The effects of the returning behaviour in the profitability of customers within fashion e-commerce

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Acknowledgements

This Master Thesis, developed at the Packaging Logistics department of Lund's Engineering Faculty (LTH), represents the final step of both a five year degree in Industrial Engineering from the Polytechnic university of Catalonia (UPC) and an MSc in Logistics and Production management from the LTH. It has been carried out during the spring semester of 2014.

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Lluc Hevia,

Lund, August 2014.

Abstract

Title

The effects of the returning behaviour in the profitability of customers within the fashion e-commerce.

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Purpose

The purpose of this thesis is to explore how the experience that customers gain by means of their purchasing and returning behaviour affects their profitability for the e-commerce fashion company. More specifically, how the profit per order or per period of time that this customers represent varies, depending on his previous experience.

Method

The methodology followed for the present project combined the development of an algorithm to process the available raw data with a case study approach. In the first stage a conceptual model and an algorithm where developed, followed then by an analysis of the data obtained from the output of the model. The results of the analysis were then used to assess the defined research questions.

Limitations

The scope of the project is limited to the case of a specific fashion e-commerce company, and the data used corresponds to the year 2009.

Findings

Experiencing a return during the first orders of a customer enhances this customer's confidence in the e-commerce company and increases the customer retention rate. However, customers who make returns from the first orders have higher chances of returning from the future orders they purchase and, therefore, these customers show a lower average profitability per order than those who do not return from those orders.

Keywords

E-commerce, customer behaviour, customer segmentation, returns, profitability.

Executive Summary

Introduction

Background - Fashion e-commerce is a fast pace business with tough competition among the firms. This requires fashion e-commerce companies, that want to become or remain successful, to improve their Supply Chain and Customer Relationship Management strategies in order adapt to their customers; their needs and their behaviour. Understanding the behaviour of customers and acting in advance to adapt to it can result in an extremely important competitive advantage for an e-commerce company, as it can lead to an overall increase in the value of these customers for the e-commerce firm.

Problem discussion - The behaviour of e-retail customers has been seen, by previous studies, to be influenced by the earlier purchasing and returning behaviour these customers have had within a same e-commerce company. To enhance customer value, it is important to allocate resources to encourage behaviours which create a certain experience for the customers and that will increase, in the, future the value of the relationship of the customer with the fashion e-commerce company. To be able to make the right decisions and encourage the behaviour that is more favourable for the firm, it can be very useful to observe and analyse change patterns and their effects.

Purpose, goal and RQs - The purpose of this thesis is to explore how the experience that customers gain by means of their purchasing and returning behaviour affects their profitability for the e-commerce fashion company. More specifically, how the profit per order or per period of time that this customers represent varies, depending on his previous experience. With this in mind, the goal set is to identify connections between the purchasing and returning behaviour of the customers; and the variation in the profitability of these e-commerce fashion customers. To reach this goal, the research questions considered were the following:

- How does a customer's buying and returning behaviour impact the future profitability of this customer?
- Which behaviour should be encouraged to the customers to enhance their profitability?

Focus and limitations - The scope of the project is limited to the case of a specific Swedish fashion e-commerce company, and the model was fed using data

from the purchases carried out in the Scandinavian Countries (Sweden, Norway, Denmark and Finland) during a period of one year (2009).

Methodology

The methodology followed for the present project combined the development of an algorithm to process the available raw data with a case study approach to analyse the output of this algorithm. The first stage, once the purpose of the project was defined, was to gather a theoretical knowledge that would contribute to the development of the project and its success. The next stage was to develop a conceptual model and an algorithm which would convert the raw data into a format which made it suitable for the further analysis and, at the same time, made this analysis easier. The process followed to develop this algorithm includes the steps that were developed as follows. The first step was to define the problem that was to be analysed and dealt with to then be able to establish the purpose and goal. Next, in order to be able to define the system, an exploration of the e-commerce company's web page was performed, together with a brief research in the area of e-commerce order placement and order management. After putting together the understanding of these steps, a model was created and the available data was adapted to the format required by the model. Further on, as a previous step to the final coding, a simplified version of the model was coded, without considering the feedback of the model, just to extract information from the data used as input. Seeing that the model worked correctly, the next model and code were developed; this time including in the model a feedback, where information about the previous purchases of the customers was taken into consideration to obtain the output of the model. These models where validated and verified to make sure that they behaved as expected and that this behaviour was similar way to the one from the real system.

Following the development of this model, an analysis of the data output of the model was performed. The results of the analysis were then used to assess the defined research questions. To answer these research questions, information about customer retention and evolution over time of the profit per order depending on previous purchasing and returning experience of the customers had to be obtained.

Frame of Reference

In this part of the text, theoretical knowledge about the most relevant topics for this thesis was gathered. These topics included e-commerce, customer behaviour

and segmentation, and Supply Chain Management, including a subpart on Customer Relationship Management.

Data and Data collection

The raw data used as input to the developed model consisted in the order lines received by the e-commerce company over the period of one year. This data was extracted directly from the ERP of the e-commerce company. When modified by the developed algorithm, the data consisted in a list of the orders placed, the profit for the company for each of these orders and the previous purchasing and returning behaviour of the customer who placed the order.

Analysis and Results

First a quantitative characterization of the fashion e-commerce company was developed and, following, an analysis of the data obtained from the model is performed focused on assessing the research questions. This includes an ABC analysis, a customer retention analysis and an evolution over time of the average profitability analysis.

The ABC analysis showed that there is a great difference between customers in the profitability that they contribute with. This result leads to an interesting segmentation of the customers, differentiating highly profitable customers to not profitable customers, with an intermediate group in the middle. The purpose of the next analyses performed was to understand the difference in behaviour between them to be able to enhance the profitability of the customers classified as less profitable. A further look into the behaviour of the different customers revealed that return experienced customers were more prone to placing another order; and that the returning behaviour of the first order (by it self) did not make any difference in the annual profitability of the customers.

The customer segmentation performed up until now was static and did not allow customers to move from one segment to another over the year. This didn't allow visualising properly the wanted results. For this reason, a more dynamic segmentation, that considered the previous behaviour of the customers and the evolution of their profitability per order. This segmentation was used in the last analysis to follow customers over time and relate the profitability per order with the returning behaviour of the e-commerce customers. The results of this analysis revealed, first, that orders from which a return was made contributed with a lower profit. And then, that customers who did not make returns from their first two orders where, in average, more profitable.

Conclusions

Experiencing a return during the first orders of a customer enhances this customer's confidence in the e-commerce company and increases the customer retention rate. However, customers who make returns from the first orders have higher chances of returning from the future orders they purchase and, therefore, these customers show a lower average profitability per order than those who do not return from those orders.

Concluding Remarks

From the results obtained and the discussion developed with these results, the recommendations for the fashion e-commerce firm can be summarized in the following points:

- To encourage returning behaviour in the first orders, as it will increase the number or future orders of the customers as well as the frequency of these orders.
- To dissuade returning after first orders. As it will drastically reduce the profitability per order of the customers that have a high return rates.
- To dedicate future research to find methods to encourage/dissuade returns of the customers, always improving the perception that customers have of the e-commerce firm.

Abbreviations

B2B: Business to Business

B2C: Business to Customer

C2B: Customer to Business

C2C: Customer to Customer

CRM: Customer Relationship management

DKK: Danish Crown

ERP: Enterprise Resource Planning

EUR: Euro

e-: electronic

FMCG: Fast Moving Consumer Goods

NOK: Norwegian Crown

RM: Returns Management

SCM: Supply Chain Management

SEK: Swedish Crown

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1. Introduction

This chapter constitutes a foreword of the master thesis. It defines briefly the background for the project, the company on which the study is based, the problem description and the purpose of the thesis. Following, the focus and limitations, as well as the target group are identified.

1.1. Background

The tough competition in the fashion e-commerce business as well as its fast pace require companies to improve their Supply Chain and Customer Relationship Management strategies in order adapt to their customers; their needs and their behaviour.

Understanding the behaviour of customers and acting in advance to adapt to it can result in an extremely important competitive advantage for an e-commerce company. In e-retail, returning behaviour has a great effect on the profitability and loyalty of the customers, so encouraging specific returning behaviours from them could enhance their contribution to the firm's profit. Studies like the one developed by Griffis et al (2012) show that, even though some e-commerce companies still see returns as a "necessary cost of doing business", these can actually be a very useful tool to influence customer behaviour and hence their value.

E-commerce companies' shipping and returning policies can be used by the firms to encourage or dissuade behaviours to their liking. For this reason, following the steps of previous research in the matter (Lewis, 2006; Griffis et al., 2012, Hjort et al., 2013; Lantz and Hjort, 2013 and Godsell et al., 2011), it is assumed that there is an opportunity for the companies to gain from the customers' returns and that adapting policies to behavioural patterns can positively influence customer value.

1.2. Company description

The fashion online company was founded in Sweden and at the moment belongs to a larger corporation which owns several other online stores, which sell different types of customer goods and entertainment. At the moment, this larger

corporation owns the leading e-commerce group in the Nordic countries which produced a turnover of more than 4 billion SEK during the year 2012 and had more than 2 million unique visitors in their webpages during the same year. The studied online fashion company has a target customer group of both women and men between the ages of 18 and 35; and the products sold are clothes, shoes, complements, jewellery and beauty & make-up products, from a wide variety of brands.

The company started working in Sweden in 2003 and expanded first to the Scandinavian countries during 2008 and then to the rest of Europe, including a site which offered the possibility to shop from anywhere in the European Union in 2011. The latest launch was in 2013 when a site that allowed shopping from outside the European Union was created, being able to serve customers from all around the globe.

1.3. Problem Description

E-commerce customers, change their behaviour over time. This change or evolution in behaviour is generally affected by the customers' purchasing experience as a whole, including the returns they might make. To enhance customer value, it is important to allocate resources to encourage behaviours which create a certain experience for the customers and that will increase, in the, future the value of the relationship of the customer with the fashion e-commerce company

In e-commerce, delivery and return conditions are a marketing tool for both customer retention and acquisition, so these can be used with the purpose just mentioned, since these conditions are also an important trigger in the change in the customers' behaviour. However, to be able to make the right decisions and encourage the behaviour that is more favourable for the firm, it can be very useful to observe and analyse change patterns and their effects.

1.4. Purpose, goal and Research Questions

The purpose of this thesis is to explore how the purchasing and returning behaviour of e-commerce customers affects their profitability within a fashion e-

commerce company. More specifically, what will be studied is how the profit per order and per period of time that these customers contribute with varies, depending on their previous purchasing and returning behaviour.

With this in mind, the goal set is to identify connections between the purchasing and returning behaviour of the customers; and the variation in the profitability of these e-commerce fashion customers. To reach this goal two research questions are considered:

- How does a customer's buying and returning behaviour impact the future profitability of this customer?
- Which behaviour should be encouraged to the customers to enhance their profitability?

1.5. Focus and Limitations

The scope of the project is limited to the case of a specific Swedish fashion e-commerce company, and the model was fed using data from the purchases carried out in the Scandinavian Countries (Sweden, Norway, Denmark and Finland) during a period of one year (2009).

Apart from that, from the many effects that could be studied, the model's basic output will be the profitability per order of the customer segment or costumer type, as it is expected that this output can be used to address accordingly the company delivery and return policies to the different customers.

1.6. Target Group

This thesis is a relevant study for managers of e-commerce companies, specifically for the ones at the fashion e-commerce company studied, as it can be a tool to help decision making regarding customer segmentation and delivery and return policies. It is also valuable for students or researchers in the field of e-commerce, customer segmentation and returns management.

2. Methodology

In this chapter the steps followed to carry out the project are described, specifying the different activities and the processes to accomplish them. It includes the theoretical framework and the specific steps followed in the thesis.

2.1. Project methodology

The first step taken at the beginning of the project was to define the purpose of it, to be able, then, to define the steps that had to be followed for the fulfilment of these goals. These steps were gathered in a project plan to set a time frame and an adequate order to guarantee the success of the project. To make sure that the goal and the path to follow were adequate, the project plan was discussed and approved by the thesis supervisor.

Once the project purpose was defined, the first task was to gain knowledge of the area of e-commerce, and more specifically about customer behaviour in this kind of transaction, by consulting related literature. This background research also includes topics such as customer relationship management or customer segmentation.

