the inbound department (consignees and team leaders) and the purchasers could create routines to have constant communication in order to follow-up the supplier’s delivery maintenance with the purpose of having more deliveries in accordance to the YAM specifications. This could be done in conjunction with when the consignees operate with deliveries that does not fit the YAM specifications and further report how
many of the pallets that did not fit the YAM specifications. This information could then be sent to the delivery coordinator, as the same principal of how the consignees work with the deviation reports. The delivery coordinator could then send the information to the purchaser in charge by e-mail. This should according to Van Weele (2010) & Leenders et al (2002) be done in order to statistically assemble the deviations and keep track of the supplier’s quality record in order to know what actions to take towards suppliers that does not send satisfactorily deliveries.

The black circles in figure 57 below shows the activities that could be redundant when having deliveries within the YAM specifications. The green arrows show how the information of the deviation could look like and the green database symbol illustrates that the purchaser has received the information by e-mail.

**Figure 57:** Illustrates which activities* that could be removed, if the pallets would be sent in accordance to the YAM specifications, and what actions that could be taken if pallets are not received within the specifications.

9: (Inspection) The consignees control what there are to be done in order to be able to label the pallets. The control could embrace assortment of the items to different pallets and dividing high single-item pallets into two different pallets.

10: (Operation) Divide pallets, resort the items into different pallets.

Receiving deliveries that are in accordance to the YAM specifications could likely reduce the inspection- and operation time and therefore reduce the flow time into storage.
5.3.5 How could the improvements reduce the flow time?

The discussed solutions above should according to Oskarsson et al (2004) be compared to the current situation in order to identify advantages and disadvantages within each alternative, which is illustrated in figure 58 below. The discussion below analyses how the current flow time could be reduced due to the mentioned improvements above.

![Figure 58: Shows which step that is going to be analysed, which is to compare the flow times today with regard to the possible flow times](image)

5.3.5.1 Flow times today

The investigated suppliers flow time varied when measuring their flow time during the inspection process. The flow time of a given flow unit is the total amount of time required by the unit to flow through the process from entry to exit. The average flow time of a process is determined by looking at all flow units that flow through the process during a specific period of time and taking their average. (Anupindi et al, 2006)

The results of the average flow time per pallet for the suppliers investigated are presented below in figure 59.

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Nilfisk</th>
<th>Esselte</th>
<th>Metsä Tissue</th>
<th>Stora Enso</th>
<th>Staples EUR Import</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average Flow time per pallet (minutes)</strong></td>
<td>17,7</td>
<td>16,5</td>
<td>0,82</td>
<td>0,75</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td>3/4 – 12</td>
<td>3/4 – 12</td>
<td>4/4 – 12</td>
<td>4/4 – 12</td>
<td>10/4 - 12</td>
</tr>
</tbody>
</table>

*Figure 59: Shows the average flow times (minutes) per pallet and supplier, and date of the measure*
According to Anupindi et al (2006) longer flow times often depend on required inspections, rework and other quality problems while shorter flow times often is a result of fast feedback and few quality problems. When comparing the different average flow times between the suppliers in the figure above, it clearly indicates that Metsä Tissue and Stora Enso have a lower average flow time than Esselte and Nilfisk. The lower average flow times mostly depends on better preparations due to that Metsä Tissue and Stora Enso sent the delivery notes in advance to Staples. This in turn created better preconditions in the inspection process, in comparison with the other suppliers who did not send the delivery note in advance. This is because the inspection process will have the labels ready in order to prevent the consignees to wait for the delivery to be booked in.

However the higher average flow times also depended on pallets that needed to be divided and assorted into different pallets, which required time and consequently increased the average flow time. The average flow time for Esselte was 16,5 minutes per pallet and almost half of the time depended on two pallets that needed to be re-assorted to different pallets which also could be known as non-value activities. The average flow time of the Nilfisk delivery was 17,7 minutes per pallet and mostly depended on many deliveries that needed to be handled, but also the non-value adding activities such as dividing and assorting 7 mixed pallets, into different pallets.

The deliveries described above, resulted into finding three different paths taken in the inspection process, which is illustrated in figure 60 below.

