MASTER´S FINAL WORK

DISSERTATION

IMPROVEMENT PROPOSAL FOR MANAGING AND PLANNING STOCKS
 IN A COSMETICS INDUSTRY

RICARDO MIGUEL DOS SANTOS MIRANDA

OCTOBER - 2023

MASTER
MANAGEMENT AND INDUSTRIAL STRATEGY

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"The line between disorder and order lies in logistics." –

Sun Tzu., a Chinese general (496 B.C.)

EOQ - Economic Order Quantity

GB1 – Brand nº 1 of the XPTO company, focused on perfumery and lotions.

GB2 - Brand nº 2 of the XPTO company, focused on make-up items.

LT - Lead Time

PRC - Periodic Review Control Model

ROP - Reorder Point

SAP - Systems Applications and Products

SKU - Stock Keeping Unit

XPTO – Adopted business designation under confidentiality.

ABSTRACT

Supply chain management is essential for companies in the industrial sector, in particular for those that do not have national suppliers. In a globalized world characterized by uncertainty, in which the global logistics sector has been increasingly highlighted, the implementation of models that maximize performance becomes extremely necessary.

The competitiveness of these companies in the market is based on fully meeting the needs and expectations of the end customer. To meet these needs, one of the benefits can be the reduction in the stock level, which will have a positive impact in terms of total costs for a given month: May of 2023.

The present Master's final work has, as its main practical objective, a study of improvement and implementation of a model of stock model that best responds to the needs of the company, allowing a total delivery of the final product to the right client and in adequate time.

For this study, a model for managing and classifying stocks will be analysed and will be confronted by the one currently used in the company XPTO. The methodology employed within a quantitative study case was used with quantitative data to provide necessary explanation between variables such as total costs.

To support the aforementioned hypothesis, data was collected from the Logistics and Planning team of an unidentified cosmetics business. ABC Analysis was used, which classifies articles by classes, according to the impact they have on the total cost of inventory. Afterwards, the Periodic Review Control (PRC) model was applied to Class A products. Through the PRC we managed to define the optimal ordering point, which reduces costs for each item, on average. With the application of this deterministic academic model, we reduced the total annual cost with storing inventory by 46,36% for GB1 and 79,86% for GB2.

KEY WORDS: Production Management, Stock, Supply Chain Management, Inventory, Management Models.

RESUMO

A gestão da cadeia de abastecimento é essencial para as empresas do setor industrial, em particular para as empresas que não possuem fornecedores nacionais. Num mundo globalizado e caracterizado pela incerteza, em que o setor logístico global tem ganhado cada vez mais destaque, a implementação de modelos que maximizem o desempenho torna-se extremamente necessária.

A competitividade destas empresas no mercado baseia-se na plena satisfação das necessidades e expectativas do cliente final. Para satisfazer estas necessidades, um dos benefícios pode ser a redução do nível de *stocks*, o que terá um impacto positivo em termos de custos totais para um mês específico: maio de 2023.

O presente trabalho final de Mestrado tem como principal objetivo prático um estudo de melhoria e implementação de um modelo de *stock* que melhor responda às necessidades da empresa, permitindo uma entrega total do produto final ao cliente certo e dentro do tempo acordado.

Para este estudo serão analisados modelos de controlo e classificação de *stocks* e confrontados com os utilizados atualmente na empresa. A metodologia associada a um estudo de caso quantitativo utilizou dados quantitativos para fornecer a explicação necessária entre as variáveis como as de custos totais.

Para apoiar a hipótese acima mencionada, foram recolhidos dados da equipa de Logística e Planeamento de uma empresa de cosméticos não identificada. Foi utilizada a Análise ABC, que classifica os artigos por classes, de acordo com o impacto que têm no custo total de stock. Posteriormente, o Modelo de Revisão Contínua foi aplicado aos produtos de Classe A. Através do modelo conseguimos definir o ponto ideal de pedido, o que reduz os custos associados de cada item. Com a aplicação do modelo académico determinístico reduzimos em 46,36% para GB1 e 79,86% for GB2 o custo total anual de GB com armazenamento de stock.

PALAVRAS CHAVE: Gestão da Produção, Stock, Gestão da Cadeia de Aprovisionamento, Inventário, Modelos de Gestão.

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1. INTRODUCTION

The supply chain is synonymous with saying "the whole process of business" and essentially, the world and its activities can be seen as one large supply chain for the production of goods and services; a collection of functional activities where consumer value is added throughout (Ballou, 2004) (Remondino and Zanin, 2022). Supply chain is a collection of functional activities (which are repeated many times) in which raw materials are converted into finished products and consumer value is added (Remondino and Zanin, 2022). An adequate level of stock management plays a decisive role in the operations of any business in order to optimize associated costs.

Supply chain management includes various activities like purchasing, materials handling, production planning and control, warehousing, logistics, inventory management, distribution, delivery and vendor management (LeMay, 2017) (CSCMP, 2023) Some activities and processes that can be seen as indirect like information technology and finances from the point of origin to the point of consumption can also be attributed to supply chain management. Its primary goals are cost reduction, service improvement, improved communication and interaction among supply-chain partners and increased flexibility in terms of delivery and response times (Ranganathan, Dhaliwal, & Teo, 2004) particularly in a dynamic world affected by an ever-increasing inflation phenomenon (Hawas *et al.*, 2023). Every aspect that affects the world affects supply chain management, from "fluctuating gas prices to environmental concerns" (Wilson, 2017).

Logistics is part of supply chain management that plans the processes for implementing and controlling efficiently and effectively flow and storage of goods, services, and related information from the point of origin to the point of consumption, with the aim of meeting customers' requirements (CSCMP, 2013). In particular, one of these industries: the global beauty industry (*e.g.* skin care, colour cosmetics, hair care, fragrances, personal care) has been shocked by the COVID-19 pandemic and its underlying effects (Gardner, 2021). Throughout human history, great endeavours have been won and lost through strengths and weaknesses associated with Logistics. However, it is only in the recent past that companies have begun to recognize the vital impact that

Logistics Management can have in creating competitive advantage brought by cost reduction that safeguards the continuity and sustainability of the business.

Despite having more advanced technology to manage supply chains than ever before, modern cosmetics logistics are filled with unprecedented challenges. In one of these particular sectors) the beauty supply chain has taken a hit in terms of raw materials, shipping and talent retention. Cosmetics are still a $579 billion global industry (Statista Market Insights, 2023), pandemic lockdowns in China have led to a lack of packaging materials needed to assemble these products. Russia's invasion of Ukraine, on the other hand, has led to a shortage of key crops used to make cosmetics, like alcohol, beets, and sunflower oil (Glasheen, J., 2022). Widespread supply shortages were caused by supply chain disruptions (Lopes, 2021). Due to this ongoing paradigm, companies and businesses should stive for more resilient practices that focus on cost and performance related to the supply chain and rely less on constant flow of materials to their warehouses.

The supply chain encompasses the flows of materials and information between the different constituent players. the same, from the acquisition of raw materials to the purchase of the final product by the consumer.

As of 2022, industries across the globe continue to battle a "Great Supply Chain Disruption" (Igan, Rungcharoenkitkul and Takahashi, 2022). They're striving to optimize execution, diminish risk, improve dexterity and identify ways to gain a competitive advantage (Permatasari and Dhewanto, 2013), that is, production of cheaper goods than the respective rivals. To reach this goal, streamlined, fast decisions have to be made.

Managing and planning stocks in a cosmetics industry is a critical aspect of operations. It can be challenging to maintain the right balance of inventory to meet customer demand while avoiding overstocking and understocking particularly when production of said items is done overseas. With this in mind, the chosen theme has been relegated to Supply Chain Management and the dedicated scope will be a cosmetics industry in the beauty sector.

The objective of this research is to analyse and optimize the stock management of a cosmetics industry in order to minimize its annual stock costs, comparing already existing models and management practices to a proposed alternative. Through this study, we seek to increase performance resulting from lower stock costs.

In order to achieve the purpose of the dissertation, it is necessary to understand several key aspects: the company as a whole, the interactions it performs on an internal and external level and the processes developed within the subject matter.

After understanding these topics, research in the literature of theoretical concepts related to the topic discussed is necessary for the development and postulation of conclusions. The main objective of this dissertation is to apply a stock management model and test its functioning.

In order to respond to the previously defined main objective, the current assignment has been divided into five chapters This Final Master's Work is divided into five chapters. The first corresponding to the Introduction, where a brief preamble of the study is made, the nature of the problem in question and the objective of the dissertation.

The second chapter consists of a non-exhaustive Literature Review, where the main classifications and stock management models that have been studied will be addressed, in order to give theoretical support to the practical part.

The third chapter consists of the Methodology, in which the type of research carried out is characterized, the way in which the data were collected, the way of treating it, and two research questions for which brief answers are sought in this study. The methodology used in this Master's final work is an exploratory, bibliographical, and documentary quantitative case study (Chapter 3) (Yin, 2018).

In the fourth chapter, the obtained results are presented and analysed. In the fifth chapter the conclusions of the work will be presented, also referring to the respective limitations, suggestions and recommendations for future studies. To answer the initial objectives, the methodology used was a quantitative study within a deductive perspective. The work focuses mainly on understanding the role that management models have within the supply chain, focusing specifically on the tasks carried out by the Planning Department of the XPTO Company in Portugal.

2. LITERATURE REVIEW

The following non-exhaustive literature review on the topic under investigation is intended to present the state of the art considered relevant for this study in a careful, concise, and systematic way. The topics to be dealt with will be, primarily, the concept of stock and stock management, logistics, supply chain, some stock management models, demand and supply.

The growing desire to seek the best beauty care standards has led the market responsible for the personal hygiene, perfumery and cosmetics sector to invest in trends, innovation and technology (Gerstell *et al.*, 2020). This has meant that product diversity increased, and inventory management has become a challenge for companies in the sector (Kittisak, 2023) which can, on some occasions have a large number of stock keeping units.