After the theoretical knowledge gathering, a case study approach was considered the most convenient one to achieve the purpose of this thesis. However, the raw data had to be processed through an algorithm, in a previous stage, in order for it to be suitable to be used as an input for the analysis. Since a simulation approach had been considered in the first steps of this thesis, the algorithm was developed and built following the first steps of a simulation project as it is described in the following parts and chapters of this thesis. It must be taken into account that, even thought the algorithm was developed following this approach, its output is still "real" data that is obtained by processing the available raw data, and that it is in no case obtained from running a simulation.

The model's algorithm was developed and run using Automod software, as is explained further in the following chapters. The obtained data output was then analysed using both Matlab and Microsoft Excel.

2.2. Literature Research

The literature research conducted is included in the following chapter, Frame of Reference. The starting point of this literature research were three published articles: Hjort and Lantz (2012), Lantz and Hjort (2013), and Hjort et al. (2013); which use data from the purchases at a Swedish fashion e-commerce company to analyse and discuss aspects related to customer behaviour in e-commerce. And from there, the search expanded to references used in those articles and then search for specific topics through the databases Web of Science and Ebscohost.

2.3. Simulation Project Methodology

In a pre-stage of this thesis, a simulation approach was considered. For this reason, the knowledge gathered in that stage was used as a framework to develop the necessary algorithm that would provide with a data input for the case study performed. Limited historical data was used as input for the model to obtain, as an output, the profitability that each order contributed with. This output obtained from the algorithm, is re-formatted data and it has not been generated by the simulation of scenarios. The next paragraphs explain the theoretical framework followed to develop and build the algorithm

Following, a merge between the steps defined by Banks (2004) and Shannon (1998) leads to the definition of the theoretical process of a simulation project.

1. Problem definition.

The different stakeholders of the project should develop this stage together; agree and understand the statement that that defines the problem (Banks 2004).

2. Setting the objectives.

According to Banks (2004), the objectives are the questions that have to be answered by the simulation project. The correct and accurate definition of these objectives facilitates that the outcome of the project is the one desired, as “it is not productive at all to find the right solution to the wrong problem” (Musselman 1994).

3. Definition of the system.

Shannon (1998) defines this step as establishing boundaries and getting to know how the system works in order to create an abstraction or simplification of the real system, which created around objective of the simulation project.

4. Model development.

Once the system is described, the conceptual model can be represented. This model is normally comprised by a block diagram or a flow chart. The different components, variables and their interactions that are part of the system should be represented in this model (Shannon 1998).

5. Data collection and preparation.

This step can start parallel to model development (Banks 2004) and consists in defining and collecting the data that in necessary to run the model and obtain a successful output from it. After the collection, the data has to be analysed and prepared to become the suitable input data for the model.

6. Model translation (coding).

To translate the model into the language of the simulation software that is going to be used to run the model.

7. Verification and validation of the model.

The purpose of this step is to check that the model actually behaves how it is expected and that its output is actually a close enough representation of the output that would be obtained from the real system (Shannon 1998).

8. Design of the experiments and experimentation.

The whole purpose of the simulation is to be able to extract the information to be able answer the questions set in the objectives. To be able to answer the questions accurately, the experiments that have to be run in the model have to be conveniently designed. This is the selection of the possible scenarios, timeline frame, or the number of runs that should be performed. With the selection made, the model is run and the wanted information extracted to be analysed.

9. Analysis and interpretation of the results.

The information and results extracted from the experimentation is analysed and interpreted to answer the questions established in the first steps of the project.

10. Documentation.

This step is very useful in case the model has to be used again, as it explains how the model operates (Banks 2004). At the same time the documentation includes a report of the results and findings obtained from the simulation project (Shannon 1998).

For the development of the algorithm, the steps followed correspond to the initial steps described in the above paragraphs. These steps were developed as follows. The first step was to define the problem that was to be analysed and dealt with to then be able to establish the purpose and goal. Next, in order to be able to define the system, an exploration of the e-commerce company's web page was performed, together with a brief research in the area of e-commerce order placement and order management. After putting together the understanding of these steps, a model was created and the available data was adapted to the format required by the model. Further on, as a previous step to the final coding, a simplified version of the model was coded, without considering the feedback of the model, just to extract information from the data used as input. Seeing that the model worked correctly, the next model and code were developed; this time including in the model a feedback, where information about the previous purchases of the customers was taken into consideration to obtain the output of the model. These models where validated and verified to make sure that they behaved as expected and that this behaviour was similar way to the one from the real system.

The simulation software used to build the model was AutoMod because the author was familiar with the software and the programming language and, at the same time, several licenses were available the university department where the thesis was developed.

2.3. Data

The available data, consisting on the details of each article purchased over the years 2008 and 2009 in the Scandinavian countries, was extracted from the fashion e-commerce company's ERP system and provided to the student by means the thesis supervisor.

The raw data was exported to Microsoft Access and Matlab to manipulate it and arrange the information in the adequate format to become a proper input to the model.

The data output from running the model in Automod was then analysed using Matlab and Microsoft Excel. The data analysis can be divided into two parts. The first part had the objective of getting to know the system (Number of orders, frequency, number of customers, customer segmentation…) named

characterization (7.3) and the second part had the objective of answering the research questions defined previously in the introduction, named further analysis (7.4).

2.4 Case study

Yin (2009) argues that case studies are useful in situations

"When "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context."

Making it a suitable approach for this project, as it allows obtaining a general perspective of the specific real life case and, even though it doesn't permit to generalise, it allows developing meaningful propositions, contributing to the understanding of the organisation and market of study.

The case study methodology has been assessed by multiple authors, which according to Soy (1997), propose six steps for a successful case study research:

1. Determine and define the research questions.

The first step in a case study research should correspond to establishing a well specified research focus. This can be accomplished by establishing research questions regarding the situation or problem studied and determining the purpose of the study.

2. Select the cases and determine data gathering and analysis techniques.

During this stage, the approach and the information gathering technique is selected

3. Prepare to collect the data.

Because of the large amounts of data, a systematic approach is necessary to prevent losing sight of the original purpose and q1uestions determined in the first stage.

4. Collect data in the field.

Evidence must be collected systematically and in the correct format that can be later referenced and sorted. Field notes or databases are examples of ways how data can become available for the following interpretation of the information.

5. Evaluate and analyse the data.

The labour of the researcher is to examine, interpret and evaluate raw data using analysis processes, to be able to develop theories and formulate hypothesis that will improve the knowledge of the specific area studied.

6. Prepare the report.

Presenting the results in a way that makes a complex issue is easily understandable for the reader. This will allow the reader, to when reading, question he theories and develop his or her own knowledge.

During this project, the first steps for the case study had already been developed in the initial algorithm development project. This included the project purpose and goal definitions, and data gathering. However, the research questions had to be defined at this stage, as they hadn't been defined previously. The data collection, stage, was somehow predetermined by the previous stage also, as the only available data came from the ERP system of the e-commerce company and, also, the data output from the model developed previously was the one used to be analysed; and to obtain information about customer retention and evolution over time of the profit per order depending on previous purchasing and returning experience of the customers.

3. Frame of reference

In this chapter the background research is developed, putting together a literature review of the most relevant topics for this thesis: e-commerce, customer behaviour and segmentation, and Supply Chain Management, including a subpart on Customer Relationship Management.

3.1. E-commerce

3.1.1. Definition of E-commerce

It is troublesome to find a unanimous definition for e-commerce, as different sources express in their own words what the term connotes and the multiple explanations vary over time and depending which area the author is more familiar with. However, many terms are mentioned repeatedly, like "commercial", "business", "transaction", "activities", "networks", "internet", "computer", "goods", "services", "sell", "purchase" "data transmission", and "data processing". (OECD 1997, EITO 1997, Garrett and Skevington 1999, European Commission 1997, Kline and Barlow 2008). Two quotes that can exemplify the evolution of the term:

"Electronic commerce (E-commerce) is sharing business information, maintaining business relationships, and conducting business transactions by means of telecommunication networks" (Zwass 1996)

"Electronic commerce or ecommerce is a term for any type of business, or commercial transaction that involves the transfer of information across the Internet." (Sattar 2013).

3.1.2. E-commerce business models

Abdollahi and Leimstoll (2011) address the issue of classifying the different business models that can be found in e-commerce, identifying nine main types. The criteria (and sub-criteria) used by the authors for the classification are the traded item (service/immaterial, good or supplementary product), the ownership (production, content or intermediation) and the way of obtaining revenue (direct, commission or subscription fee). Another way of classifying e-commerce business is depending of the parts that take part in the transaction, which are basically businesses and customers. This leads to four possible combinations B2B, B2C, C2C and C2B.

The specific case of study of this master thesis is a fashion e-commerce company which can be classified as a B2C commercialising goods from a selection of brands and which obtains a direct revenue from its sales. This type of e-commerce has its supply chain design focus on the sourcing and delivery of finished goods (Hjort et al. 2013). Due to the nature of this business, different e-commerce companies are in close competition for the same market, making the return and delivery conditions one of the main competitive edges.

The return and delivery fees have, according to Lewis (2006), a significant impact in the behaviour of the e-commerce customers. The same author explains how the profitability of an e-commerce company can be affected by this and especially by the relationship between the shipping fees charged to the customers and real costs of these.

3.1.3 E-commerce in the Scandinavian Countries

The population of the Nordic region have similar tastes and behaviours, and for that reason, e-commerce companies which operate in one of the Scandinavian countries, find it favourable to expand to the neighbouring countries and begin this way their international growth (Postnord 2014).

According to Emota's 2013/2014 report, the Scandinavian countries count for a 33 per cent of the European e-commerce turnover and it grew a 13% over the year 2013. And reports from logistics providers like Postnord (2014) and Bring (2014) show in their studies that a 29 per cent of the Scandinavian population makes at least a purchase online every month.

When it comes to clothing and shoes, in Norway and Sweden the most common is that customers pick up their orders themselves from a pick up point, whereas in Denmark, the orders are most commonly delivered to the door of the customer (Bring 2014). The distribution of the orders if generally outsourced to a logistics provider, for any of the pick op or delivery choices. In Scandinavia, the most common logistics providers used by e-commerce companies are Bring, Postnord, DB Schenker, and UPS.

3.2. Customer Behaviour and segmentation

Customer behaviour impacts greatly the profitability of the business of fashion retail e-commerce. Furthermore, as Hjort et al. (2013) explain, this behaviour is

not homogenous, making the approach "one size fits all" not suitable for the design of the supply chain. Godsell et al. (2011) agree on that statement and add that it makes sense to adjust supply chain strategies to the different customer groups and their requirements.

E-commerce companies are easily able to collect data of their customers and their purchases which allows them to use that information to classify the customers. Some studies that have analysed behaviour of e-commerce customers and segmentation criteria have suggested parameters such as age, gender, income, occupation, region of residence, education or international background (Bhatnagar and Ghose 2004, Shiu and Dawson 2010) as segmentation criteria. Hjort et al. (2013), on the other hand, suggest analysing this data on the purchases and returns to extract useful information and use it for customer segmentation. For the study of this thesis, the chosen criteria to segment the customers is this last one, as the information available is the one provided by the e-commerce company and it is limited to the purchases done by "customer numbers".

Studies have proven that customer behaviour is influenced by the delivery and return conditions established by the retail companies (Ericsson 2011). Additionally, according to Griffis et al. (2012) and Hernández et al. (2010) in their studies, the behaviour of the e-commerce customers changes over time as their purchasing experience conditions their future purchases. Giffis et al. (2012) conclude from their study that returns-experienced customers purchase more frequently, and in higher amounts, having a higher relationship value for the e-commerce retail company. This is possibly explained by an increase of the confidence that the customers experience after having positive results from the purchasing and returning process.

Being able to identify the behaviour of customers and segment them is beneficial for e-commerce companies as it can lead to an individualised approach of customer relationship management (CRM) allowing them to save resources or to conveniently redistribute them.. The criterion that companies are most interested in is how profitable a customer or customer segment is. Once the customers are segmented and the profitability of the different groups is analysed, as Libai et al. (2002) explain, firms can focus their resources in marketing strategies for the more profitable customers and utilise less in the least profitable segments. To conclude in encouraging purchases from profitable customers and, at least, not encouraging not profitable customers to purchase.

3.3. Supply Chain Management

The Council of Supply Chain Management Professionals (CSCMP) defines SCM the following way:

"Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies."(Gibson et al., 2005).

SCM faces the challenge of having to manage independent actors which work in multiple layers of the supply chain, sometimes running all the way between the raw material to the end customer, passing through different tiers of suppliers and distributors.

At present product lifecycles are getting shorter and that is increasing how challenging it is becoming to do a good job. Shorter lifecycles increase the risk of obsolescence and make demand more uncertain and volatile (Norrman 2013).