<table>
<thead>
<tr>
<th>Path 1: Pre booked and dividing of pallets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 → 2 → 3 → 4 → 7 → 9 → 10 → 11 → 15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Path 2: Not pre booked and dividing of pallets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 10 → 11 → 15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Path 3: Pre booked and no dividing of pallets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 → 2 → 3 → 4 → 7 → 11 → 15</td>
</tr>
</tbody>
</table>

*Figure 60: Shows the different paths taken in the inspection process, depending on if the delivery was pre-booked, and if the pallets were divided*
Figure 61 below illustrates the process map over the inspection process in order to easier see which steps the three different paths take.

Figure 61: Shows the process map, which illustrates the different steps that could be taken in the process

5.3.5.2 Possible flow times
If all deliveries were in accordance to path three described above, the flow time could theoretically be reduced. Path three means that the delivery note is sent ahead, and that no extra handlings would be needed, other than too label the pallets/items. Stora Enso is the only supplier investigated, that today takes this “path”. Therefore as seen on figure 62 below, the total time for Stora Enso to be saved is 0 minutes, due to that it already fulfills the improvement possibilities. The total flow time for Metsä Tissue could however be reduced with approximately 40 minutes, for Esselte 120 minutes and for Nilfisk 185 minutes, if the delivery note would sent ahead, and if no extra handlings would be needed with the pallets. Furthermore if Staples would have better control over their incoming deliveries as described in the previous analytic chapter, Staples could prevent re-movements of pallets as described for the Nilfisk delivery.
If the improvements would be done, the average flow time per pallet could be reduced to the potential flow time per pallet, which is shown on the bottom of figure 63 below. This could then lead to that the flow time into storage could be decreased, and the pallets could flow faster into storage.

**Figure 62**: Shows the possible time (minutes) to be saved if the improvements are realized

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Nilfisk</th>
<th>Esselte</th>
<th>Metsä Tissue</th>
<th>Stora Enso</th>
<th>Staples EUR Import</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>N/A</td>
</tr>
<tr>
<td>No delivery note in advance created waiting time (min)</td>
<td>75</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>Extra handlings of unfitted YAM deliveries (min)</td>
<td>110</td>
<td>60</td>
<td>40</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>Re-movement of pallets (min)</td>
<td>90</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>Possible time to be saved (min)</td>
<td>275</td>
<td>120</td>
<td>40</td>
<td>0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Figure 63**: Shows the average flow time per pallet today, and the potential average flow time per pallet, if the improvements are realized

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Nilfisk</th>
<th>Esselte</th>
<th>Metsä Tissue</th>
<th>Stora Enso</th>
<th>Staples EUR Import</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Flow time per pallet today (min)</td>
<td>17,7</td>
<td>16,5</td>
<td>0,82</td>
<td>0,75</td>
<td>N/A</td>
</tr>
<tr>
<td>Potential average flow time per pallet (min)</td>
<td>5,22</td>
<td>4,5</td>
<td>0,59</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>Possible time to be saved per pallet (min)</td>
<td>12,48</td>
<td>12</td>
<td>0,23</td>
<td>-</td>
<td>N/A</td>
</tr>
</tbody>
</table>
6. Results

*In the last chapter of the thesis, the results of the 3 research questions are presented. Further on contribution to the theory, own reflections, suggestions for further research and criticism to the study is presented*

6.1 Conclusions

6.1.1 To what extent is the incoming flow of deliveries late or early?  
The purpose of this research question was to show the extent of the late and early deliveries. The measuring was made for two different time periods. The first time period included measures of all the incoming flow of deliveries during the time period of (2/4 – 5/4 and 10/4 - 2012). The results showed that during the measured time period 20 deliveries arrived too early, and 27 deliveries arrived too late out of 118 deliveries made during the time period. Together, the late and early deliveries reached a percentage rate of 40%, in relation to the total amount of deliveries made during the time period.

The second time period included measures of the incoming flows of late and early deliveries for six different suppliers during the time period of (30/1-2/3 – 2012). The results showed that the average days of early deliveries varied from 0,33 days to 5,6 days, and the average days of late deliveries varied from 0,33 days to 8 days. The six suppliers delivery index showed that they together had a mean value of approximately 60% when it comes to deliver in time.