According to Ching (2010) the volume of inventories can vary according to the demand forecast of a company, and there may be large and small-scale inventories, and even zero inventory at any given point. Concurrently, in order not to run out of products or increase the company's costs (which consequently minimizes the profit margin) companies must establish strategies to "plan, organize and control their inventories" (Barcelos *et al.*, 2017) as to not damage their financial returns.

2.1. LOGISTICS AND THE SUPPLY CHAIN

The supply chain is described as the connection between the installations and the suppliers, which are responsible for the acquisition of materials, their transformation into intermediate or packaged final products (Mclennan, 2016) and, finally, their distribution to the final consumer where value is consistently added (Figure 1). It is also a network that "operates as a complex adaptive system, where every agent grapples with the tension between control and emergence" (LeMay, 2017). All functions to fulfil requests – even indirectly – like marketing or finances can be seen as an integral part of the supply chain (Figure 2).
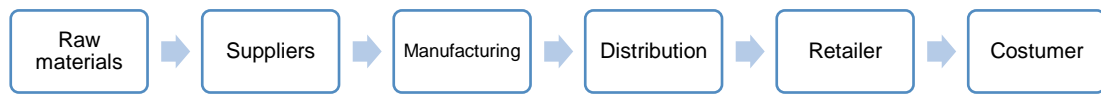
Figure 1 – Summarized vision of the supply chain for a single business. Between each link, transportation should be considered as another stage.

According to McKinsey (2022), the supply chain can be seen as "an interconnected journey that raw materials, components, and goods take before their assembly and sale to customers" (Figure 2). Chopra and Meindl (2016) add that the supply chain is dynamic and involves flows of information, product and resources between stages (Figure 2). The latter also claim that there is a close relationship between the design and management of these flows and the success of the supply chain. Supply Chain Management has evolved from being understood as "only logistics" to a multifunctional corporate undertaking that ranges from procurement and demand forecasting to distribution and after-sales service" (Lu and Swaminathan 2015). Nowadays, supply chains have added degrees of complexity due to internationalisation operations with the final goal being the maximization of its profitability.
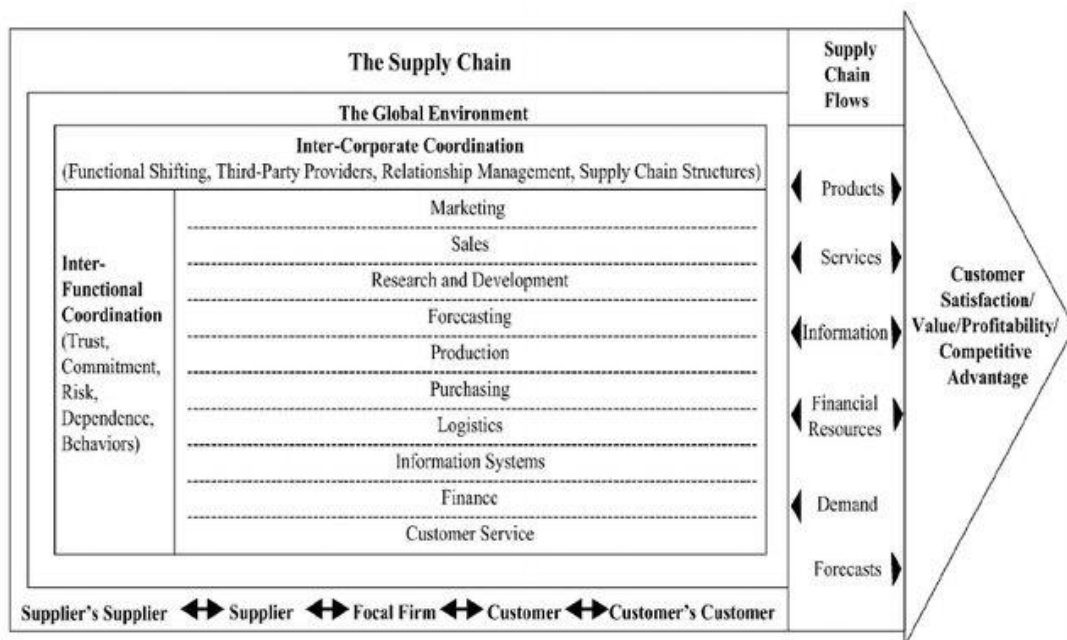
Figure 2 – Schematics of the Supply Chain Management Model. Adopted from Mentzer *et al.*, 2001.

One of the more precise definitions of Supply Chain Management is given by the Council of Supply Chain Management Professionals, includes collaboration and coordination between the different partners in the chain, as well as the planning and management of activities that are integrated into sourcing and procurement, conversion and all logistical activities (CSCMP, 2013).

Although there are different definitions of supply chain management, there is a general direction that it represents the integrity and management of business processes associated with the flow and transport of goods and services, as well as information, both within and between the organizations that make up the supply chain. The goal of supply chain management is to meet customer objectives, trying to minimize stock and associated costs.

2.2.   LOGISTICS PLANNING

Logistics is the process that creates value by timing and positioning inventory. It is the combination of a firm's order management, inventory, transportation, warehousing, materials handling, and packaging as integrated throughout a facility network (Rajuldevi Veeramachaneni, and Kare, 2008). Not all companies approach this planning with the same importance though and not every company has all stages present. Logistics is fundamental as a strategic tool and as a method to develop recommendations for strategic planning (Kotsifaki *et al.*, 2007). Short-term scheduling or planning objectives include "minimizing execution time, maximizing utilization, keeping stock levels low and minimizing customer waiting time". According to the International Monetary Fund, logistics costs average about 12% of the world's GDP with a "projected growth rate of 5% through 2023" (Market Growth Reports, 2022).

2.3.   DEMAND FORECASTING

Demand forecasting in supply chain management refers to the process of planning or predicting the demand of materials to ensure you can deliver the right products and in the right quantities to satisfy customer demand without creating an unnecessary surplus. This

planning stage considers the process of predicting future customer demand for products using historical data, market trends or other relevant information to enable organizations to make informed decisions regarding inventory, production, and distribution.

The world today is experiencing a transition between a growth economy and a distribution economy with environmental, social, and human awareness, globalisation and its effects on demand and the new possibilities for managing the supply chain and demand forecast should take this into consideration.

2.4. TECHNIQUES OF STOCK MANAGEMENT

Stocks can be seen as bundles of raw materials, components, work-in-process and finished products (Ziukov, 2015) that arise at numerous points in the production and logistics of companies (Ballou, 2004). They are assets in the form of materials to be used in the production process, consumed or distributed in the provision of services and held for sale or distribution in the normal course of operations (Kyalo *et al.*, 2018).

Effective stock management models help companies optimize their inventory levels, reduce carrying costs, and ensure products are available when needed. The following are some of the main stock management models employed by companies in varied industrial settings:

- Periodic Review Control Model : An inventory management strategy where inventory levels are reviewed and replenished at predetermined, fixed intervals instead of continuously monitoring stock. This approach offers several advantages, particularly for businesses managing a large number of items or those with predictable demand patterns. This model is used to determine the optimal order quantity that minimizes the total inventory costs, including ordering costs (incurred when procuring or replenishing inventories) and holding costs (also known as carrying costs incurred by maintaining inventories) (Tarver, 2022). The EOQ determines, as such, the most cost-effective order quantity.

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- Just-In-Time (JIT) Model: This model aims to minimize inventory levels by producing and delivering products just in time to meet customer demand (Dange *et al.*, 2016). JIT relies on a synchronized flow of materials and information across the supply chain. It's widely used in industries that seek to minimize inventory.

- MRP (Material Requirement Planning): A model for calculating materials and/or components needed to manufacture a product that takes into consideration inventory of materials, identifying missing ones and scheduling their production or purchase accordingly. Through the use of a Bill of Materials, the output of an MRP system is a schedule of planned orders, purchase orders, and production orders for materials and/or components (Malindzakova *et al.*, 2022).

2.5. SAFETY STOCK

Safety Stock (otherwise known as "buffer stock) is generally defined as an appropriate inventory management strategy to deal with the uncertainty of demand and supply, as well as for limiting the risk of service loss and overproduction (Díaz *et al.*, 2021). Safety stock is used specifically for mitigating stockouts due to variations in demand and supply that were not accounted for. There are 3 main reasons safety stock is a key element in the strategy of different companies (Jenkins, 2022):

1. Mitigating demand fluctuations**:** Demand for products is unpredictable. Safety stock acts as a buffer, ensuring sufficient inventory to fulfil orders during periods of higher demand than anticipated.

2. Buffering against disruptions happening in the Supply Chain**:** The supply chain is susceptible to various disruptions (indicated in Chapter 2.1) such as delays in deliveries or events like the COVID-19 pandemic that affect . Safety stock provides a cushion by covering these delays.

3. Lead Time Variability: Lead times, the time it takes for products to be delivered from your supplier, can fluctuate due to various factors like transportation delays, customs clearance issues, or production bottlenecks. Safety stock helps bridge this

gap, ensuring you have enough inventory to cover the time between placing an order and receiving the new stock.

In particular, companies from the cosmetics and beauty industry face additional inventory management challenges derived from the strict regulatory standards applicable in different jurisdictions, in addition to the constantly changing trends, which highlight the importance of defining an accurate safety stock (Guedes *et al.*, 2013). Safety stock plays a critical role in ensuring that companies can meet customer demand and maintain a high level of customer satisfaction serving as a means to withstand seasonal variations (Anisimov *et al.*, 2019) and lead time (LT) variability. The cosmetics industry is highly competitive and brand reputation-sensitive so the safety stock serves as a risk management tool, safeguarding against unexpected events. More specifically, the safety stock can be quantified by applying the following formula:

$$S_s = k * \sqrt{\sigma^2 * (L + T) + x^2 * var(L)}$$

- k = Factor of required Service Level, that is a correct service level for a certain SKU by balancing inventory costs vs the cost of stockout
- σ = Standard deviation of forecast error
- T = Inventory review period, which is aligned with the demand for a given SKU.
- L = Supplier Lead Time, that is the time needed for a supplier to deliver a SKU to a customer.
- x^2 = Mean Demand (demand per period)
- var(L) = Variance of the supplier lead-time

2.6.   ASSOCIATED COSTS

Inventory has a broad definition that can be applied to finished product held for sale, goods in warehouses, work in process, goods in transit, any owned for financially controlled raw material, work in process, and/or finished good or service held in anticipation of a sale not yet sold (Heizer *et al.*, 2020).