Still, SCM specialist still have to deal with the traditional Supply Chain challenges, such as reducing Lead Times, costs and tied-up capital. For this reason it is fundamental that resources are allocated effectively and coordinated in a right manner to be able to obtain the maximum out of them.

There are fundamentally three flows at which SCM is dedicated: goods or services, information and cash. This flows must progress throw the different of the supply chain. This seen from a process perspective is illustrated in Figure 1.

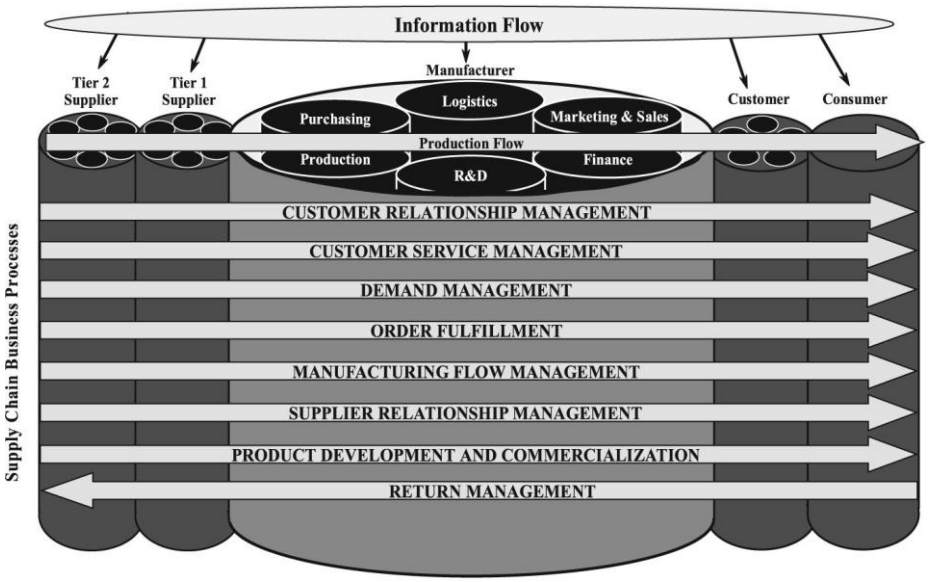

Figure 1 - SCM from a process perspective. Source: Cooper et al. (1997)

Two of the processes of SCM described by Cooper et al. (1997) which are critical in the e-commerce business are CRM and RM. For this reason they are briefly described in the following paragraphs.

3.3.1. Customer Relationship Management

CRM is a business strategy which aims to maximize customer value by understanding and influencing customer behaviour by integrating the supply chain functions of the organisation, marketing, sales and customer service. (Ngai et. al, 2009). It is one of the fundamental parts of supply chain strategy as, by managing the relationships of companies with their customers, their value for the company can be enhanced (Reinartz et. al, 2001). Payne and Frow (2005), argue that the term CRM is used more commonly in the technology solutions context and that the term "relationship marketing" can be also used to describe this topic.

Some of the topics typically addressed by this area of the business are the connection between the companies' performance and customer satisfaction, customer loyalty programs, or the relationship between customer loyalty and their profitability (Reinartz et al., 2004). However, the way companies understand the implementation of CRM may vary significantly. Payne and Frow (2005), set the example that, for some companies, CRM included a help desk or customer service while, for others, it was more related to creating a loyalty card scheme or a database where information about the customers was kept. All in all, it can help the organisations to allocate their resources more effectively, focusing on the customers that result more profitable (Ngai et al., 2009).

One of the latest trends is that companies are starting to implement a segment-based approach, using models that are updated with customer specific data, which allows the firms to save money, investing in the customers that are profitable and, therefore, interesting for the company (Libai et al., 2002)

3.4.1 CRM in e-commerce

To demonstrate the importance of e-CRM, already in 2002 it was estimated that 45 per cent of e-commerce companies were using CRM applications and that 37 per cent had those applications in the implementation or planning stages (Feinberg and Kadam, 2002). E-retailers are situated at the closest end of the supply chain from the customers and from their sites is where the customers make their purchase. For this reason, they should be ahead of other industries in the understanding and implementation of CRM (Feinberg and Kadam, 2002).

One key aspect that e-retailers have to deal with is returns. Returns are understood as the reverse flow of goods in the supply chain, in the case of a B2C e-commerce company, this would be the flow of articles from the customers back to the company.

This issue can impact customer loyalty and their shopping behaviour (Griffis et al., 2012). Returns management (RM) are a meaningful part of selling products online, as the returning behaviour of the customers, if not matched with a suitable delivery and return strategy, can affect the company's profitability (Hjort et al., 2013). For this reason, policies adopted by e-commerce companies regarding which part takes care of the costs of the returns can have a big impact on the companies' business. Customers appreciate free returns and thus this policy may attract new customers, but at the same time, they must me managed correctly or they could entail excessive costs for the e-commerce firm.

4. System Description

A description of the order process at the online shop is included in this chapter as well as a brief explanation of the system boundaries and how customers where segmented.

4.1. Order process at the e-commerce company

Once the customer chooses the desired article, it can be added to a virtual shopping cart; and once the customer has finished adding all the desired articled to the virtual shopping cart, he or she can start with the paying procedure. In the case of Swedish customers, if they are not previously registered, they can choose either to give their identity number and obtain automatically, their address or give the address where they want the order to be delivered. Other information that is required by the e-commerce company is the contact telephone, e-mail, the gender of the customer. The next step in the order placement is the selection of the type of shipping and paying mode desired, which leads to the final step; introducing the payment details.

At the e-commerce company once the order is placed by the customer, it is registered in the company's ERP system and the company's warehouse which is closest to the customer is notified of the order. After this, the corresponding picking, packing and shipping procedures follow.

Up until the moment when the order is shipped is what could be considered the first sub-process of this whole purchasing process. The second sub-process starts when the buyer receives or picks up the order. It is just at this point where the customer decides if the products that form the order satisfy the expectations and if he or she wants to exercise the right to return one or more of the articles purchased.

In the case where the customer decides to return any of the articles, or if the order is not even collected from the pick-up point, a return is processed. The type of return will condition which one of the parts will pay for the costs of the returns. The three main possible types of returns are a change for a different size of the same article or the exact same article, because the article was damaged, for example; a return where the customer just wants to get the money back, as he or she no longer want to purchase the article, or the customer directly doesn't pick up the purchased articles from the pick-up point.

4.2 Boundaries

For this project and especially for the model, the interesting part of the process is the information flow, which identifies article by article every purchase. Therefore, the boundaries are set around this information. Every article sold belongs to a specific order and it is purchased for a certain price, by a numbered customer on a determined date. It will not be of interest for the study information regarding addresses of customers, or time from order placement to delivery, for example.

4.3. Customer segmentation

Regarding this study, in order to identify how purchasing and returning behaviour influences the profitability of orders, the e-commerce customers are segmented depending of their previous experience with the fashion e-commerce company. Apart from this segmentation, which takes into account how many times has a customer purchased and returned, another classification is used, taking into account how profitable customers are to the e-commerce company. In other words, the first segmentation is done according to the number of orders the customers have placed and the number of returns they have made, while the second segmentation is done according to how much profit they contributed with to the e-commerce company during the year 2009.

5. Data Collection

This chapter includes an explanation of the raw data available as well as the necessary assumptions that were made in order to obtain an adequate input for the model.

5.1. Raw Data

The raw data was supplied to the author of this thesis by the supervisor and it was directly obtained from the fashion e-commerce company's ERP system. The data was collected automatically from each article purchased at the e-commerce company's website. The data was only modified for privacy issues, deleting customer private information before being provided to the author.

This data consists of order lines - one row per article ordered- and the following information for each line:

- Order date

The date in which the order was placed by the customer on the webpage. The data doesn't include the time at which the order was placed, so it has the following format: yyyy-mm-dd 00:00:00.

- Invoice date

At the moment of the picking and packing, an invoice for the order is issued by the company, and the date when this invoice is issued is also registered in the ERP system. It has the same format as the order date, as the time is not available for this field either.

- Purchase price

The amount due to be paid for the article by the customer in the currency of the country where the customer is purchasing from

- Currency

Defines in which currency the price was paid by the customer. The options in 2009, when the company operated in 4 different markets were (SEK, DKK, NOK and EUR)

- Customer number

The first time a customer makes a purchase, or registers at the e-commerce company's webpage, an identification number is assigned to him or her. This number is only for internal use, in the company's ERP system. In the data available for this project, the format is a number between 1 and 398312, without

this meaning that all the customer numbers appear in the data used for this thesis (only data from the purchases in 2009).

- Market (Country)

In the year 2009 the e-commerce company was operating in four different countries (or markets): Sweden, Denmark, Norway and Sweden. In the data, a number from one to four is assigned to each one of the markets to identify them. This can be very useful to do studies separating the customers by markets.

- Order number

Each order is identified with a ten digit number, which is both used internally for the ERP system and by the customer so that in case of any trouble, the support services easily track the order.

- Invoice number

This is again a ten digit number, which is used internally for the accounting of the e-commerce company.

- Article number

Each unique article sold by the fashion e-commerce company is identified by a six digit number. This number is again only used internally for inventory purposes.

- Type of article

Articles are classified into groups for internal purposes. The group is identified by a number between 1 – 50 and 800 – 854.

- Size of the article

Being a fashion e-commerce company means that most of the products come in different sizes, and when an article is purchased it is essential to deliver the correct size. Therefore, the size of the articles is also registered when the order is placed.

- Number of articles

It is possible that a customer wants to order more than one unit of one of the articles purchased. For this reason, instead of registering, for example, twice the same product, the product is only registered once, adding the information of the amount of units purchased.

- Price paid by customer in local currency

Since the company operates indifferent markets with different currencies, and the relation between the currencies can change, the information regarding the amount paid by the customer in SEK is stored in the ERP system for accounting purposes.

- Local currency

Indicates which is the local currency of the company is, to which the paid amount by the customer has been converted in the previous field (Price paid by customer in local currency). In the data used, the local currency is en every case Swedish Crowns.

- Cost of the article for the e-commerce company in SEK

Is the amount that the fashion e-commerce company has had to pay the supplier of the article for said article.

- Article was returned or not

A binary variable that indicates with a one that the product has been returned, exchanged or not picked up, and with a zero that the customer received the article and decided to keep it.

- Return date

If the product was returned, the date of the return is indicated in the format: yyyy-mm-dd 00:00:00. If the product was not returned the following date appears in the correspondent field: 0001-01-01 00:00:00.

- Return type

If the product was returned, there could be several types of return. The product can be returned; changed for a different size or because it had a defect; or the product was never picked up by the buyer from the pick-up point.

5.2. Unavailable Data and Assumptions

The data specifying if the customer had purchased before the year 2008 or not was not available and, due to the importance that is given to the purchasing experience of the customers, the following assumption is made: Customers that did not place an order during the year 2008 are considered as new customers when they purchase in the year 2009. This is considered due to the fact that it is unlikely that a customer will remain inactive during a whole year. However, this assumption brings along another one; customer's experience in other e-commerce purchases doesn't affect their behaviour towards the fashion e-commerce company studied in this thesis. Meaning this that it is assumed that the customer purchases exclusively at the studied company or is not influenced by other previous e-commerce purchases at other online stores

Another assumption that had to be made when developing the model was that the picking and packing costs where an average of 8,33 SEK for each article of an order. The cost of handling and unpacking an incoming product (from a return or a change) was considered to be the same and, in the case of a change, the cost would have to be counted twice, once for the incoming product and another one when shipping the new product.

Another aspect to mention in this part of this document is that during the conducted study, no difference has been made between the data originated from the different countries. All the data has been treated and analysed independently which market originated it.

5.3. Model Input

From the raw data obtained from the fashion e-commerce company, the data used as input for the model is the following

- Order date
- Customer number
- Price paid by customer (in SEK)
- Price paid by the e-commerce company (in SEK)
- Binary parameter that establishes if the article was returned or not
- Type of return
- Order number (The actual data used was the invoice number, as it represented the different orders more accurately, due to a change in the order number coding during the expansion of the company to new European markets.)

6. Modelling

In this chapter the system's model is developed and described. First the input and obtained output are described, following by the two models developed and their validation and verification.