6.1.2 How could Staples improve the control of the incoming flow of deliveries?  
The purpose of this research question was to find improvement possibilities regarding the control of the incoming flow of deliveries. The findings made based on the research question imposed that in order for Staples to improve their control of the incoming flow of deliveries they could take the following actions:

*Clarify the delivery day:* In order to make sure that the suppliers have understood the meaning of the confirmed delivery day, the purchasing order could be made more
distinct with the aim to clarify that the confirmed delivery day means the day when the delivery should physically be present at Staples warehouse. And if this day for some reason cannot be followed, the purchasing department should be contacted. Control the delivery: Staples could also start with prevention approach expediting. This means that the purchasers could call the suppliers in advance in order to get information from the supplier about when the delivery will occur and if any changes are made within the delivery. This would lead to that the purchasers would extend the information exchange with the suppliers regarding the deliveries, and the information taken from the suppliers could then be used to update the information that exists about the actual delivery in the SAP system.

Update of the incoming delivery list: Updating the incoming delivery list once a day instead of once a week, the incoming delivery coordinator could get more updated information regarding what deliveries that will arrive to Staples. The list would then have to be updated on a daily basis for the next upcoming day in order to capture all the orders that are made, and that will arrive to Staples. Implement routines towards arriving suppliers: If the incoming delivery list is updated on a daily basis, and if the prevention approach expediting is executed, then the incoming delivery list could be more accurate regarding what deliveries that are expected. The incoming delivery list could be used by the incoming delivery coordinator in the aspect of managing the suppliers that arrives. The incoming delivery coordinator could then start to check all the suppliers that arrive, regarding if they have arrived on time. If a supplier has arrived earlier these could be refused access to deliver. The incoming delivery coordinator could then forward this information about the early delivery to the purchaser in charge of the supplier, which in turn would forward this information to the specific supplier, in order to make the supplier aware of the refused delivery.

6.1.3 How could Staples improve the inspections of the incoming flow of deliveries?

The purpose with this research question was to improve the inspections of the incoming flow of deliveries in order to decrease the flow time into storage. In order to find the improvement possibilities, the current situation was first illustrated. The illustration of the current situation lead to finding three causes which increased the flow time, which were: Deliveries that have arrived too early or too late creates waiting time, delivery
notes creates waiting time and pallets that is not consistent with the YAM specifications causes non-value activities. Improving these causes could lead to an improvement of the inspections, which could lead to a decreased flow time into storage. Initially the deliveries could be controlled in a way that expected deliveries occurs on the right day. This would make the team leaders and consignees more prepared for what deliveries there are to come and to be handled. When the team leaders would know what deliveries there is to come, they could prepare by booking the delivery note into the SAP system and thereby prevent waiting time for the consignees. The purchasers could therefore require the suppliers to send the delivery note in advance by e-mail or fax so that the team leader have the access to the delivery note before the deliveries has occurred. Further on the purchasers could require their suppliers to send their pallets according to the YAM specifications. This could save a lot of time due to that the consignees not have to spend hours of non-value activities in dividing and sorting the pallets in order to validate the pallets. The communication between the purchasers and consignees and team leaders could then be extended if they report all the deviations to the purchasers which in turn could take use of these deviations in order to constantly require improvements from their suppliers.

6.2 Contribution to the theory

The thesis scientific approach was deduction, which means that the purpose is to test the current theory, in order to reject or enhance the theory. The thesis theoretical and empirical framework was connected in the analysis. The analysis resulted in an enhancement of the theory. The contribution to the theory is consequently a complement to the theory that a poor information flow leads to a poor control of the material flow, which in turn leads to problems in the internal operations. Based on the measures made, approximately 40% of all the incoming flow of deliveries arrived too late or too early into Staples, which created internal problems. This could be seen in deliveries that arrived earlier and later than expected in figure 54, where early- and late deliveries caused problems in the inspection process. Thereby this study strengthens the theory described above.

6.3 Own reflections

During the thesis we saw that Staples have a poor control over their incoming flow of
deliveries, but we also saw that the inspection process have potential for improvements in making them faster. We recommend that Staples should begin to follow-up their suppliers in a more detailed matter by measuring how well the ability to deliver on time is. Staples could do this with the help of the supplier delivery index as seen in figure 8. Measuring the supplier reliability in on-time deliveries in different time-periods can clarify if the suppliers' delivery performance has improved or worsened. Staples should also take measurements of how well their suppliers deliver along the YAM specifications in order to ensure efficiency within the inspection process.