A reasonable estimate of the costs involved: cost of holding stock, cost of ordering and cost of disruption; and optimize stock costs, as excess stock is often a limiting factor in the efficiency of logistics management (Godichaud and Amodeo, 2018).

According to Phipps (2023) the most important inventory cost factors can be summarized as:

- Ordering costs
- Holding costs
- Shortage costs
- Set up costs
- Unit costs

To calculate inventory holding costs, we must first determine storage, employee wages, inventory depreciation, and opportunity costs. Adding these amounts together, and dividing that number by the total value of your annual inventory. The resulting number, expressed as a percentage, is the inventory holding cost.

Inventory holding costs also take into consideration costs with warehouse or other storage locations, insurance, labour, transportation (to and from storage areas), depreciation and inventory shrinkage (*e.g.,* theft, damage, and obsolescence).

2.7.   MAIN MODELS OF STOCK MANAGEMENT

There are several stock management models which depend on the behaviour and nature of supply and demand that makes it necessary to know and understand the behaviour of these two variables, in order to verify the existence of variation.

There can be stochastic models, in which supply and demand are random and uncertain, and deterministic models, in which supply and demand are known and constant (Carvalho and Barbieri, 2020).

 According to Carvalho and Barbieri (2020), there are three types of deterministic models can be summarized as:

- Periodic Review Control Model (PRC) seeks to find the ideal moment to make a request along with optimal quantity (Figure 3). It is intended to determine the optimal order quantity that minimizes total inventory costs. It considers the costs of acquisition, holding stock and backorders and establishes a relationship between order quantity and annual cost. This model, alongside its Economic Order Quantity (EOQ) helps businesses strike a balance between ordering costs (which increase with more frequent orders) and holding costs (which increase with larger order quantities). By minimizing the total inventory costs associated with these variables, an organization can efficiently manage its inventory while reducing costs and ensuring product availability. According to Carvalho and Barbieri (2012), EOQ is a calculation that companies perform to represent their ideal order size, allowing them to meet demand without overspending. Inventory managers calculate the EOQ to minimize holding costs and excess inventory (Tarver, 2022).

- Periodic Review Control order without instant stock replenishment where delivery is carried out in stages - demand is constant, with stock replenishment not instantaneous but continuous throughout the supply period.

- Inventory Turnover Ratio is the number of times that an inventory "turns over" or cycles through the firm in a year (Rao, M. and Rao, P., 2009) and is a financial metric used to assess how efficiently a company manages its inventory. The inventory turnover ratio is used to assess how quickly a company is able to sell its inventory and replace it with new stock
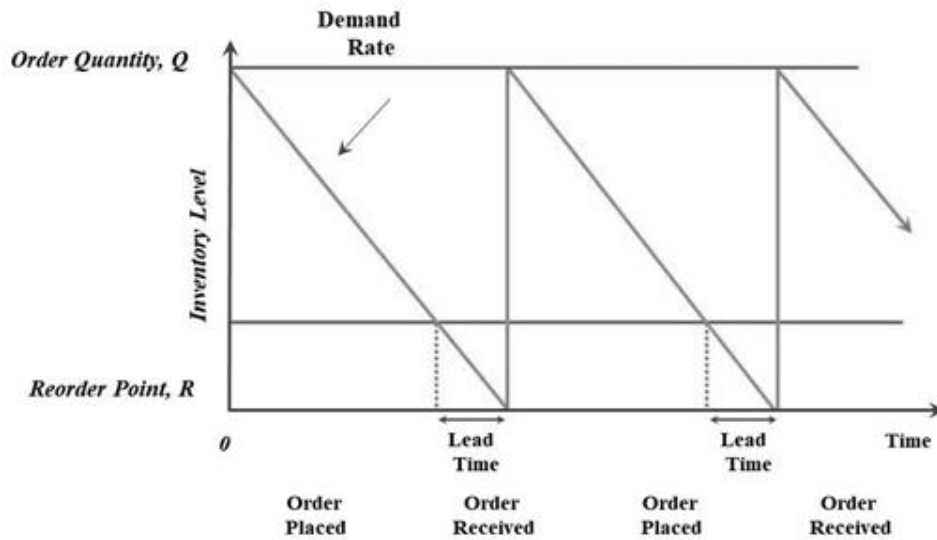
Figure 3 - Supply Chain Management Model. Adopted from Mentzer *et al.*, 2001.

2.8. PRODUCT CLASSIFICATION - ABC ANALYSIS

ABC Analysis is a categorization technique based on the Pareto Principle for determining "which items should get priority in the management of a company's inventory". This inventory categorization can be done based on total sales (or revenue) of specific Stock Keeping Units that make up the portion of a business.

The ABC analysis is a methodology that aims to provide information on direct and indirect costs of owning stock (Chu *et al*, 2008) (Chouhan et al, 2017). A firm's different products are typically in different stages of their life cycles and the product life cycles serve as a basis for the 80-20 curve. The bulk of the sales is generated by only a "few products".

For a specific business, SKU (Stock Keeping Units) have different levels of importance, in terms of sales, profit margin, market representation and competitiveness. Therefore, it is important to differentiate products into categories and, for each one, proceed with a different treatment, depending on its importance.

The ABC analysis distinguishes 3 types of classes: A, B and C. In decreasing order, Class A are the articles with greater relevance followed by articles of Class B and Class

C are the articles with less importance. This classification method is based on the 80/20 principle or Pareto's Principle. Each category is determined as follows (Guedes *et al.*, 2020):

• A Class: Products that represent the highest revenue value but represent a small portion of the total product pool. About 20% of the items representing approximately 80% of the total turnover (which is also representative of Pareto's Principle);

• B Class: Intermediate group, which corresponds to about 30% of the articles that represent approximately 15% of the total revenue;

• C Class: Items that represent the majority but make the lowest contribution to revenue. About 50% of the products representing approximately 5% of the total turnover.

The ABC analysis allows the treatment of the articles according to their category, defining different levels of services. The focus should be located on the items considered most important, making a more integral control of stocks, in order to guarantee that there are no ruptures or stockout. On the contrary, Class C items are the least relevant, and simpler stock management and periodic review can be used. The products that will be subject to more rigorous optimization and planning in this study are those of Class A, as they have a greater impact on the financial and operational performance of the company and therefore require more detailed control in their management.

Figure 4 shows the curve of the ABC analysis, which graphically represents the 5 classes, and the respective products, in terms of financial value for the company while Table 1 reflects what percentage of value is attributed to each item.
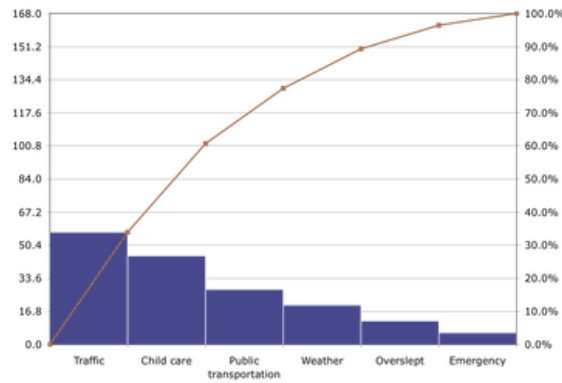
Figure 4- Example of ABC Curve for late arrivals in a company. Adapted from StatisticsHowTo (2023).

Table 1 – Percentage of item and their relationship with total revenue value.

Category	Percentage of items	Percentage of value
A	10%	70%
B	20%	20%
C	70%	10%

3. METHODOLOGY AND DEFINITION OF DATA

This chapter aims to describe the methodological procedures of this study, which is divided into three parts. In the present assignment, the type of study is exploratory (seeks to clarify a specific topic), with a deductive approach (that is starting with a general hypothesis and then testing it through specific data to confirm or refute its validity) and quantitative approach.

A quantitative case study is a research method that focuses on the analysis of specific instances within a larger population, using numerical data to draw conclusions and generalize findings to a broader context. This approach typically involves collecting structured data through existing records, and then analysing this data to identify patterns, with the goal of testing hypotheses. The case study approach is commonly used in social sciences research to explore complex issues, events, or processes within their natural contexts (Crowe *et al.,* 2011). These were chosen because they enabled better obtaining

of information that could elucidate the object of study and be transformed into research variables. This allows for a more comprehensive understanding of the case being studied, as well as the potential to triangulate the findings from different data sources and methods.

3.1.   ADOPTED RESEARCH METHODOLOGY

Data collection was undertaken by use of financial management software used by the company (*e.g.,* System Applications and Products - SAP) where data on annual sales of products are summarized, in order to identify main variables such as total costs and monthly demand. All the information where SKU needs are mentioned (*e.g.,* Material Requirements Planning sheets) was also be employed.

Information will also be requested from the Planning and Logistics Team, as well as other direct stakeholders (when appliable) in order to clarify questions about the business, products, costs associated with placing an order, unit costs, stock levels, stock management methods used by the company as well as replenishment deadlines (also known as lead times, that have fluctuated given the current paradigm of international instability) since current lead times have been affected by exogenous factors (Kader and Akter, 2014).