6.1. Input and output of the system

Modelling consists on representing the system describing it conceptually, by means of a flow chart or a block diagram. The model can be considered as a "black box" that provides with a desired output when the right input is used. In this project the input of the model, named in Figure 2 "customer behaviour", refers to the attributes of every article ordered and, in the model with feedback regarding customer segmentation, the previous purchasing and returning experience of the customer. The output, named "effects", is data regarding the profit the e-commerce company obtains from each order placed and, in the model with feedback regarding customer segmentation, an update on the experience of the customer. The input and the desired output of the system where defined with help of the literature review

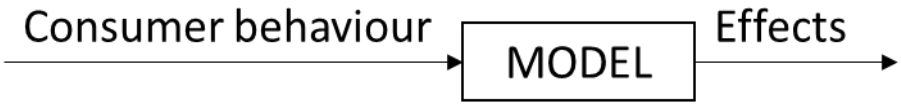

Figure 2 - Input/output of the model.

6.2. First Model

In the process of developing the model, first, a simplified version of the model was developed. This model did not include information regarding the customer segment or, in other words, the previous purchasing or returning experience of the customer. The model that can be seen in Figure 3 gives an output where all the articles which belong to the same order are summed up together and the total

profit for each order is then calculated. Taking into account if any of the articles from the order where returned.

After, this model was coded, in the AutoMod language and debugged. Once the model was working, it was run and then checked to make sure that it was working as it was expected and that the output was the result of the profit that the e-commerce company would obtain for each order. This verification and validation of the model was performed by choosing several critical and then random orders and calculating manually the profit they contributed with. This way, using the order number, the model was proved to work as expected and to give a correct output.

6.3. Second Model

Once the simplified model was fully developed and working correctly, de next step was implemented, adding a feedback to the model with the data about the previous purchases and returns of the customer, as it can be seen in Figure 4. In this model, when an article corresponding to a new order is read from the database, the information about the customer is also obtained, from a database created by the model itself. So, in order for this to work correctly, when the model reads the last article from an order, before starting to process a new order, it must update the database with the new information of the customer's experience. This means that if the customer has returned any of the articles of the order, the model will add one to the number of times that the customer has done a return, and independently of the returns, the model will also add one to the number of orders the customer has placed at the fashion e-commerce company. Basically, the second model was a development of the first one and that added information about the purchasing and returning experience of the customers.

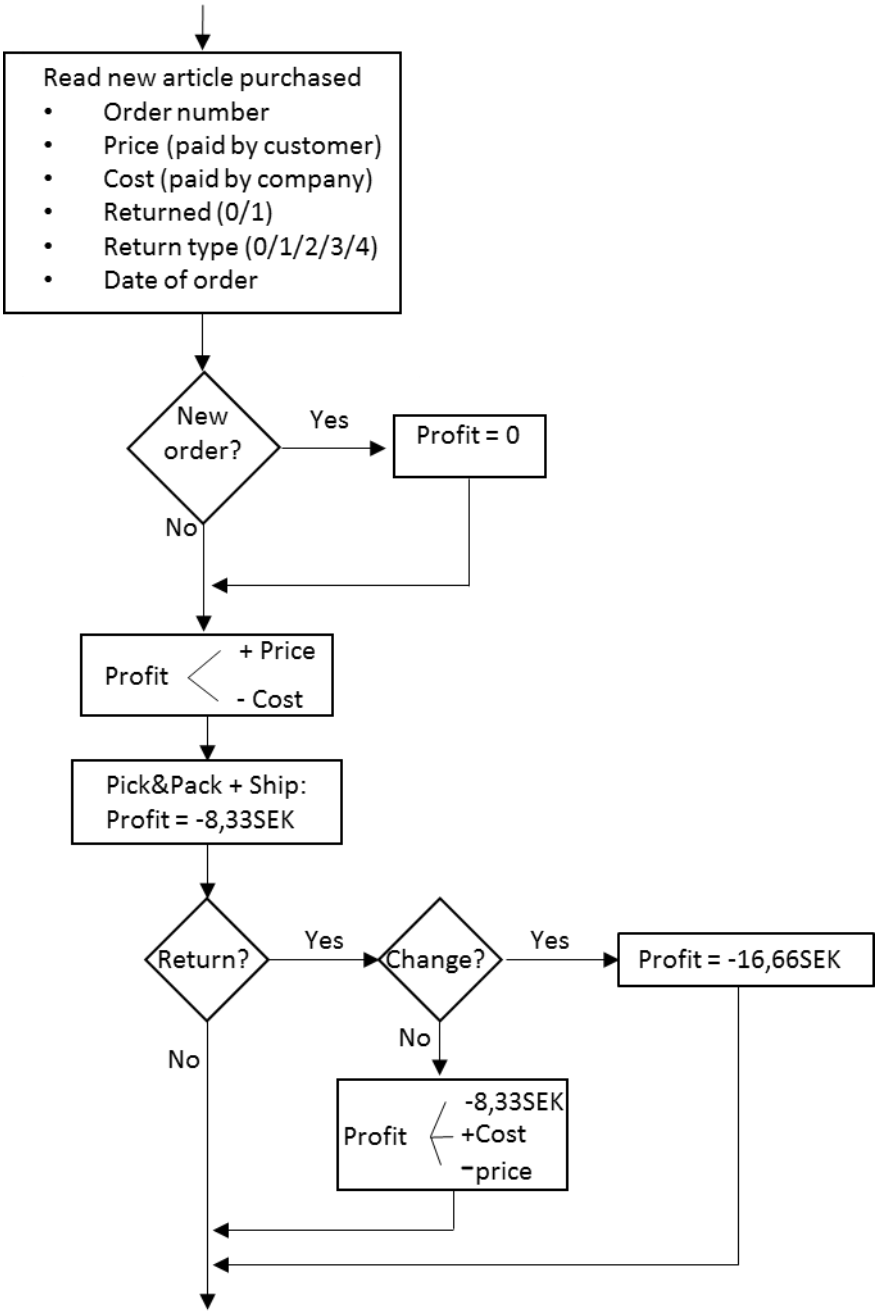

Figure 3 - Model of the system without feedback of customer information.

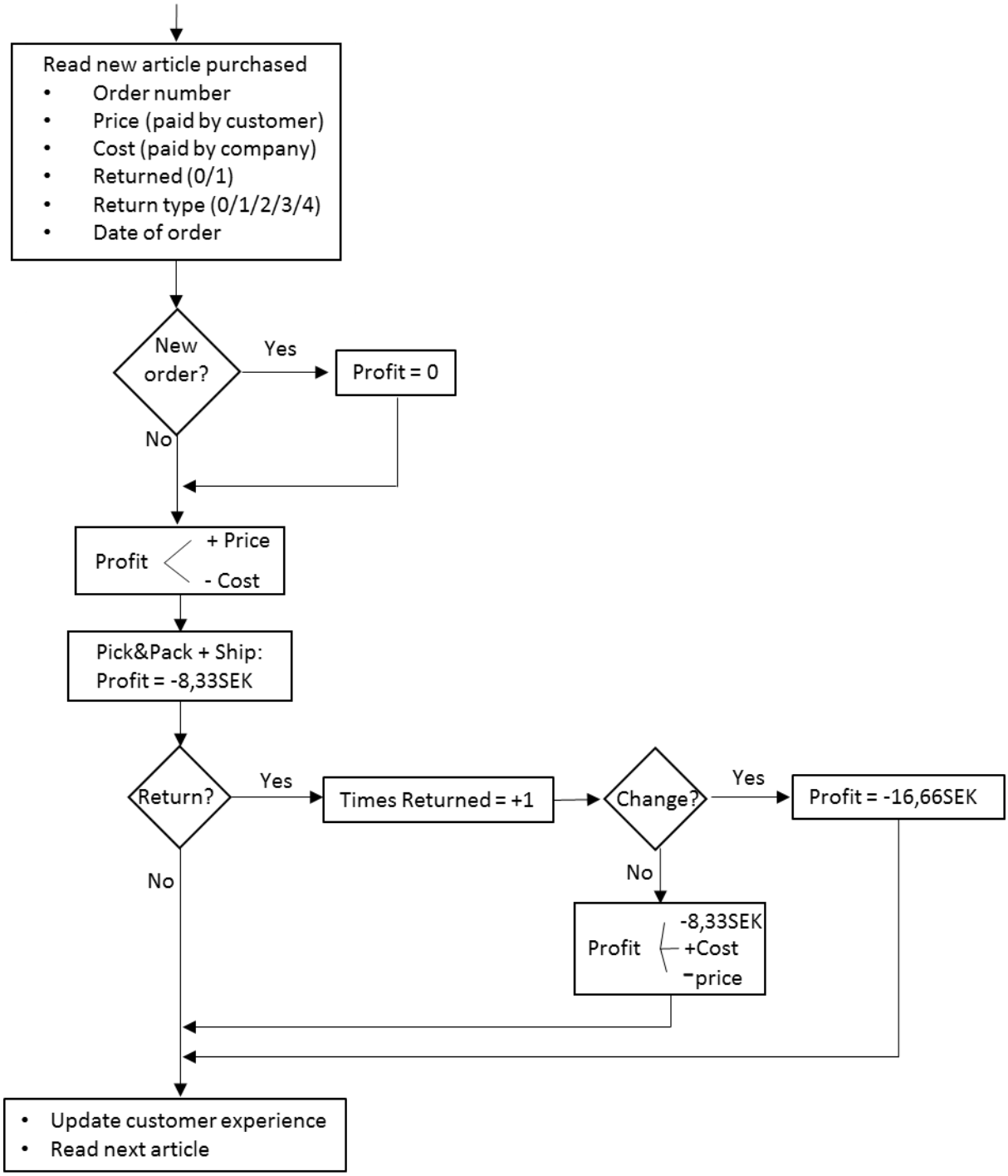

Figure 4 - Model of the system with feedback of customer information.

6.4. Verification and Validation of the final model.

A great importance was given to this step to ensure that the model was working as intended. Continuous checks and changes were performed on the model when it was observed that it didn't follow the conceptual model correctly. Since the final model (seen in Figure 4) was a development of the simplified model (seen in Figure 3), the first part of the validation, is exactly the same as for the previous model. By choosing critical and then random orders and checking manually the profit for the e-commerce company and comparing them to the systems output. The second part of the validation was to follow manually some customers over the whole year to check that the output and feedback of the model was correct during the whole process. This was possible thanks to that every update of the customer's purchasing and returning experience is recorded in a text file while the model is running.

7. Analysis

In this chapter, first a quantitative characterization of the fashion e-commerce company is developed and, following, an analysis of the data obtained from the model is performed focused on assessing the research question defined in part 1.4. This includes an ABC analysis, a customer retention analysis and an evolution over time of the average profitability analysis.

From the possible measurements that can be made to analyse the company's relationship with their customers, the chosen ones for the analysis performed in this chapter are customer retention and average profitability per order.

The whole analysis is performed in the basis that customers' experience modifies the customer's future behaviour and therefore is a very relevant factor in the analysis. In the analysis, the customer's experience is measured in times that the customer has purchased or placed an order with the e-commerce company and the times the customer has made a return from these orders.

Customers that contribute with a larger profit for the company are considered to be the most important. It is therefore interesting for the company to invest resources or adapt policies for the satisfaction of the customer segments that represent the most profit, or to move customers from other segments to more profitable segments.

7.1. Characterization

A quantitative characterization of the fashion company was performed with the objective of gaining understanding of the size of the business, and obtaining some perspective of the numbers that were used in the further analysis. To get to know the system better, the number of orders, the size of them, the frequency of the orders, or the number of customers, for example, where calculated.

During the years 2008 and 2009, the fashion e-commerce online store received 508273 orders, and sold 1234827 articles (2,43 articles per order in average). Of these articles, 988327 were sold in 2009, distributed in 401550 orders (2,46 articles per order in average). The big increase in sales for the year 2009 has to do with the expansion of the company, as the data of 2009 includes de sales of all the Scandinavian countries while the data of 2008 only includes the sales from Sweden, as well as a growth of the sales in Sweden.

But, since the study of this thesis focuses on the year 2009 and on customers who had never purchased before at the specific e-commerce business, a narrowed and more complete quantitative study was performed with only that set of data.

In the year 2009, the company received 337216 orders from 181619 unique customers (1,86 orders per customer per year in average) who had no previous purchasing experience at this web site. From the total of these customers, a 30% returned at least one article over the year 2009, and a 29% of the customers returned at least one article from their first order they purchased. Out of all the orders placed over 2009, an 84% where placed by this group of customers, who had no previous purchasing experience at this web site at the beginning of the year. The total yearly profit from the new customers was 120994673 SEK allowing calculating the average yearly profit form this customer group which was 666 SEK per customer in 2009 and the average profit per order which was 359 SEK.