Therefore we recommend that Staples must begin to control their suppliers more extensively, and the flow of information must be intensified both internally and externally, in order to constantly seek for new opportunities to improve the incoming flow of deliveries.

6.4 Suggestions for further research
This study was designed to improve the control and inspections of the incoming flow of deliveries. The suggestions for further research could be to explore the possibility of scheduling the supplier’s arrival times, in order to smoothen out the incoming flow of deliveries. The research could take the inspection process in consideration of how big capacity the inspection process has, when it comes to handle the incoming flow of deliveries, and consequently find the possibilities of scheduling the incoming deliveries after the capacity in the inspection process.

6.5 Criticism to the study
During the study, the authors had access to be inside Staples central warehouse and to investigate the logistical problems Staples was experiencing. The number of potential problems to investigate misled the authors at the beginning to define themselves in a clear area of concern. The criticism includes that the authors could have limited themselves to either the “control of the deliveries” or the “inspection of the deliveries” in order to get a greater focus on the specific problems. This could have contributed to more findings which could have made the analysis more focused, and the results better connected to the problems.
7. Sources


Ayers, J-B & Odegaard, M-A (2008) *Retail Supply Chain Management*, Auerbach, USA


Ishikawa, K (1985) *What is total quality control?*, Prentice Hall, New Jersey


Purchaser (2012) Tingdahl, E-M. Interview, 2012-03-07


Staples company presentation (2012), Powerpoint presentation

Supply Chain Specialist (2012) Salomonsson, J. Interview, 2012-03-06


Appendix

Appendix 1

Interview- Purchasing Department

Name: Ewha-Maria Tingdhal,

Position: Purchaser

Date of interview: (7/3-12)

How does the process start when you are about to begin your work?

What tasks are included in the purchasing process?

When does the process end?

What tasks do you have after the purchasing process?
Appendix 2

Interview – Purchasing department

Name: Johan Salomonsson,

Position: Supply chain specialist

Date of interview: 6/3-12

Would you overall able to tell how a purchaser currently works at Staples?

Do the buyers plan and decide which day deliveries will occur in the incoming delivery?

What are the quality requirements like when buyers make an order to a supplier?

Do you have a delivery control of your suppliers?

How do buyers know if a shipment has arrived too late and if the quality or quantity does not match the specification?

Do you have any assessment of your suppliers after a delivery has been made?
Appendix 3

Interview – Inspection process

Name: Per Willman

Position: Inbound department manager

Date of interview (27/3-12)

How well are inspections procedures specified, and how well are they followed

How does the process start, what kind of activities are included in the inspection process?

What problems does the inspection process often face?

How well are the problems faced in the inspection process followed up? Is there any routines regarding this?

How long time does an inspection approximately take? Does it differ between suppliers?

What do the employees do when an supplier has to many or few products? Or damaged products? How is it followed up?

Does the employees know when the deliveries will occur?

Are any measures used within the inspection process to see how many deliveries that were sent wrong?

How is the work of the inspection process planned daily?
Appendix 4

Interview – Inspection process/Purchasing process

Name: Ulrika Karlsson,

Position: Incoming delivery coordinator

Date of interview: (29/3-12)

How does your daily work look like?

How does the process look like from that the incoming deliveries occur?

On which way do you work with the deviation reports, and what does them contain?

Does the deviation reports get saved?

- If yes, do the company follow up these data in some way?

What kind of contact do you have with the suppliers?

What kind of contact do you have with the purchasers?

What kind of contact do you have with the employees within the inspection process?

How do you make the incoming deliveries list?

What does the list contain?

Who receives the list?

How do the company use the list?

Do you experiencing problems with the incoming flow of deliveries today?

- If yes, what kind of problems and how does it affect the inspection process?

Will you know if any backorders are included in the deliveries that will occur in the incoming deliveries?
Appendix 5

Interview – Inspection process

Name: Anders Strömgren
Position: Profiler
Date of interview: (13/3-12)

How does the quality requirement looks like today according to the deliveries?
Which problems are perceived today within the inspection process?
### Appendix 6

Deliveries within the time period 30/1 – 2/3

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