3.2.   INVESTIGATION QUESTIONS

From the theme "Logistics and Supply Chain Management", the topic of understanding and improving current stock management models arose and from this same topic the following investigation questions were formulated: "What is an alternative stock management model that maximizes delivery of orders to the final customer in a cosmetics industry?" and "What does this model contribute to the company's improvement in the form of total costs?". Both of these questions seek an explanation for the phenomenon of stock management within an optics of applied research that can be answered within a quantitative case study approach.

3.3.   DATA COLLECTION METHOD

Research was conducted in a company that wishes to remain anonymous with its sensible data classified. Henceforth, the company shall be known as "XPTO". The data collection was done in the period of one year where it was possible to observe its operation on a daily basis and interact with different teams (*e.g.,* Planning, Logistics).

Data collection was out using Microsoft Office tools employed (*e.g.,* management software that entail invoices and associated costs like SAP) where data on annual sales of products marketed in the company under study were obtained, in order to identify monthly demand.

Information was asked of managers from the Planning and Logistics Team, as well as other stakeholders in order to clarify questions about the business, products, costs associated with placing an order, unit costs, stock levels, stock management methods used by the company as well as replenishment deadlines (also known as lead times, LT, that have fluctuated given the current paradigm of international instability).

3.4.   BUSINESS PRESENTATION

The XPTO Company works in the Beauty and Cosmetics sector, has a large international presence and relies heavily in the "Push Inventory Management", that is, where products are pushed through the supply chain based on forecasts and production schedules rather than being pulled by actual customer demand. This technique allocates production to stocking locations based on overall demand, encourages economies of scale in production and minimizes the need for inventory. Since the production is done overseas, a request of needs is emitted every month (that is, MRP considers its needs on a monthly basis).

3.5. EXISTING STOCK MANAGEMENT TECHNIQUES

Materials Requirement Planning is one of the most widely used inventory management methods, being the choice for the XPTO company to know its existences, requirements and articles (SKU) that are incurring the risk of obsolescence due to their expiration date. MRP is considered in a "push" production planning system, that is, where the decision on which goods and which quantities to produce is done according to how much is expected to be sold.

Companies of all sizes depend on MRP-based systems to meet customer demands for their products, "control inventories, manage entire supply chains, reduce costs, and respond to market changes" (SAP, 2022).

The MRP system is designed to answer three questions: "What items are required?", "How many are required?" and "When are they required"? (SAP, 2022). The MRP system is also intended to simultaneously meet three objectives:

- Ensure materials are available for production and products are available for delivery to customers.
- Maintain the lowest possible material and product levels in store
- Plan manufacturing activities, delivery schedules and purchasing activities (SAP, 2022).
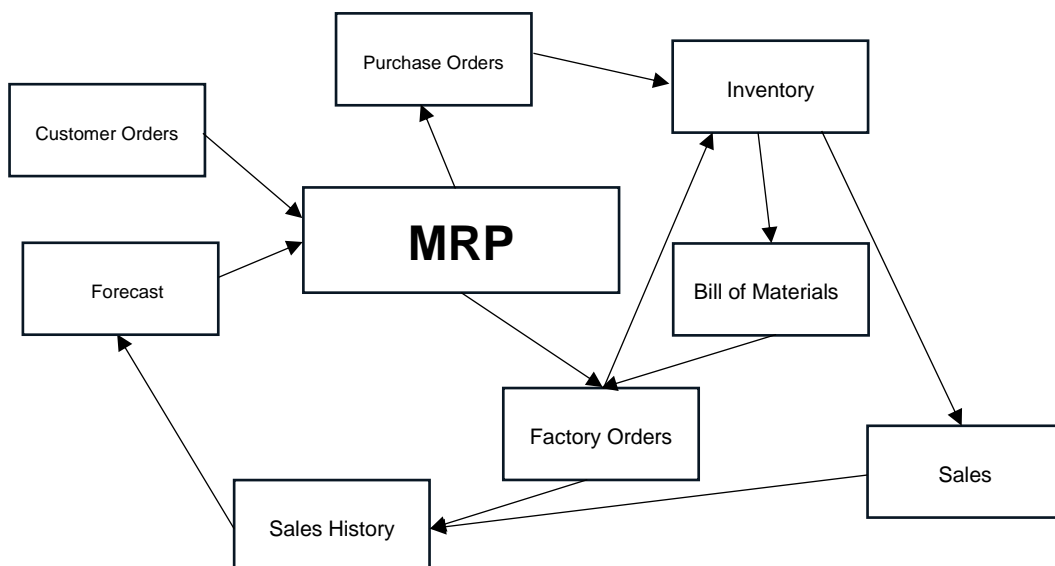
Figure 4 - Schematics of Material Requirements Planning. Adapted from (Malindzakova *et al.*, 2022)

3.6.   PROPOSED STOCK MANAGEMENT MODEL

The EOQ model has some assumptions, mainly that the delivery of the ordered inventory takes place in a single moment, the total ordering cost shall remain constant and ordered units, whose consumption is to take place, are certain. Any type of discount is not Available at EOQ, whether it is on value or on quantity.

Prior to MRP, and before computers dominated industry, Reorder Point/Reorder Quantity (ROP/ROQ) type methods like Periodic Review Control (PRC) had been used in manufacturing and inventory management from moderate to high success. The ROP is calculated based on the Lead Time (LT), Demand Rate (D), and Safety Stock level.

3.7.   RESEARCH METHODOLOGY

The methodology used in this Master's final work is an exploratory, bibliographical, and documentary quantitative case study (Yin, 2018) as explained in Chapter 1.

Exploratory in terms of purpose, as it aims to explain cause and effect relationships based on a theory related to stock management. Thus, it is necessary to understand the stock management model used by the company and adapt the nature of the problem to the context in which it finds itself.

Bibliographic because it was necessary to provide theoretical support for concepts related to stock management, nature of demand and stock optimization models, through the Literature Review, in order to frame and apply the developed project.

Documentary because the study is served by quantitative data relating to the period in question and coming from documentation shared by the company, such as, for example, sales records by product and the respective purchase amounts and associated costs.

It refers to a case study because it is an in-depth exploration from multiple perspectives of a particular project in a real-life context being "research-based, inclusive of different methods and is evidence led" (Simons, 2009). The primary purpose is to generate an in-depth understanding of a specific topic (Simons, 2009). The employed research approach

is deductive since from the results achieved, initial propositions are either corroborated or refuted.

3.8. DATA COLLECTION METHODS

In an initial planning phase, it was essential to outline how the research would be carried out and applied in the study of the XPTO company. Data collection was carried out through management software and other cloud-based documents and procedures used by the company, where data on annual sales, costs and Material Requirement Planning of different SKU marketed can be obtained, in order to identify the annual demand for a specific month of the year of 2023.

It was also be employed the use of the diary to register the reflective process (Yin, 2008), documentary sources that the company sees fit to share and do not have privacy issues attached. Per the company's request, every mention of its original designation and other sensible data is protected under a verbal confidentiality agreement which took distinct designations from the original (*e.g.,* XPTO company).

4. PRESENTATION AND ANALYSIS OF RESULTS

The research methodology summarizes the systematic approach used to investigate the initial research questions (Chapter 2.2), gather and analyse data, and draw respective conclusions. This study was developed with the intent of comparing the impact from using the academic model of stock management of Periodic Order Review against the current techniques employed by the XPTO Company (Material Requirement Planning) for the management of its stocks in the year of 2023. This analysis included all costs associated with procurement, supply and demand needs.

To reaffirm the results, a series of consecutive stages was performed: an ABC analysis was made for all inventory products (on both brands identified as GB1 and GB2), total costs were calculated, the Periodic Review Control (EOM) Model was applied and the values before and after the EQ were compared to study changes on both company brands.

Results in this chapter are restricted to a sample of items identified as Class A, following Chapter 3.1.

4.1. ABC ANALYSIS

The ABC Analysis allowed us to analyse the products that were part of the inventory according to their impact on total inventory costs. This analysis stated that around 20% of the total number of articles sold represented 80% of the total inventory costs, with these products being classified as category "A". The initial study focused on 768 SKU (stock keeping units) from Brand GB1 and 469 SKU from Brand GB2 (Appendix 1 and 2). Roughly 20% of both articles on these brands (respectively, 154 and 94) are classified as Class A and will be subject to a deeper analysis.

Furthermore, a list of articles was developed to classify each one belonging to the "XPTO" company according to impact. This list is structured according to the decreasing total cost of the products. The Classification is presented in Appendix 3 and Appendix 4 for brands GB1 and GB2, respectively. Data from these Appendixes was calculated via commercial variables; that is, the relative of

By analysing Table 2 and Table 3 and Appendix III and, we found that Class A represents 154 and 94 articles, respectively, which correspond to around 51% of total inventory costs, 135 174 €, and represents around 11,33% of the total articles. Class B and C of the GB1 brand include 230 and 384 items and Class B and C of the GB2 brand include 141 and 235 SKUs and 141, respectively, which translates into approximately 95 717,00 € and 33 976,98 € (for GB1) and 10 297,80 € and 15 437,40 € (for GB2) of the total items and which corresponds to 36,1% and 12,8% of the total inventory costs with GB1 and 18,5% and 27,9% of the costs totals with inventory with GB2.

Table 2 - Result of ABC Analysis applied to GB1 brand as of May 2023 – 768 total SKU.

Class	Nº Articles	% Articles	% Value
Class A	154	20	70
Class B	230	30	25
Class C	384	50	5
Total	768		

Table 3 - Result of ABC Analysis from GB2 Articles as of May 2023 – 469 total SKU.