7.2. Further Analysis

7.2.1. ABC Analysis

A first step for the analysis is to categorise which customers contribute with a larger profit for the company. To establish this ranking of the most important customers an ABC analysis was performed. This study classifies the customers in three segments in order of importance – or profit they contributed with over one year- being the A customers the most profitable ones. The chosen distribution for the ABC analysis was 60-30-10. This means that the customers in group A represent a sixty percent of the profit obtained by the company over the year 2009, the customers in group B the following thirty percent and the customers in group C, the remaining ten percent.

The process followed to create the classification included five steps. First all the customers where ordered by descending order of profit that they contributed with during the year 2009. Second, the percentage of the total profit with which each one of the customers had contributed over the year was calculated. Third, a cumulative sum of the profit of every customer was done, starting from the customer who contributed with the biggest profit, down to the customer which caused the biggest loss. Fourth, the customers where classified into the three classes defined in the previous paragraph. And fifth and last, a diagram that can

be seen in Figure 5 was plotted to help visualise the groups of customers. In Table 1 and Figure 5 the results of this analysis are displayed.

Table 1 - ABC Analysis

% Profit	Customer Type	Number of customers	% of Customers	Profit(SEK)	Individual annual profit
60%	A	34034	19%	72596804,4	53335 to 980
30%	B	62381	34%	36298216,4	980 to 340
10%	C	85204	47%	12099652,3	340 to -16120
total		181619	100%	120994673,1	-

The results of the ABC analysis, displayed in Table 1, show that only a 19% percent of the customers contribute already with a 60% percent of the total annual profit of the e-commerce business, and, what is even more significant, that 90% of the annual profit is brought in by a 53% of the customers. This means that the company's business is running nearly entirely thanks to half of the customers that make use of its services. It is, therefore, very interesting to analyse the behaviour of this groups of customers, as they should be the most important customers for the business. Increasing the detail of the classification of the customers, it was also observed that a 10% of the annual profit was produced by only the 0,9% of the customers that contributed with most annual profit (more than 5000SEK over the year). At the same time, the 30% of customers that produced less profit for the company, contributed with only 2,5% of the total annual profit of the fashion business.

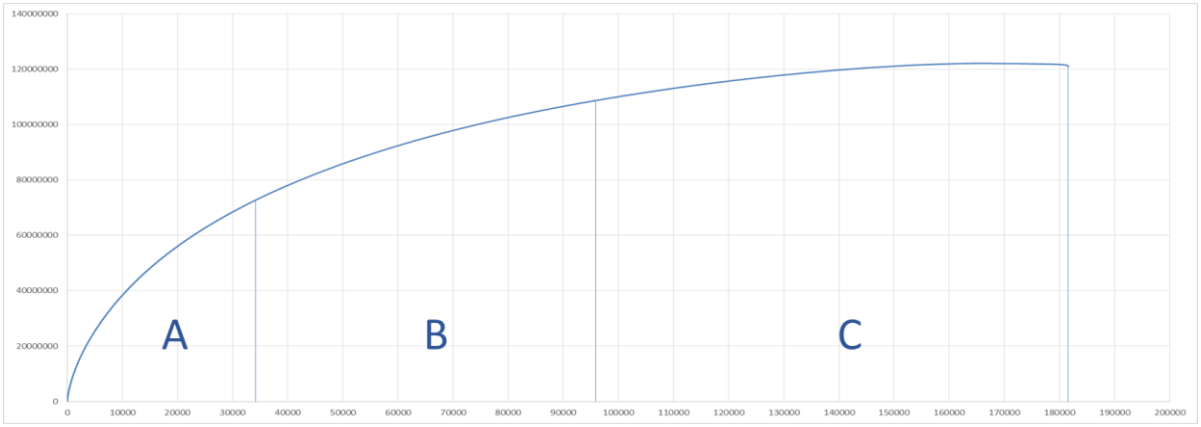

Figure 5 - Graph showing the cumulative sum of the annual profit. It displays the number of cutomers on the horizontal axis and the profit in SEK in the vertical axis.

Using the results of the ABC analysis, a study of the characteristics that differentiated the behaviour of the customers who contributed with the most profit from the ones that contributed with the least was conducted. From this analysis it was observed that customers from different segments behaved similarly in their first purchase regarding the returns. As it can be observed in Figure 6, during their first purchase, the same percentage of customers from group A and C returned at least one article in their first purchase (b1r1: buy one, return one / b1r0: buy one, return zero). A possible explanation to these results could be that customers who only placed one order during 2009 and actually returned a part of that order, tend to be part of customer group C.

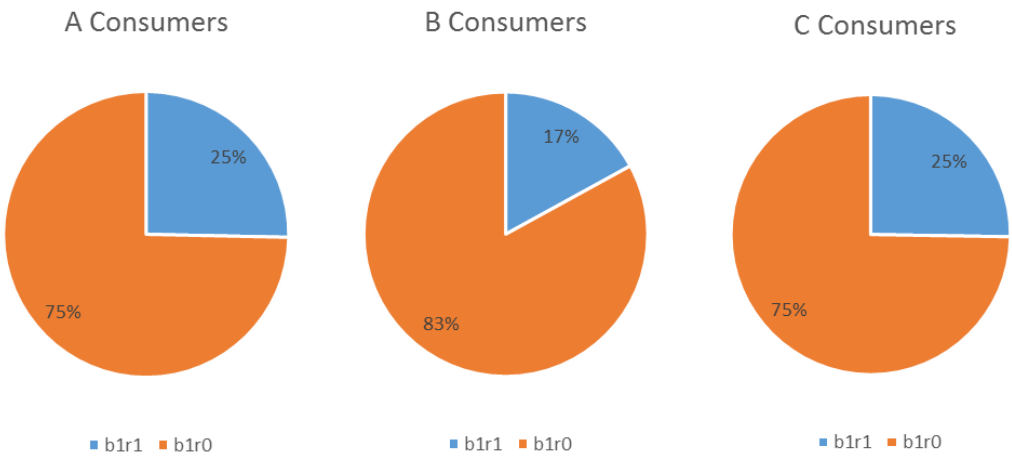

Figure 6 - Percentage of customers who returned at least one article on their first purchase.

In a further analysis, seen in Figure 7, customers from group A, who have contributed with a higher annual profit, as it would seem reasonable, have placed a higher number of orders. This would mean that, a part from encouraging customers to purchase larger orders (in value), it is also profitable for the fashion e-commerce business to enhance customer retention and therefore the times and frequency that the customers place orders. In other words, it has been seen when the number of orders placed by a customer increases, so does the profit with which this customer contributes. The numbers between the customer groups differ significantly, as it can be observed in Figure 7, less than half of the customers in group B and only a 15% of the customers from group C placed two orders or more, while this number is significantly higher (80%) in the case of customers from group A.

In the following sub-section of this report, a study of the relation between customer retention and the returning and purchasing behaviour of the customers is conducted.

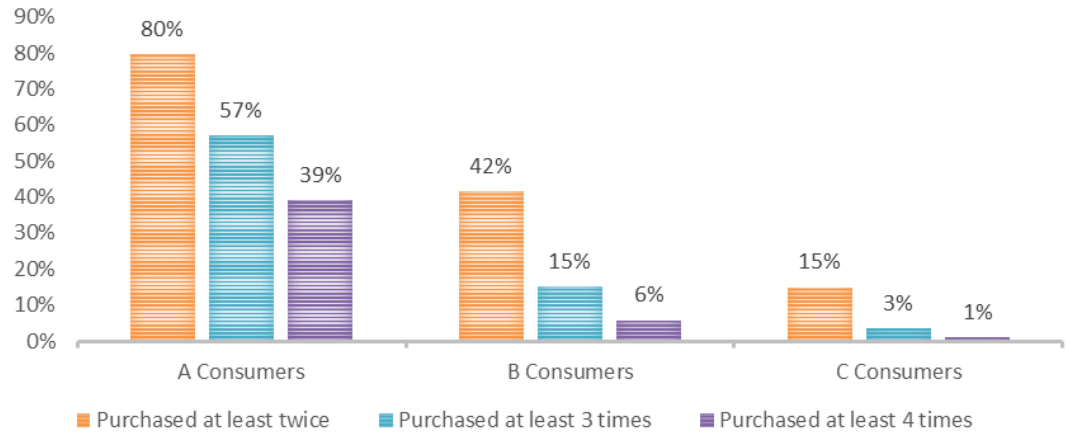

Figure 7 - Distribution of customers according to the number of annual orders placed and the ABC classification.

7.2.2. Customer Retention

With the results observed in the ABC analysis from the previous section in mind, a customer retention analysis was performed to dig deeper and complement them. Since customers, who contributed with a higher annual profit where seen to place a higher amount of orders. The retention rate in this study refers to the percentage of customers that, after purchasing at the online store, came back to purchase again after a certain time, therefore being retained between these two orders as customers of the fashion e-commerce firm.

The analysis of this section has the objective of evaluating if the purchasing and returning decisions made by customers during an order, had any impact in their future decisions or behaviour.

A summary of this study can be seen in Figure 8, where a b stands for “buy” and an r stands for “return”. So b1r1, like explained previously for Figure 6, stands for “bought once and returned at least one article from that order”, while b1r0, would mean “bought once but hasn’t returned any article yet”; a better explanation of this can be read in Table 2.

Table 2 – Explanation of the abbreviations used in the following figures.

In Figure 8	Explanation
from b1r0	From the first purchase, no article was returned.
from b1r1	From the first purchase, at least one article was returned.
from b1r0 & b2r0	No articles were returned from the two first orders.
from b1r0 & b2r1	At least one article was returned from the second order, being this one the first returning experience.
from b1r1 & b2r1	At least one article was returned from the first order but no articles where returned from the second order.
from b1r1 & b2r2	At least one article was returned from each one of the two first orders.

The study summarised in Figure 8, shows that the returning decisions customers make, impact significantly their future behaviours. Half of the customers who from their first order decided to return at least one article, came back to place a second order during the same year, while the percentage of customers who returned to place a second at the fashion e-commerce business drops to 32% when customers didn't return any article from their first order.

When it comes to the retention rates between the second and the third order, the numbers are even clearer. The percentage of customers who placed a third order increases from 11% to 60% depending if customers don't have any returning experience or if they have returned at least an article from each one of their two first orders. In other words, what can be observed from Figure 8 is that the chances that a customer places a future order increase if he or she has acquired returning experience in previous purchases. But at the same time, customer retention drops if the customer did not return any article from the previous order, even if he or she had previous returning experience. This effect is specially observed from the evolution of the customers who returned at least an article from their first order. When it comes to placing a third order, the percentage of these customers who did so decreases from 60% to 22% depending if any article was returned from the second order. From these results it could be said that return experienced customers have higher retention rates, and that the highest impact on these customer retention rates relies on the previous purchase, and not so much on all the accumulated previous experience.

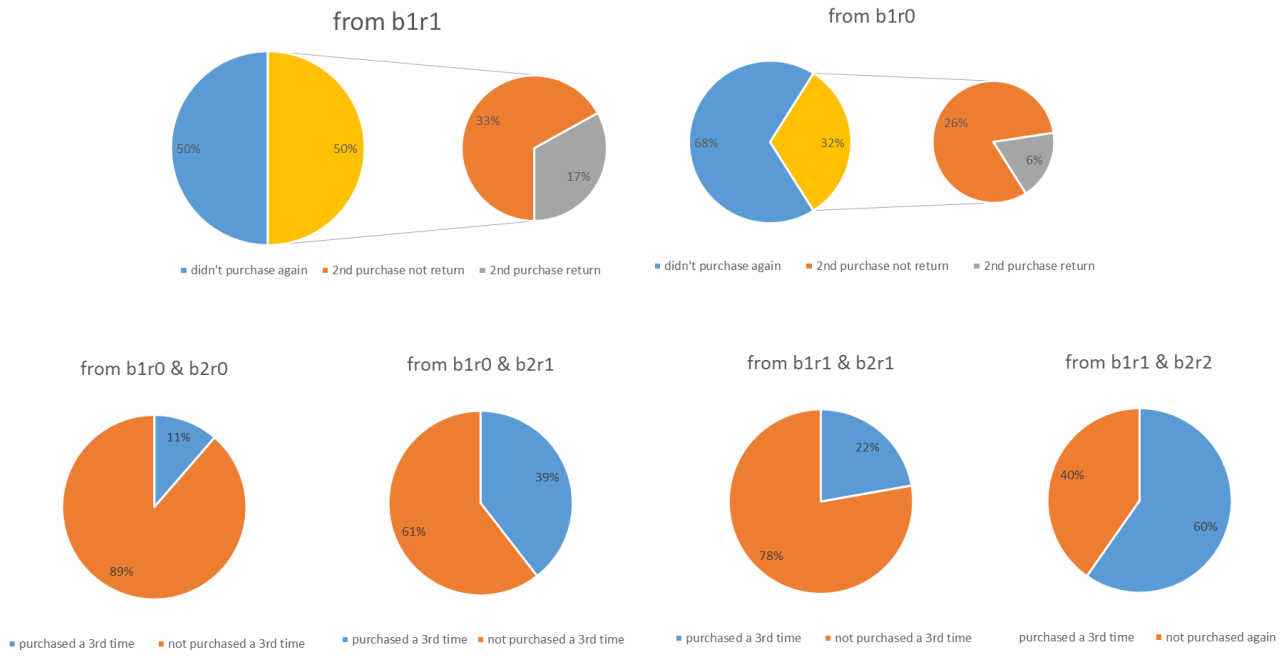

Figure 8 - Customer retention rates and the relation to purchasing and returning experience.

7.2.3. Evolution of the profitability per order

From the ABC analysis, information about annual profitability from customers has been extracted. However, to complement this information, a study about order profitability by customer segments was thought that could be very interesting.

In this part, the main purpose is to study how previous purchasing and returning experience influences how profitable a customer's orders are. This is, looking at profit per order, instead of annual profit; and instead of looking at individual customers, segmenting them depending on their previous experience with the e-commerce business and not on how profitable they are.

Parting from the results seen in the previous analyses, it seemed recommendable that customers returned from every purchase, in order to increase the customer retention. However, it is shown in Figure 9 that the average profit per order decreases order after order when customers make a return every order, from 264,75 SEK in average on the first order to 42,77 SEK in average on the tenth order. Compared to the average order profit for customers with the same purchasing experience, this numbers are even less satisfactory. The average profit per order from all "first orders", or orders placed by customers who had no

previous experience purchasing at the studiers web site, was of 365,89 SEK, more than 100SEK higher than the average of all the first orders from which at least an article was returned.

This tendency shown in Figure 9 can be explained due to the gain of confidence in the returning procedure. Some customers, seeing that the return process works, gain confidence and are less scared to purchase articles which they know have higher chances of being returned, causing this that the customer ends up returning more and that the average profit for each order decreases.

In this study, as it can be seen also in Table 3, it can be observed that orders from which at least an article has been returned contribute with a much lower profit to the e-commerce company, due to the fact that articles which are returned do not contribute to the profit of the order they are part of. So orders from which articles are returned tend to be smaller, in the sense that the customer keeps fewer products, not that they have les order lines per order.

Figure 9 - Average profit per order when at least one article is returned from every order.

To be able to observe the evolution of the customer behaviour, segmenting customers by their previous purchasing and returning experience at the online shop, it was decided to analyse the output data from the model developed in chapter 6. The data used was the order profit and it was segmented according customer behaviour, as it can be seen in Table 3. The customer behaviour for this analysis is represented by the times the customer decides to return at least one article from an order, and at this point only the first four orders. In the first column of Table, the behaviour, and now segment, of the customer is indicated. As an example, in the third row the customers who have "1-1/2-2/3-2/4-3" as a

behaviour pattern, out of the four first orders they placed, they made a return from all orders except the third one. The first number of every pair corresponds to the number of orders placed previously and the second number corresponds to the number of previous returns (including that order).

The average order profit shows again in Table 3 that orders from which a return was made generate significantly less profit for the e-commerce business. These numbers also show that the most profitable order in average was the fourth order of the customers who had been returning articles from their three first orders, and that didn't return in the fourth one. However, after the four first orders, the customers that had resulted more profitable for the e-commerce company where those who had returned the least, meaning that by looking only at the four first orders, even if experience returning improves customer's confidence, it does not pay back.

A Visual representation of Table 3 (the evolution of the average profit per order (in SEK) for the different customer segments) can be seen in Appendix 1. The customers are segmented according to their purchasing and returning behaviour during the first four orders.

Table 3 - Average order profit for each customer segment in the four first purchases in SEK.

Buy & return	first order	second order	third order	fourth order	Total
b-r: 1-1/2-2/3-3/4-4	264,7461	210,16	201,65	184,58	861,14
b-r: 1-1/2-2/3-3/4-3	264,7461	210,16	201,65	455,66	1 132,22
b-r: 1-1/2-2/3-2/4-3	264,7461	210,16	413,6	219,57	1 108,08
b-r: 1-1/2-2/3-2/4-2	264,7461	210,16	413,6	380,66	1 269,17
b-r: 1-1/2-1/3-2/4-3	264,7461	376,98	233,57	227,37	1 102,66
b-r: 1-1/2-1/3-2/4-2	264,7461	376,98	233,57	404,25	1 279,54
b-r: 1-1/2-1/3-1/4-2	264,7461	376,98	396,96	262,44	1 301,13
b-r: 1-1/2-1/3-1/4-1	264,7461	376,98	396,96	386,79	1 425,48
b-r: 1-0/2-1/3-2/4-3	395,1607	250,48	216,2	224,36	1 086,20
b-r: 1-0/2-1/3-2/4-2	395,1607	250,48	216,2	370,95	1 232,79
b-r: 1-0/2-1/3-1/4-2	395,1607	250,48	390,47	226,91	1 263,01
b-r: 1-0/2-1/3-1/4-1	395,1607	250,48	390,47	397,99	1 434,10
b-r: 1-0/2-0/3-1/4-2	395,1607	380,58	264,17	253,3	1 293,21
b-r: 1-0/2-0/3-1/4-1	395,1607	380,58	264,17	404,86	1 444,77
b-r: 1-0/2-0/3-0/4-1	395,1607	380,58	396,86	261,72	1 434,32
b-r: 1-0/2-0/3-0/4-0	395,1607	380,58	396,86	401,5	1 574,09
All behaviours	365,89	345,78	358,59	358,78	1 429,044

Since it was seen that it was necessary to explore further in time (or further in number of orders) but it was not possible to do so with this approach, due to the exponential growth in number of customer segments, it was decided, for a further analysis, to segment the customers only in their behaviour from their two first purchases, and then follow those customers until their tenth order. The results of this analysis are displayed in Figure 10. The desired outcome of this particular study was to find out if the initial experience of customers –during their first two orders- affected the profitability of the customers in their future purchases at the online shop. In addition to Figure 10, the numbers are shown in Appendix 2, complemented by the number of customers that are used to calculate each average. Here, customers that did not return any article during their first two purchases where in average more profitable in every order they placed, even if they returned from any of their future purchases at the e-commerce site. On the other hand, customers who returned at least an article from their first two orders, where in average the least profitable in every order that they purchased, even if they didn't continue to return after the two first orders. A possible reason could be that customers that have already returned from their two first orders have a higher tendency to keep returning than those who have not; and it was seen in the previous analyses that orders from which a return is made result less profitable. Both because of the returning costs and because the order will be smaller.

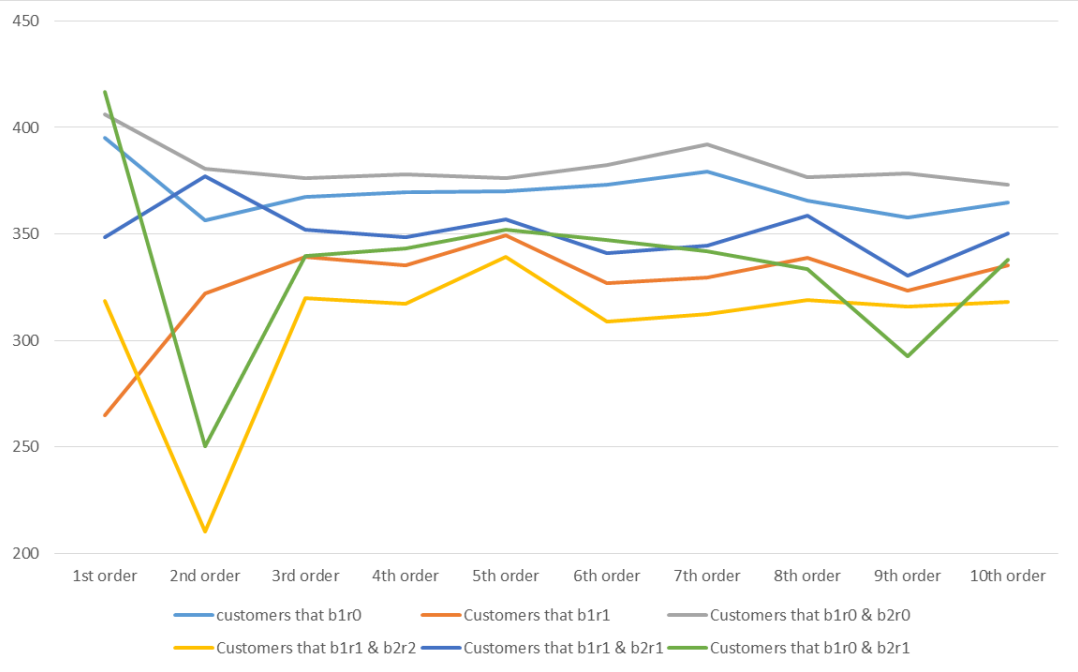

Figure 10 - Average order profit (SEK)

To isolate the tendency that customers might acquire in their first two purchases, it was decided to have a look at the change of behaviour between before any return was made and after the first return was made. In the results of this analysis, displayed in Figure 11, it can be observed that post return orders have a tendency to be more profitable in average than the ones made after the returning experience. The graph showed in Figure 11 is again a good chance to comment on the difference in average profitability between from which a return has been made and the rest of the orders. It is very easy to observe drastic decrease in average profit per order when a return is made.

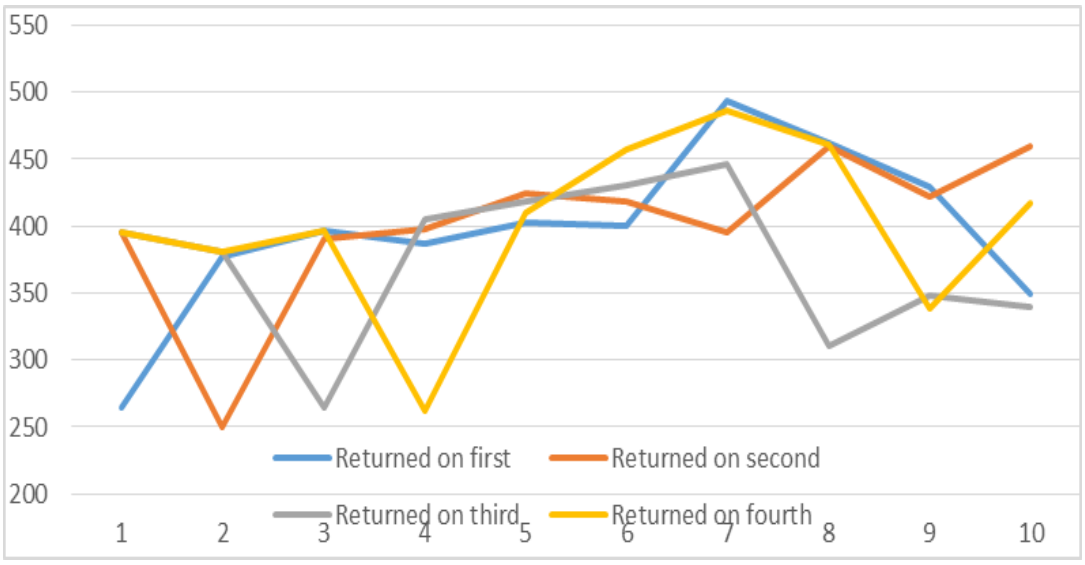

Figure 11 - Pre and post return average order profit

7.3. Analysis Summary

The first analysis, in part 7.2.1, shows that the largest amount of the profit obtained by the e-commerce firm (60% of the annual profit in 2009) was generated by a group of customers which sum up 19% of the total customers. And, on the other hand, the largest group of customers which sum up to a 47% of the total amount of customers contributed with only a 10% of the annual profit. This large difference in the profitability of the different groups of customers makes interesting to understand the difference in behaviour between them to be able to increase the profitability of the customers classified as part of group C.

As part of this ABC analysis it was also seen that the behaviour of the different customers during their first purchase was similar in the most and least profitable segments, regarding the percentage of returns. However, it was observed a large difference in the amount of orders placed by the different segments, being the number of customers from the most profitable segment who placed a large amount of orders much higher than the rest of the segments.