Class	Nº Articles	% Articles	% Value
Class A	94	20	70
Class B	141	30	25
Class C	234	50	5
Total	469		

Articles belonging to category A are those that have the greatest impact on the company's financial sustainability and consequently those that require more appropriate control (*e.g.,* attention during new sales cycles, promotional campaigns or new launches). Category B and C have an intermediate and relatively low impact on the company, respectively, will not be the subject of study. In Figure 5 it is possible to observe the ABC analysis curve for GB1 brand products. In the X axis the cumulative percentage of total items (in percentage) and in the Y axis, the cumulative percentage of total sales (in percentage).
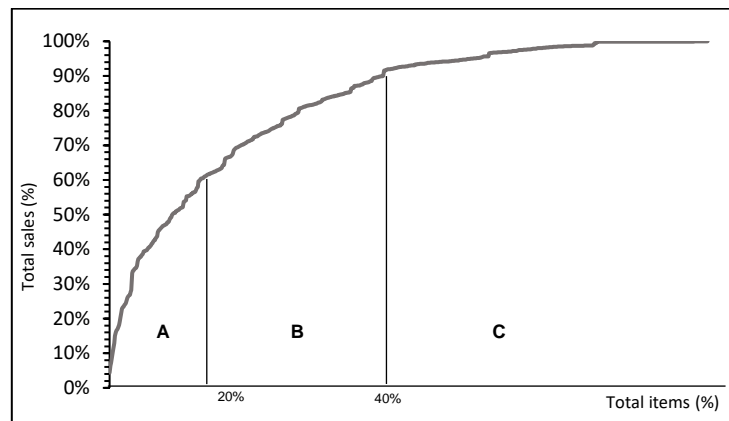
Figure 5 - ABC Analysis Curve (Pareto Curve) for the GB1 Brand.

4.2.   TOTAL COSTS

It was necessary to make a comparison between the values of the company before and after application of the study. To this end, we determined the total cost of the stock management operation of the company.

The following formula is used to calculate total costs.

$$TC = \frac{D}{Q} \times S + \frac{I \times C \times Q}{2}$$

Variables

TC: Yearly total cost relative to stock (€ / Year)

Q: Quantity to order (Units)

D: Demand rate / Annual consumption (Units / Year)

S: Unit order cost (€ / Order)

C: Unit acquisition cost (€ / Order)

I: Stock ownership cost (% / Year)

To determine the quantity to order (Q) we look at data obtained from XPTO Company for Brand 1 and Brand 2 presented in Table 4 and Table 5, respectively, with their totality being present in Appendix 7 and Appendix 8. N is defined as the coefficient between the Demand Rate (D) and Quantity to Order (Q).

Table 4 – Q value before EOQ model implementation of the GB1 brand.

#	SKU	D	Q	N
1	10597	11636	1257	9,3
2	104987	5252	1250	4,2
3	10592	2225	193	11,5
4	101968	4659	833	5,6
5	101975	3362	708	4,7
6	105641	2939	1343	2,2
7	101876	4118	1020	4,0
8	104989	5611	100	56,1
9	101877	2920	875	3,3
10	101591	1179	317	3,7

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Table 5 - Q value before EOQ model implementation of the GB2 brand.

#	SKU	D	Q	N
1	107080	2609	150,0	17,39
2	105739	2433	241,7	10,07
3	106132	216	125,0	1,73
4	105718	847	250,0	3,39
5	105615	808	110,8	7,29
6	106261	1039	66,7	15,59
7	105394	2214	30,2	73,40
8	105322	716	75,0	9,54
9	105393	843	150,0	5,62
10	105162	695	18,2	38,24

In the year of 2023, the company "XPTO" spent on a total of 768 products (GB1) and 469 products (GB2), an Order Placement and Stock Holding Cost of 8308,55 € (Table 6) and 2203,36 € (Table 7), respectively. The cost of placing the order was considered by the company to be of 1 Euro (€) per order, on average. The Cost of Stock Possession was provided by the company XPTO to be of 25%. Thus, to calculate the Total Costs (TC) of the articles, the value of article 10597 of Brand GB1 and the value of article 105739 of Brand GB2 were used as an example, where:

GB1

D= 11 636

Q= 1 257 units

S= 1,00 €

I= 25,00%

C= 3,22

GB2

D= 2433 units

Q= 20,1 units

S= 1,00 €

I= 25,00%

C= 0,63 €

Thus,

$$TC_{(10597)} = \frac{D}{Q} * S + \frac{I * C * Q}{2} = \frac{11636}{1257} * 1 + \frac{0,25 * 2,50 * 1257}{2} = 515,20 €$$

$$TC_{(205739)} = \frac{D}{Q} * S + \frac{I \, x \, C \, x \, Q}{2} = \frac{2433}{20,1} * 1 + \frac{0,25 * 0,63 * 2433}{2} = 127,13 €$$

To determine the Quantity to order (Q) we use the data provided by the company XPTO, partially presented in Table 6 and 7 (the entirety is presented in Appendix 13 and 14).

Table 6 - Total costs per product from the GB1 brand (2023).

#	SKU	D	Q	S	I	C	TC
1	10597	11636	1257,0	1,00 €	25%	3,22	515,20
2	104987	5252	1250,0	1,00 €	25%	1,23	196,39
3	10592	2225	192,7	1,00 €	25%	7,71	197,23
4	101968	4659	833,3	1,00 €	25%	0,99	108,72
5	101975	3362	708,3	1,00 €	25%	1,05	97,72
6	105641	2939	1343,3	1,00 €	25%	2,20	371,60
7	101876	4118	1020,8	1,00 €	25%	1,99	257,97
8	104989	5611	100,0	1,00 €	25%	2,16	83,11
9	101877	2920	875,0	1,00 €	25%	1,89	210,06
10	101591	1179	316,7	1,00 €	25%	3,40	138,31
						Total	8308,55

Table 7 - Total costs per product from GB2 brand (2023).

#	SKU	D	Q	S	I	C	TC
1	107080	2609	12,5	1,00 €	25%	1,00	210,28
2	105739	2433	20,1	1,00 €	25%	2,50	127,13
3	106132	216	10,4	1,00 €	25%	1,92	23,22
4	105718	847	20,8	1,00 €	25%	0,70	42,45
\5	105615	808	9,2	1,00 €	25%	1,04	88,63
6	106261	1039	5,6	1,00 €	25%	2,40	188,69
7	105394	2214	2,5	1,00 €	25%	1,21	881,22
8	105322	716	6,3	1,00 €	25%	0,63	115,01

9	105393	843	1,5	1,00 €	25%	0,39	572,45
10	105162	695	1,5	1,00 €	25%	1,17	459,06
						Total	10 358,73

Having concluded the calculation of the Total Cost for all Class A articles from the company XPTO, we can state that the Total Cost of the GB1 brand products is 8 308,55 € and for the GB2 brand it is 10 358,73 €.

4.3. PERIODIC REVIEW CONTROL: THE ECONOMIC ORDER QUANTITY

In order to optimize XPTO's stock management, it is necessary to calculate the order quantity so that total inventory costs can be optimized. To do this we use the Economic Order Quantity formula. For this we use the formula of Economic Order Quantity (EOQ) (Table 8 and Table 9):

$$EOQ = \sqrt{\frac{2 \times D \times S}{I \times C}}$$

Variables

EOQ = Economic Order Quantity (Units)

D: Demand rate / Annual consumption (Units / Year)

S: Ordering cost per order (€ / Order)

I: Cost of stock ownership (% / Year)

C: Cost of unit acquisition (€ / Order)

Article nº2 from the GB1 will be used as an example:

$$EOQ_{(104987)} = \sqrt{\frac{2 \times 5252 \times 1}{0,25 \times 1,23}} = 184,82 \text{ units (185 units rounded up).}$$

Table 8 shows an example of Class A articles from GB1 and Table 9 from GB2 with respective Appendices 9 and 10 showing more articles from Class A from both brands.

Table 8 – Economic Order Quantity of GB1.

#	SKU	D	S	I	C	EOQ
1	10597	11636	1,00 €	25%	3,22	170,03
2	104987	5252	1,00 €	25%	1,23	184,82
3	10592	2225	1,00 €	25%	7,71	48,05
4	101968	4659	1,00 €	25%	0,99	194,03
5	101975	3362	1,00 €	25%	1,05	160,05
6	105641	2939	1,00 €	25%	2,20	103,38
7	101876	4118	1,00 €	25%	1,99	128,67
8	104989	5611	1,00 €	25%	2,16	144,16
9	101877	2920	1,00 €	25%	1,89	111,17
10	101591	1179	1,00 €	25%	3,40	52,67

Table 9 - Economic Order Quantity of GB2.

#	SKU	D	S	I	C	EOQ
1	107080	2609,0	1,00 €	25%	1,00	144,47
2	105739	2433,4	1,00 €	25%	2,50	88,24
3	106132	215,8	1,00 €	25%	1,92	29,99
4	105718	846,5	1,00 €	25%	0,70	98,36
5	105615	807,5	1,00 €	25%	1,04	78,81
6	106261	1039,0	1,00 €	25%	2,40	58,85
7	105394	2214,3	1,00 €	25%	1,21	121,00
8	105322	715,7	1,00 €	25%	0,63	95,33
9	105393	842,7	1,00 €	25%	0,39	131,47
10	105162	694,6	1,00 €	25%	1,17	68,92

$$N = \frac{D}{Q}$$

Variables

N: Number of orders per year (units)

T: Time between orders (days)

LT: Lead time

$$T = \frac{Q}{D}$$

26

Q: Quantity to order (Units)

D: Demand rate (units/year) but for use in the ROP formula, we have to divide it by 12 months of the year.

$$ROP = d * LT$$

ROP: Reorder Point (units)

d: Demand rate (days)

LT: Lead Time

For instance, for the product of GB2 "107080", with an N = 9,3, d of 31,9 and ROP of 127,6 means for the management of the company XPTO to be more effective, it should have placed 9,3 * 12 = 112 orders per year in an interval of 31,9 (so, 32 days) between each order. Every time the stock hits 128 units (corresponding to the ROP in Table 10) a new order should be placed.

Table 10 and 11 partially shows the calculation of the variables mentioned above from some Class A products (with totally in Appendix 11 and 12). In Table 12 and 13, we can observe the total costs before and after applying the Periodic Review Control. Therefore, it is possible to see that the total costs for 2023 without the economic ordering model are 8308,55 € and with the model 3116,59 € for GB1 and 10 210,25 € and with the model 872,31€, which translates into a reduction of 62,49 % and 91,46 % respectively of total inventory costs. When we look at global differences in percentage of each Class A product, the differences are, respectively, 46,36% for GB1 and 79,96% for GB2. Attached are the calculations and comparison of Total Costs in their entirety for each brand (Appendix 13 and 14).

Table 10 – Calculating N, T, LT and ROP for GB1.

#	SKU	D	EOQ	N	T	d	LT	ROP
1	10597	11636	170,03	9,3	0,11	31,9	4	127,6
2	104987	5252	184,82	4,2	0,24	14,4	4	57,6
3	10592	2225	48,05	11,5	0,09	6,1	4	24,4
4	101968	4659	194,03	5,6	0,18	12,8	4	51,2
5	101975	3362	160,05	4,7	0,21	9,2	4	36,8
6	105641	2939	103,38	2,2	0,46	8,1	4	32,4
7	101876	4118	128,67	4,0	0,25	11,3	4	45,2
8	104989	5611	144,16	56,1	0,02	15,4	4	61,6
9	101877	2920	111,17	3,3	0,30	8	4	32
10	101591	1179	52,67	3,7	0,27	3,2	4	12,8

Table 11- Calculating N, T, LT and ROP for GB2.

#	SKU	D	EOQ	N	T	D	LT	ROP
1	107080	2609,00	144,47	208,72	0,005	7,1	4	28,4
2	105739	2433,43	88,24	120,83	0,008	6,7	4	26,8
3	106132	215,80	29,99	20,72	0,048	0,6	4	2,4
4	105718	846,50	98,36	40,63	0,025	2,3	4	9,2
5	105615	807,50	78,81	87,43	0,011	2,2	4	8,8
6	106261	1039,00	58,85	187,02	0,005	2,8	4	11,2
7	105394	2214,33	121,00	880,84	0,002	6,1	4	24,4
8	105322	715,71	95,33	114,51	0,009	2	4	8
9	105393	842,67	131,47	572,38	0,002	2,3	4	9,2
10	105162	694,63	68,92	458,83	0,0022	1,9	4	7,6

5. FINAL REMARKS

The present study had as its main objective the review and optimization of a stock management for an international cosmetics company with operations in Portugal. To achieve this objective, the academic and stock management model of the Periodic Order Review was applied to data provided by the XPTO company in regards to May of the year 2023.

For the analysis of the 768 articles corresponding to the GB1 brand inventory and the 469 GB2 brand inventory, ABC classification was used. With this, it was possible to identify critical products, which have the greatest impact on the total inventory costs and which are essential to focus, so the company can reduce its costs, guaranteeing the company's revenue maximization.

The items that represent Class A are those that require greater focus, analysis, control and management as they are those that have the greatest impact on inventory costs. To do this, in addition to this classification, it is necessary to carry out the calculations and apply the Periodic Review Control model that establishes the frequency and quantity to be ordered, in order for total annual costs are low.

The significance of a new stock management model can have a substantial impact on a business's overall efficiency, profitability, and competitiveness. By implementing an effective stock management model, the business can reduce carrying costs associated with warehousing, insurance or financing. By ensuring that the right amount of inventory is on hand, a business can avoid overstocking (which ties up capital) and understocking (which can lead to missed sales opportunities). With the adequate stock management model, a business can optimize its cash flow by minimizing the amount of capital tied up in excess inventory. This enables the company to allocate resources more efficiently, such as investing in its growth and a reduced risk of stockouts can also occur. Stockouts can result in lost sales, damage to a company's reputation, and increased costs due to expedited shipping or lost customers. An effective stock management model helps minimize the risk of stockouts by ensuring that inventory levels are adequate.

One of the dimensions which can be affected is cost and its mitigation. Regarding the first investigation question raised in Chapter 3.2., "What is an alternative stock management model that maximizes delivery of orders to the final customer in a cosmetics industry?" one of the models that the company decided to give data was for the application of the academic model of the Periodic Review Control (PRC) (to the detriment of basing demand simply with MRP techniques). Regarding the second question of "What does this model contribute to the company's improvement in the form of total costs?", it would achieve a reduction in total costs

from 8308,55 € to 3116,59 €, which represents less than 62,49% for GB1 (when we look at a global difference of each percentage we obtain a difference of 46,36%) and a 10 210,25 € to 872,3 €, a reduction of 91,46 % for GB2 (when we look at each difference in percentage we see a 79,96% reduction). A proper stock management ensures that products are consistently available when customers want them in turn, leading to higher customer satisfaction and boosted loyalty.

Many stock management models heavily rely on data analytics and forecasting techniques to make objective decisions. This allows businesses to make informed decisions based on historical sales data, market trends or other relevant information. Data-driven decision-making can lead to more accurate demand forecasting and inventory planning. Through this, competitive advantage could be achieved through a competitive edge, that is a more quickly response to changing market conditions and customer demands, potentially outperforming competitors with less efficient inventory management. An efficient stock management reduces the likelihood of cosmetics becoming obsolete due to validity issues. This minimizes waste and can be particularly important in these types of industries (*e.g.*, obsolescence due to shelf life).

It is also recommended to consider the intense variations in product acquirement throughout the months (*e.g.*, peak on Valentine's Day and Christmas) and the seasonality of product sales in different distribution channels (stores, online commerce and direct sales (DS)) during holiday periods and commemorative days since we are present in a business whose brands are "extensively promotional". It would also be interesting to study the impact of other academic models on the company's total annual costs, such as the Periodic Review model with quantity discount in order to analyse the possible advantages and study impacts on total costs.

During the writing of this dissertation, there was a limitation in obtaining the data provided by the company mainly due to a verbal, exclusivity and confidentially agreement partook by both parties. A period of time where longitudinal data is obtained would be beneficial to study the advantages and disadvantages of this model in periods of high and low demand.

Based on this case study in the considered time period, the company should apply the aforementioned academic model with the aim of improving its stock management since there exists a "steep" reduction in inventory costs when looking at both brands however, an overarching approach should be taken into consideration. Procurement of these items have advantages when being ordered on a monthly basis and in bulk due to quality standards so an approach that favours simplicity in handling, picking operations and allocation of items should be studied.

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APPENDICES

The Tables in these Appendices present data of each article of the XPTO Company that is necessary for managing and planning stocks.

- "#": Number defining each SKU (stock keeping unit).
- "Articles": SKU defining number: Number to identify respective Stock Keeping Unit.
- Brand: Within the portfolio of "GB1" and "GB2", the products are included in different brands.

For a better understanding of the products that make up the portfolio of the "GB1" and "GB2" brands, the following tables show the total number of keys by status and by category as of May 2023.

Appendix 1 – Inventory of XPTO's GB1 Brand.