Seeing that it was interesting that customers purchased a high amount of times, an analysis of the customer retention was performed, seeing how returning behaviour in the first two orders affected this rate. The results of this analysis showed that customers with returning experience during their first two purchases had higher retention rates (in the third purchase) than those who didn't; or in other words, they came back to the online store to purchase again after their second order.

A last analysis aimed to follow customers over time and relate the profitability per order with the returning behaviour of the e-commerce customers. The results of this analysis revealed, first, that orders from which a return was made contributed with a lower profit. And then, that customers who did not make returns from their first two orders where, in average, more profitable.

Another aspect, that has not been commented until now, but that is worth mentioning, is the segmentation of the customers made along the different analyses. There is a notorious contrast between the segmentation developed in the first analysis (ABC) and the third one (evolution of the profitability per order). The first segmentation is static; it allows looking at the picture of the orders from one year and classifying the customers into groups. Whereas the second segmentation can be dynamic; as it allows the customers to move from one group to another according to the evolution of their behaviour, which can suffer changes over time.

8. Results and discussion

The necessary discussion of the results obtained from the analyses developed in the previous chapter is carried out in this chapter. At the end of the discussion, the research questions are assessed.

No difference was appreciated in the return behaviour of the first order between the most profitable customers and the least, classified according to the ABC analysis, against the initial expectations. To discuss this result first a few aspects that could make customers less profitable, and even not profitable at all (15774 or 9% of the customers represented a loss for the fashion e-commerce site), were pointed out and commented as follows. (To give a sense of scale, it is remembered from the ABC analysis, that customers who rank in the 47% of the least profitable are those who contributed with less than 340SEK over the year 2009.)

- Low value of order / low amount of orders during the year

Customers who have placed a low amount of orders during the year of study, and therefore show a low purchasing frequency and those orders did not have a high value

- Purchase mostly from articles on sale.

When an article on sale is sold, in many occasions, the cost of the article for the company is higher than the price paid by the customer. For this reason, the purchase by a customer of an article on sale produces a net loss for the e-commerce business.

- Return most or all of the articles ordered.

When a customer returns most (or even all) of the articles which were part of the order he or she placed, the profit of this order is reduced, as the articles returned do not count as sold and even cause a decrease in the benefit due to the extra handling and shipping costs. Many customers present a negative balance at the end of the year because they didn't keep any of the articles they purchased, even though they, in some occasions place more than one order. Especially in this last case, as studied by Hjort and Lantz (2012), the fact of retail borrowing should be considered and looked into, to understand if a fraudulent use of the return policies of the e-commerce company is being made.

- Maybe the customer will purchase with high frequency, but only became a customer at the end of the year.

Since the data available and used only included order lines from purchases from the first of January until the end of December of the year 2009, customers who, for example, purchased for the first time for the Christmas of 2009/2010, might have only one order registered in the data set, and actually become much more profitable in the following purchases.

Having in mind these aspects, the discussion of the perceived results can be developed a bit further. Customers who caused a loss or that where less profitable because many of articles that they purchased were on sale, shouldn't be considered as not profitable, as the act of buying from a sale is not one of the behaviours considered, and it actually is a positive aspect for the e-commerce firm. However, for the following two reasons it was decided to also compare customers in group A to the ones in group B, and try to understand these results as more significant than the comparison to customer group C. First, the impact of the purchase of articles on sales for this study is strictly negative, and many purchasers from segment C were sale-buyers, thus receiving a negative performance in appearance, when the real situation might be that these customers actually have a beneficial behaviour for the business. And second, customer who started purchasing near the end of the year might seem less profitable than they actually are, since the study reflects a strict time frame, it does not follow customers over a year of their purchasing experience.

In this second comparison, the percentage of customers who made a return from their first order is slightly higher in the case of the most profitable customers. This result, though expected, it is not was such a big difference as expected. Probably due to the influence of the issues just discussed. This result would be congruent with previous research in the matter like the results displayed by Griffis et al. (2012), where it is shown that return experienced customers increase order frequency, order size and average item value, and therefore result more profitable for the electronic commerce business. So the case studied in this thesis would relate to these results by showing that customers that experienced a return on their first purchase belong in a higher percentage to the most profitable customers.

What did show very clear results, as part of the ABC analysis, were the percentages of customers who had bought more than once, more than twice and more than three times. The results of this analysis showed that the most profitable customers, belonging to group A, in a higher proportion, had placed more orders during the year 2009 than the other segments, placing a 39% of them at least 4 orders and 57% at least three orders during the period of that year. Seeing that the

trend for the most valuable customers was to purchase repeatedly and, since a limited period of time is studied, with a higher frequency, it is assumed that it is very interesting for the e-commerce company to increase the number of orders placed by the customers.

The next analysis had the purpose of analysing which returning behaviours in the customers lead to a higher loyalty towards the fashion e-commerce site, and, therefore, higher customer retention. In other words, if experiencing a return procedure and seeing that it was successful increased the level of confidence from customers and this lead to them purchasing more times. The results of this analysis showed that in a higher degree, customers who had returning experience purchased subsequent times. It is very significant that only 11% of customers, who after the second order had not returned any article, purchased a third time during the period studied, showing this number a very low customer retention rate. On the other hand, customers who had returned at least an article from the immediate previous order, purchased again in at least a 39% of the cases (looking at the first thee orders). This number increases to a 60% when the buyer had made a return during from each one of the first two orders. Seeing these results, one can assume that return experiences increase the confidence of the customers, increasing this way the number of orders they place and the frequency of them, making the customers more profitable for the e-commerce business. Nonetheless, it should be kept in mind that the study was performed using data belonging to one year and did not follow customers' first year after their first purchase, in this way the numbers might vary, as customers that seemed to not have purchased again, actually did purchase after the end of the year 2009. In any case, this could happen independently for return experienced and non-return experienced customers, so the results were accepted, just keeping in mind this possibility.

In order to increase profitability of the customers, it was seen by means of the previously mentioned results that encouraging customers to become return experienced had positive effects, such as an increase in the retention rates and in the profitability if these customers.. However, an excess of returns was seen to lead to low and decreasing profitability of customers over time. Customers who returned at least an article from every order were seen to decrease their average profitability per order, order after order. Reaching a point, at the tenth order where the average profitability per order reaches a value of less than 50 SEK. For this reason, it is identified as not appropriate to encourage customers to return as much as possible.

To be able to observe the evolution of the profitability, and the impact the returning behaviour s had on this profitability, the analysis shown in Table 3 was developed. The results of this analysis showed that from all the customer

behaviour the most profitable after four orders was the one where no returns were made. But this is due to the fact that orders from which a return was made have a much lower average profit. A number that stands out as the most profitable average profit per order is the one from the customers that had made three returns from the first three orders and do not make a return from the fourth order. This, together with the fact that the second highest average profit per order was represented by the third order from customers who had made returns in both of the first two orders, induces to the thought that returning experience does increase confidence in the customers and hence their profitability.

The further analysis was carried out to observe the impact of the behaviour of the customers further in time, up to the moment when they purchased their tenth order. The results showed that the most profitable customers in average where those who had not returned any article from their first ten orders, as they maintained an average above 373SEK in every order, as it can be seen in Figure 10. And on the opposite side are those customers who had made a return from both of their first two purchases. These are the group that is in average the least profitable in every one of the first ten orders. The reason that has been thought is behind this results is that customers, who have started their relationship with the e-commerce fashion company returning, are keener to continue making returns after the two first orders, used as control for the analysis. And so, knowing that orders from which at least an article has been returned from are much less profitable, and that customers that made two returns from their two first orders will make more returns than less return experience customers, the results are very reasonable.

In the following lines, the two research questions established in part 1.4 are assessed.

- How does a customer's buying and returning behaviour impact the future profitability of this customer?

First of all, it can be said that experiencing a return during the first orders of a customer enhances this customer's confidence in the e-commerce company and increases the customer retention rate. This means that customers that return at the beginning of their relationship with the company are more inclined to come back and place further orders.

This being said, it was also seen that customers who make returns from the first orders have higher chances of returning from the future orders they purchase. For this reason they contribute with less profit per order, as it was observed in the

analysis that orders from which a return was made are less profitable. Hence customers that return many times result less profitable when looking at profit per order. But on the other hand, customers who return, come back to purchase again in a percentage, and they have higher confidence in the company, meaning that when they don't return from an order, the profit from that order is in average higher than those from customers who had not experienced a return.

- Which behaviour should be encouraged to the customers to enhance their profitability?

Customers should be encouraged to make returns, to increase their confidence and to improve the chances that they will purchase again at the online store. However, a balance should be found, as the most interesting thing for the e-commerce firm is that customers purchase repetitively and that they contribute with a high profit per order. Taking this into account, the most interesting customer behaviour for the e-commerce company would be that the customers make returns, but in a limited amount of their orders. This way, the higher amount of orders and the orders from which a return is not made –and have a higher profit per order- would compensate for the lower profit per order that the rest of the orders would contribute with.

9. Conclusions and future research

In this chapter, the final remarks are made, together with the recommendations for further research.

Customers who return articles from their orders show a lower average profitability per order than those who do not return. However, this returning experience enhances their confidence in the e-commerce company, making them more prone to coming back to purchase again. Encouraging new customers to make a return early in their relationship with the company seems, therefore, an appropriate strategy, but with the touch of trying to limit re frequency of the future returns.

This solution comes up as in accordance with what was discussed in the theory, where it is agreed that increasing restrictiveness in the returning conditions or making them more difficult or costly for the customer can lead to loss of customers but too permissive conditions can be too costly for the company. The appropriate balance in this area, as always, is complicated to find, but in the e-commerce business this would be linked to an individualised strategy for every customer segment. This strategy should also evolve over time, as do the customers, to adapt to their behaviour.

To develop further this research, it would be very interesting to discuss with the e-commerce company how to assess the sales issue. Articles with price reductions can be useful to get rid of stock and to attract new customers, but also reflect a loss in the profitability calculations. So understanding how and for which reasons the company uses discounts, would increase the ability to analyse the data.

Another aspect that would result highly beneficial to dig deeper into is the customer behaviour of the customers classified in segment C in the ABC analysis, to be able to clarify the reasons for their low profitability and to try to find ways make those customers change segment and become more profitable.

One more point that would be interesting for this research would be to follow customers during one year instead of studying one year of fixed time. This research was developed by Griffis et al. (2012), who do a study of the pre and

post return experience for a set of customers in another e-commerce business, showing really interesting results. Developing a similar study with larger sets of data from the fashion e-commerce company and combining it with a simulation project would allow defining a more specific strategy for returns management in the fashion e-commerce company.

10. Recommendations for the company

In this chapter, the final recommendations for the fashion e-commerce company are summarised, taking into the account the results, discussion and conclusions.

From the results obtained and the discussion developed with these results, the recommendations for the fashion e-commerce firm can be summarized in the following points:

- To encourage returning behaviour in the first orders, as it will increase the number or future orders of the customers as well as the frequency of these orders.
- To dissuade returning after first orders. As it will drastically reduce the profitability per order of the customers that have a high return rates.
- To dedicate future research to find methods to encourage/dissuade returns of the customers, always improving the perception that customers have of the e-commerce firm.

After giving these general recommendations, a few comments must be made in order to complement these recommendations.

- The confidence of the customers on the e-commerce firm does not increase permanently. For this reason it is not necessary to invest resources for ever in, for example, making returns extremely easy for the customer. Rather invest in the beginning of the relationship and then maintain a lever of good quality service.
- When recommending encouraging returns, the perception that the customers have of the e-commerce company must at all moment be as positive as possible. It is understood that if the way of encouraging customers to return is to send a damaged product or the wrong product, these customers will return, but their confidence will not be enhanced, rather the opposite, the satisfaction of these customers will drop. For this reason the recommendation of encouraging a returning behaviour at the beginning of the relationship with a customer, has more to do with making the customer feel like the returning procedure is simple, easy and accessible.