#	Articles	#	Articles	#	Articles	#	Articles	#	Articles	#	Articles	#	Articles
1	10597	81	104815	161	103092	241	104688	321	105697	401	104226	481	107603
2	104987	82	104996	162	104840	242	105633	322	106560	402	10752	482	105542
3	10592	83	101587	163	10156	243	10155	323	106250	403	104217	483	105221
4	101968	84	104661	164	103225	244	105707	324	106276	404	106988	484	104179
5	101975	85	105130	165	104841	245	105716	325	106196	405	103474	485	104211
6	105641	86	104843	166	103963	246	104716	326	106676	406	106301	486	105805
7	101876	87	10142	167	105632	247	106151	327	106483	407	106902	487	104147
8	104989	88	106309	168	104194	248	104850	328	10808	408	106040	488	105120
9	101877	89	106564	169	104866	249	104689	329	106216	409	10459	489	105061
10	101591	90	105131	170	105452	250	106766	330	104694	410	106339	490	105993
11	10569	91	104817	171	104993	251	102094	331	106368	411	107014	491	106737
12	103087	92	105779	172	105757	252	105668	332	106739	412	107428	492	103477
13	106311	93	106141	173	105451	253	104889	333	107426	413	104145	493	104227
14	10598	94	10703	174	10180	254	106561	334	107287	414	104221	494	105807
15	105937	95	105362	175	104765	255	104709	335	103979	415	106632	495	106016
16	104992	96	105277	176	104641	256	105271	336	106158	416	107429	496	106225
17	105275	97	101068	177	104823	257	105484	337	105868	417	1043349	497	107450
18	106306	98	102100	178	105267	258	105935	338	107026	418	105121	498	10754
19	106432	99	106307	179	105674	259	103865	339	105389	419	104224	499	106573
20	102360	100	104635	180	105438	260	105209	340	10788	420	107002	500	104152
21	10562	101	106459	181	104845	261	106195	341	105776	421	10458	501	105657
22	101907	102	105879	182	106150	262	105210	342	104237	422	107007	502	105986
23	104021	103	101067	183	104856	263	105819	343	103475	423	104151	503	105774
24	104884	104	106308	184	105712	264	104692	344	108248	424	104984	504	104146
25	103056	105	105288	185	104858	265	104759	345	104710	425	104150	505	107004
26	10400	106	102367	186	102285	266	105608	346	106251	426	103476	506	106224
27	105666	107	105703	187	10695	267	106293	347	106340	427	104983	507	107432
28	104634	108	105813	188	104860	268	10184	348	105869	428	104966	508	105806
29	104027	109	105335	189	104851	269	105719	349	107285	429	104922	509	104220
30	107019	110	105230	190	106246	270	105700	350	104215	430	104236	510	104140
31	104991	111	106204	191	105648	271	104771	351	104216	431	104156	511	106002
32	105287	112	104132	192	104886	272	106503	352	104213	432	104657	512	104148
33	106310	113	104564	193	106366	273	105629	353	106978	433	104225	513	105904
34	104715	114	10177	194	106206	274	105708	354	104517	434	106908	514	103579
35	10737	115	108578	195	105713	275	104395	355	104051	435	105509	515	106226
36	104636	116	105422	196	105487	276	104853	356	106254	436	104219	516	107433
37	10618	117	104202	197	106199	277	105654	357	106253	437	106631	517	106037
38	106383	118	104029	198	106148	278	105226	358	107284	438	104154	518	105369
39	104990	119	103697	199	103890	279	106367	359	104181	439	106738	519	105994
40	105334	120	105109	200	106408	280	104857	360	104276	440	106630	520	104279
41	105408	121	102192	201	106600	281	105721	361	107427	441	106019	521	104235
42	104028	122	106317	202	105651	282	105720	362	104214	442	107431	522	104222
43	106262	123	105279	203	10399	283	104693	363	105216	443	103867	523	105119
44	106312	124	106610	204	105628	284	106197	364	106201	444	107430	524	106003
45	104813	125	105705	205	105649	285	105698	365	107423	445	104613	525	106026
46	10704	126	104839	206	104770	286	105816	366	106305	446	104612	526	106994
47	105841	127	105704	207	104526	287	106200	367	105611	447	105329	527	106025
48	105333	128	106609	208	104192	288	106274	368	107003	448	103480	528	104615
49	102275	129	106194	209	104862	289	104256	369	107425	449	105513	529	103482
50	104822	130	104844	210	104205	290	10181	370	106629	450	106575	530	106004
51	1076	131	104595	211	105756	291	104826	371	105152	451	104218	531	105368
52	10141	132	105136	212	104863	292	105449	372	107012	452	105508	532	108391
53	105643	133	107295	213	106291	293	106504	373	10786	453	106038	533	105996
54	108601	134	105016	214	104757	294	105852	374	105421	454	106633	534	105370
55	104745	135	106315	215	106113	295	106338	375	105506	455	106578	535	108392
56	10629	136	105423	216	106399	296	105780	376	106337	456	104763	536	10617
57	105278	137	104678	217	106294	297	104872	377	104524	457	105330	537	106577
58	10158	138	106314	218	104195	298	106511	378	104238	458	104062	538	108394
59	106530	139	106400	219	106599	299	106558	379	105505	459	107006	539	105905
60	103439	140	105880	220	103678	300	105607	380	102248	460	106574	540	104611
61	10615	141	106752	221	105655	301	105609	381	105606	461	107013	541	106017
62	104565	142	104870	222	102098	302	105630	382	104523	462	106020	542	105997
63	10154	143	104842	223	106502	303	105941	383	105610	463	105543	543	106032
64	104749	144	105538	224	105634	304	105284	384	105626	464	106223	544	104164
65	105101	145	104855	225	104849	305	105328	385	106580	465	102185	545	108393
66	106361	146	104444	226	104133	306	104691	386	104157	466	105635	546	106001
67	104640	147	106364	227	104277	307	106149	387	107015	467	106907	547	104143
68	102216	148	106434	228	106598	308	104707	388	105447	468	103529	548	108107
69	103930	149	107022	229	106295	309	105669	389	106903	469	106222	549	105976
70	103852	150	106597	230	105714	310	106559	390	104504	470	105062	550	105995
71	105231	151	10567	231	104201	311	108214	391	106336	471	106041	551	108389
72	105486	152	105702	232	104695	312	105659	392	104982	472	108464	552	101611
73	102082	153	105647	233	104888	313	106157	393	106009	473	104614	553	105981
74	10398	154	105229	234	105715	314	105874	394	10827	474	103478	554	104176
75	104128	155	106198	235	10563	315	107025	395	104212	475	105220	555	104223
76	102873	156	105535	236	105671	316	104859	396	105432	476	106022	556	103745
77	104742	157	104885	237	105123	317	106562	397	103557	477	105507	557	105980
78	104750	158	10454	238	106292	318	105347	398	104631	478	105992	558	105975
79	105944	159	102097	239	107283	319	105845	399	107011	479	106576	559	106000
80	10397	160	105450	240	103679	320	105701	400	104522	480	10789	560	105977

#	Articles	#	Articles	#	Articles
561	105982	641	106855	721	1010011
562	105415	642	107040	722	1010014
563	105987	643	107041	723	1010015
564	106027	644	107042	724	1010016
565	108396	645	107055	725	1010134
566	106227	646	107301	726	1010175
567	104986	647	107302	727	1010177
568	105978	648	107303	728	1010178
569	105998	649	107304	729	1010185
570	105979	650	107306	730	1010186
571	107449	651	107320	731	1010188
572	108395	652	107327	732	1010191
573	103483	653	107378	733	1010214
574	108398	654	107380	734	1010215
575	104616	655	107381	735	1010259
576	105988	656	107382	736	1010260
577	105741	657	107383	737	1010261
578	108388	658	107384	738	1010350
579	105516	659	107385	739	1010353
580	103746	660	107387	740	1010468
581	102341	661	107436	741	1010521
582	105263	662	107437	742	1010545
583	108390	663	107438	743	1010602
584	10814	664	107439	744	1010652
585	105985	665	107440	745	1010657
586	106228	666	108032	746	1010706
587	108401	667	108127	747	1010785
588	106551	668	108129	748	1011342
589	105991	669	108130	749	10201712
590	103744	670	108131	750	10201915
591	106034	671	108150	751	101000019
592	1043945	672	108151	752	101000222
593	106031	673	108277	753	109990569
594	105367	674	108278	754	109990786
595	105374	675	108279	755	109999980
596	103481	676	108280	756	1099901877
597	107434	677	108281	757	1099902216
598	108108	678	108408	758	1099904140
599	105371	679	108410	759	1099904145
600	108399	680	108469	760	1099904146
601	10742	681	108484	761	1099904147
602	108402	682	108485	762	1099904151
603	105949	683	108486	763	1099904156
604	101300	684	108487	764	1099904181
605	105742	685	108489	765	1099904279
606	108403	686	108491	766	1099904750
607	101303	687	108497	767	1099905805
608	105135	688	108564	768	1099905807
609	108404	689	108565		
610	105930	690	108566		
611	105073	691	108642		
612	108397	692	108643		
613	1043350	693	108662		
614	1043915	694	108864		
615	108400	695	108993		
616	107290	696	108994		
617	101296	697	109038		
618	101297	698	109042		
619	106842	699	109044		
620	105134	700	109045		
621	101290	701	109123		
622	102328	702	109124		
623	104764	703	109128		
624	105242	704	109496		
625	105243	705	109499		
626	105280	706	109555		
627	105437	707	109562		
628	105645	708	109564		
629	106237	709	109647		
630	106470	710	109655		
631	106843	711	109656		
632	106844	712	109684		
633	106846	713	109691		
634	106847	714	109707		
635	106848	715	109715		
636	106849	716	109903		
637	106850	717	109946		
638	106851	718	1010008		
639	106852	719	1010009		
640	106853	720	1010010		

Appendix 2 - Inventory of XPTO's GB2 Brand.

#	Articles	#	Articles	#	Articles	#	Articles	#	Articles	#	Articles
1	107080	81	106277	161	105895	241	105410	321	105055	401	105748
2	105739	82	105077	162	105325	242	105368	322	105078	402	106046
3	106132	83	105516	163	105070	243	106206	323	105509	403	105047
4	105718	84	105079	164	105769	244	106421	324	105029	404	106422
5	105615	85	106172	165	106094	245	105801	325	105650	405	106437
6	106261	86	105156	166	105090	246	105702	326	106216	406	105446
7	105394	87	105171	167	105738	247	105781	327	106198	407	105181
8	105322	88	105726	168	105146	248	105510	328	105792	408	105590
9	105393	89	105046	169	106190	249	105692	329	105280	409	106200
10	105162	90	105082	170	105655	250	106211	330	106435	410	105787
11	106489	91	106577	171	105085	251	106518	331	105790	411	105839
12	106463	92	106360	172	106084	252	106126	332	105865	412	105785
13	106462	93	105452	173	105124	253	105021	333	106207	413	105052
14	105883	94	106351	174	105467	254	106203	334	105184	414	105316
15	106158	95	106100	175	105523	255	106101	335	106247	415	106244
16	106260	96	105521	176	105369	256	106096	336	106241	416	105866
17	105529	97	105417	177	106086	257	105444	337	105357	417	105019
18	105361	98	105337	178	105780	258	106045	338	105826	418	105053
19	107104	99	105081	179	106220	259	105004	339	106029	419	106229
20	106419	100	107153	180	105888	260	105152	340	105784	420	105610
21	105740	101	105154	181	105364	261	105904	341	105465	421	105663
22	105360	102	106413	182	105517	262	105283	342	105147	422	105858
23	105306	103	105747	183	106239	263	105169	343	106240	423	105135
24	105142	104	106353	184	106496	264	105017	344	105823	424	106112
25	105352	105	105143	185	106509	265	106539	345	106222	425	106224
26	105772	106	106191	186	107272	266	106410	346	105931	426	105857
27	106514	107	105468	187	106436	267	105129	347	106103	427	105151
28	105685	108	106278	188	106095	268	105050	348	106004	428	105840
29	107079	109	105340	189	105766	269	105701	349	105864	429	106111
30	105525	110	105144	190	105592	270	106519	350	105786	430	105841
31	105618	111	106580	191	105776	271	106195	351	105789	431	105413
32	107348	112	105565	192	105058	272	105284	352	105285	432	105185
33	105277	113	106508	193	105762	273	105506	353	105835	433	105037
34	106090	114	105806	194	106221	274	105884	354	105649	434	105409
35	106091	115	105278	195	106124	275	105867	355	105014	435	105677
36	107350	116	106237	196	106276	276	105370	356	106199	436	105165
37	106490	117	106039	197	105601	277	105363	357	106208	437	105178
38	107351	118	106192	198	105512	278	106238	358	105593	438	105838
39	106484	119	106194	199	106201	279	106279	359	105652	439	105899
40	107349	120	105173	200	105808	280	105594	360	106210	440	105166
41	105359	121	106350	201	106083	281	105365	361	105003	441	107436
42	105691	122	105761	202	106097	282	106127	362	105431	442	107437
43	105569	123	105033	203	106438	283	105462	363	105469	443	107438
44	107271	124	105319	204	105582	284	105859	364	106205	444	107439
45	105600	125	106044	205	105042	285	105071	365	105025	445	107326
46	106093	126	105779	206	106122	286	105445	366	105281	446	107323
47	106159	127	105426	207	105802	287	105513	367	106246	447	107325
48	105798	128	106358	208	105008	288	105861	368	105315	448	107324
49	106513	129	105566	209	105520	289	105045	369	106109	449	107198
50	105793	130	106087	210	105366	290	105775	370	105287	450	107273
51	106581	131	105013	211	105145	291	105007	371	106128	451	105820
52	106119	132	105976	212	105804	292	106104	372	106227	452	105057
53	106156	133	105174	213	105909	293	105457	373	106223	453	105182
54	105877	134	105010	214	105463	294	105180	374	106523	454	105799
55	105768	135	106537	215	106495	295	105043	375	105800	455	107260
56	106139	136	105344	216	105771	296	106107	376	106196	456	107294
57	106485	137	106099	217	105367	297	106113	377	106197	457	101000171
58	107345	138	105828	218	106202	298	105782	378	105309	458	101000173
59	106352	139	106193	219	105074	299	105371	379	106110	459	101000172
60	107148	140	106359	220	105362	300	106105	380	105030	460	101000175
61	105164	141	106123	221	105054	301	105860	381	106214	461	101000174
62	106155	142	105583	222	105148	302	106102	382	105905	462	101000177
63	106285	143	106120	223	105778	303	105744	383	105038	463	101000176
64	107151	144	106012	224	105774	304	106125	384	105286	464	101000170
65	105690	145	105777	225	105783	305	106209	385	105414	465	107575
66	105333	146	105430	226	106412	306	105552	386	105314	466	107661
67	105141	147	105454	227	105282	307	105651	387	106225	467	107658
68	105728	148	106280	228	106219	308	105863	388	106129	468	107660
69	106501	149	106037	229	105001	309	105653	389	106108	469	107659
70	106361	150	106372	230	105830	310	105451	390	106521		
71	106138	151	106494	231	106515	311	106243	391	105791		