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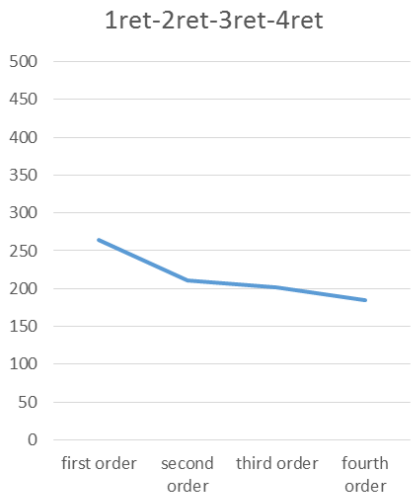
Appendix 1

Visual representation of the evolution of the average profit per order (in SEK) for the different customer segments. The customers are segmented according to their purchasing and returning behaviour during the first four orders.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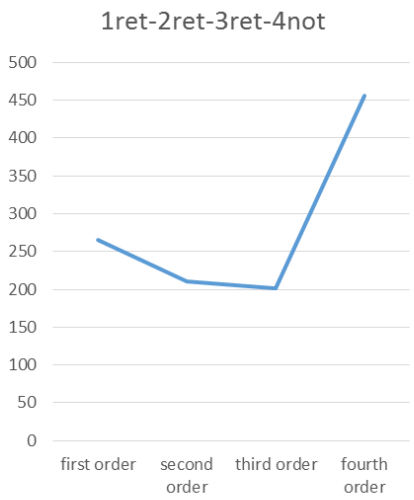
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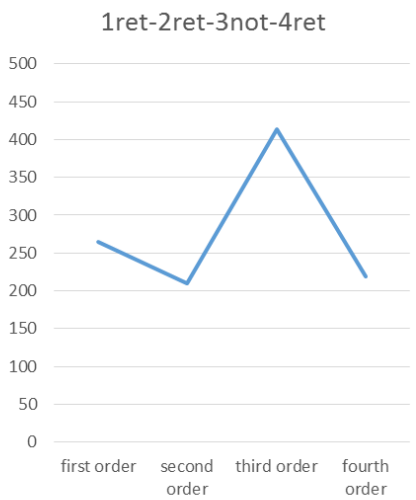
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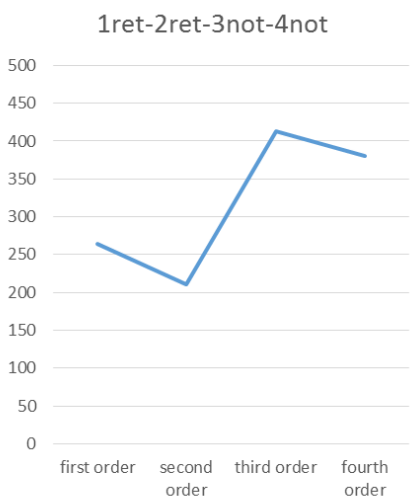
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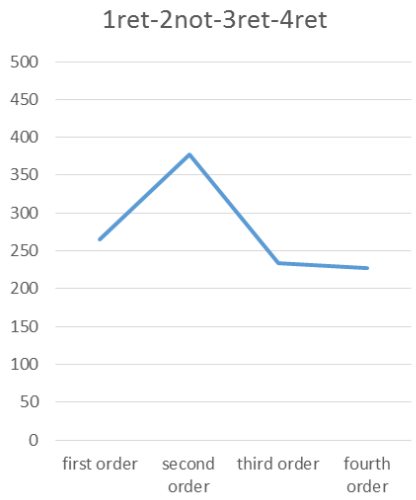
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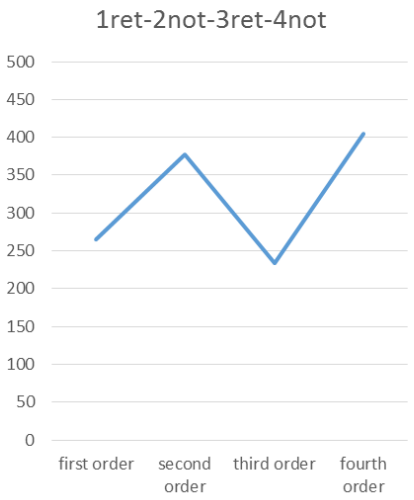
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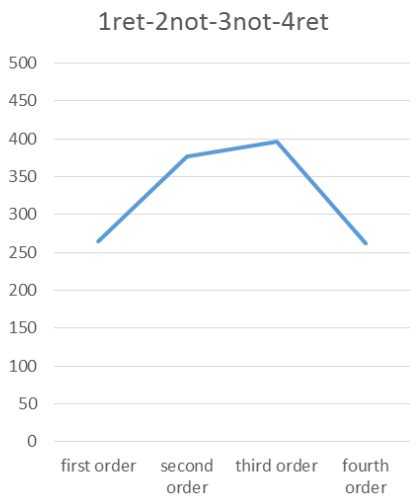
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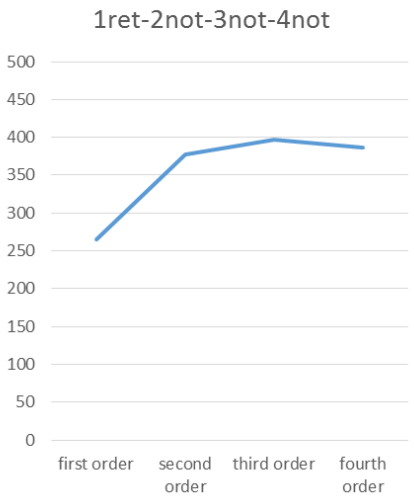
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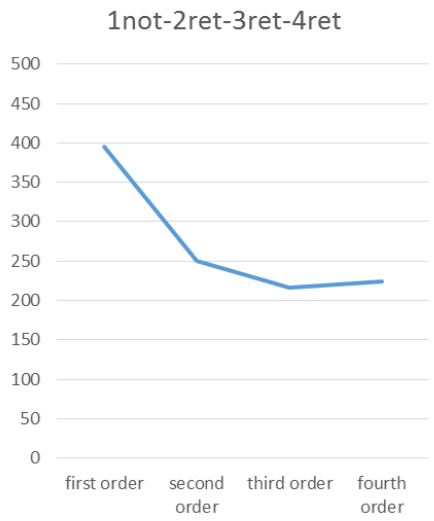
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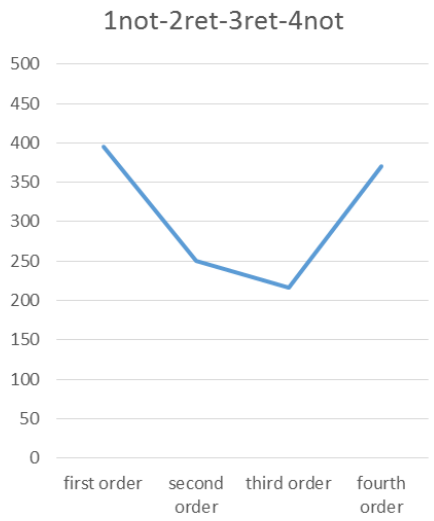
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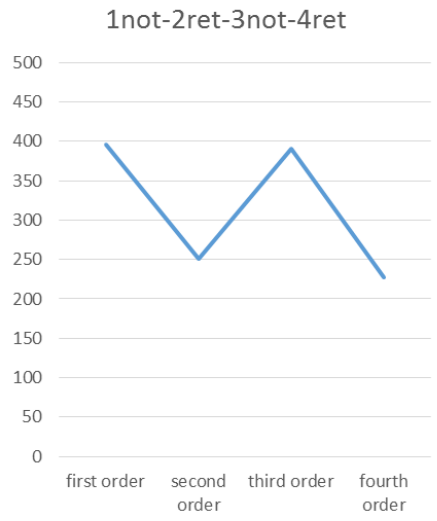
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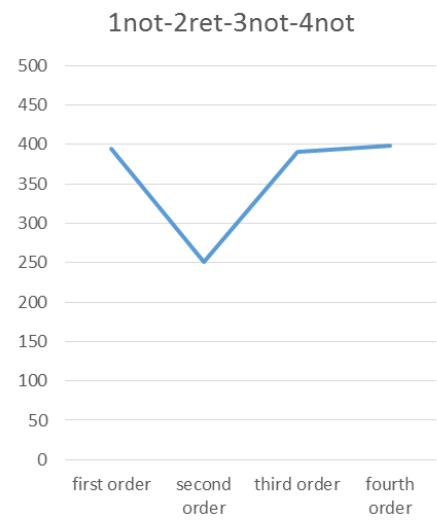
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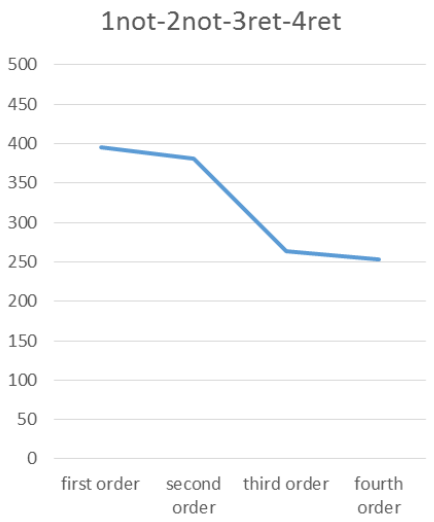
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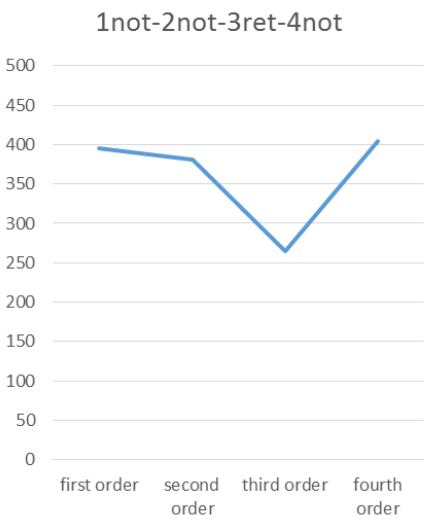
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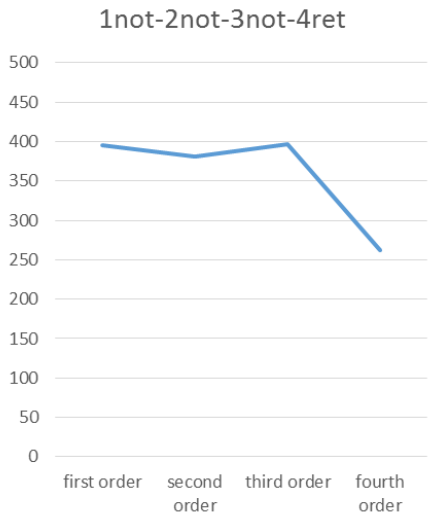
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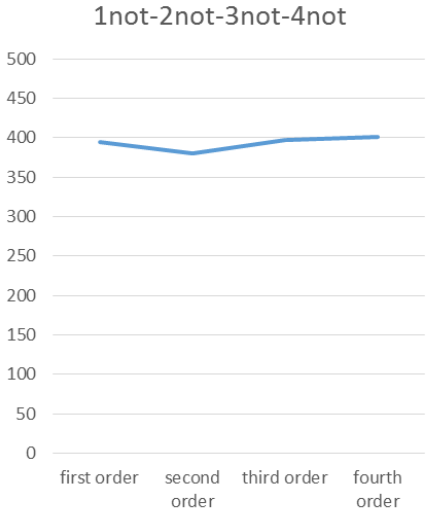
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Appendix 2

Average order profit and number of customers from each segment for the first ten orders (in SEK)

		1st order	2nd order	3rd order	4th order	5th order	6th order	7th order	8th order	9th order	10th order	total
customers that b1r0	Average profit	395,16	356,6	367,46	369,5	370,24	373,35	379,46	365,81	357,8	364,61	3699,99
	# of customers	140860	45282	21874	12315	7656	5039	3480	2438	1756	1305	
Customers that b1r1	Average profit	264,74	321,89	339,13	335,18	349,16	326,8	329,72	338,81	323,6	335,16	3264,19
	# of customers	40761	20509	9972	5588	3495	2315	1573	1111	809	623	
Customers that b1r0 & b2r0	Average profit	406,3	380,57	376,05	378	376,2	382,31	391,86	376,5	378,23	373,34	3819,36
	# of customers	-	36938	16679	9295	5769	3756	2615	1834	1337	983	
Customers that b1r1 & b2r2	Average profit	318,61	210,16	319,99	317,33	339,1	308,8	312,26	319,03	315,91	318,1	3079,29
	# of customers	-	6773	4045	2379	152	1025	726	528	377	294	
Customers that b1r1 & b2r1	Average profit	348,46	376,98	352,19	348,4	356,94	341,09	344,52	358,45	330,3	350,35	3507,68
	# of customers	-	13737	5928	3210	1971	1291	848	548	433	330	
Customers that b1r0 & b2r1	Average profit	416,88	250,48	339,88	343,33	352,04	347,11	342,02	333,37	292,67	337,93	3355,71
	# of customers	-	8345	5196	3021	1888	1284	866	605	420	323	