72	105076	152	105153	232	105773	312	105150	392	105032
73	106121	153	106491	233	106189	313	105155	393	106213
74	106098	154	106538	234	105829	314	106242	394	106212
75	105016	155	105461	235	105932	315	106215	395	105449
76	106174	156	105320	236	106013	316	106520	396	106226
77	105128	157	106173	237	105573	317	105862	397	105511
78	105175	158	107463	238	105575	318	106047	398	105170
79	106282	159	107105	239	105568	319	105788	399	105127
80	106092	160	105022	240	105745	320	106204	400	106106

Appendix 3 – Inventory's ABC Analysis of GB1.

#	SKU	Yearly Total	Value (%)	Cumulative Percent of Total Items	Cumulative Percent of Total Value	Class
1	10597	11 636,00	4,39%	0,13%	4,39%	A
2	104987	5 252,00	1,98%	0,26%	6,38%	A
3	10592	2 225,00	0,84%	0,39%	7,22%	A
4	101968	4 659,00	1,76%	0,52%	8,98%	A
5	101975	3 362,00	1,27%	0,65%	10,24%	A
6	105641	2 939,00	1,11%	0,78%	11,35%	A
7	101876	4 118,00	1,55%	0,91%	12,91%	A
8	104989	5 611,00	2,12%	1,04%	15,03%	A
9	101877	2 920,00	1,10%	1,17%	16,13%	A
10	101591	1 179,00	0,45%	1,30%	16,57%	A
11	10569	898,00	0,34%	1,43%	16,91%	A
12	103087	1 312,00	0,50%	1,56%	17,41%	A
13	106311	1 898,00	0,72%	1,69%	18,13%	A
14	10598	2 428,00	0,92%	1,82%	19,04%	A
15	105937	2 909,00	1,10%	1,95%	20,14%	A
16	104992	4 240,00	1,60%	2,08%	21,74%	A
17	105275	3 050,00	1,15%	2,21%	22,89%	A
18	106306	1 166,00	0,44%	2,34%	23,33%	A
19	106432	304,00	0,11%	2,47%	23,45%	A
20	102360	1 466,00	0,55%	2,60%	24,00%	A
21	10562	455,00	0,17%	2,73%	24,17%	A
22	101907	725,00	0,27%	2,86%	24,45%	A
23	104021	2 295,00	0,87%	2,99%	25,31%	A
24	104884	1 779,00	0,67%	3,13%	25,99%	A
25	103056	1 369,00	0,52%	3,26%	26,50%	A
26	10400	475,00	0,18%	3,39%	26,68%	A
27	105666	263,00	0,10%	3,52%	26,78%	A
28	104634	2 367,00	0,89%	3,65%	27,67%	A
29	104027	1 324,00	0,50%	3,78%	28,17%	A
30	107019	12 971,00	4,90%	3,91%	33,07%	A
31	104991	1 923,00	0,73%	4,04%	33,80%	A
32	105287	351,00	0,13%	4,17%	33,93%	A
33	106310	1 026,00	0,39%	4,30%	34,32%	A
34	104715	377,00	0,14%	4,43%	34,46%	A
35	10737	410,00	0,15%	4,56%	34,61%	A
36	104636	1 597,00	0,60%	4,69%	35,22%	A
37	10618	3 280,00	1,24%	4,82%	36,46%	A
38	106383	1 901,00	0,72%	4,95%	37,17%	A
39	104990	662,00	0,25%	5,08%	37,42%	A
40	105334	919,00	0,35%	5,21%	37,77%	A
41	105408	246,00	0,09%	5,34%	37,86%	A
42	104028	1 149,00	0,43%	5,47%	38,30%	A
43	106262	347,00	0,13%	5,60%	38,43%	A
44	106312	1 141,00	0,43%	5,73%	38,86%	A
45	104813	1 364,00	0,51%	5,86%	39,37%	A
46	10704	256,00	0,10%	5,99%	39,47%	A
47	105841	242,00	0,09%	6,12%	39,56%	A
48	105333	287,00	0,11%	6,25%	39,67%	A
49	102275	319,00	0,12%	6,38%	39,79%	A
50	104822	1 227,00	0,46%	6,51%	40,25%	A
51	1076	586,00	0,22%	6,64%	40,47%	A
52	10141	357,00	0,13%	6,77%	40,61%	A
53	105643	668,00	0,25%	6,90%	40,86%	A
54	108601	589,00	0,22%	7,03%	41,08%	A
55	104745	1 319,00	0,50%	7,16%	41,58%	A
56	10629	328,00	0,12%	7,29%	41,71%	A
57	105278	1 348,00	0,51%	7,42%	42,21%	A
58	10158	896,00	0,34%	7,55%	42,55%	A

59	106530	176,00	0,07%	7,68%	42,62%	A
60	103439	1 531,00	0,58%	7,81%	43,20%	A
61	10615	327,00	0,12%	7,94%	43,32%	A
62	104565	1 174,00	0,44%	8,07%	43,76%	A
63	10154	3 123,00	1,18%	8,20%	44,94%	A
64	104749	1 365,00	0,52%	8,33%	45,46%	A
65	105101	234,00	0,09%	8,46%	45,55%	A
66	106361	1 097,00	0,41%	8,59%	45,96%	A
67	104640	531,00	0,20%	8,72%	46,16%	A
68	102216	519,00	0,20%	8,85%	46,36%	A
69	103930	896,00	0,34%	8,98%	46,70%	A
70	103852	205,00	0,08%	9,11%	46,77%	A
71	105231	227,00	0,09%	9,24%	46,86%	A
72	105486	563,00	0,21%	9,37%	47,07%	A
73	102082	289,00	0,11%	9,51%	47,18%	A
74	10398	184,00	0,07%	9,64%	47,25%	A
75	104128	1 364,00	0,51%	9,77%	47,77%	A
76	102873	167,00	0,06%	9,90%	47,83%	A
77	104742	266,00	0,10%	10,03%	47,93%	A
78	104750	1 790,00	0,68%	10,16%	48,60%	A
79	105944	953,00	0,36%	10,29%	48,96%	A
80	10397	651,00	0,25%	10,42%	49,21%	A
81	104815	1 595,00	0,60%	10,55%	49,81%	A
82	104996	990,00	0,37%	10,68%	50,19%	A
83	101587	413,00	0,16%	10,81%	50,34%	A
84	104661	265,00	0,10%	10,94%	50,44%	A
85	105130	197,00	0,07%	11,07%	50,52%	A
86	104843	1 119,00	0,42%	11,20%	50,94%	A
87	10142	253,00	0,10%	11,33%	51,03%	A
88	106309	408,00	0,15%	11,46%	51,19%	B
89	106564	308,00	0,12%	11,59%	51,30%	B
90	105131	201,00	0,08%	11,72%	51,38%	B
91	104817	1 091,00	0,41%	11,85%	51,79%	B
92	105779	194,00	0,07%	11,98%	51,87%	B
93	106141	189,00	0,07%	12,11%	51,94%	B
94	10703	214,00	0,08%	12,24%	52,02%	B
95	105362	205,00	0,08%	12,37%	52,10%	B
96	105277	4 382,00	1,65%	12,50%	53,75%	B
97	101068	183,00	0,07%	12,63%	53,82%	B
98	102100	312,00	0,12%	12,76%	53,94%	B
99	106307	342,00	0,13%	12,89%	54,07%	B
100	104635	3 112,00	1,17%	13,02%	55,24%	B
101	106459	133,00	0,05%	13,15%	55,29%	B
102	105879	101,00	0,04%	13,28%	55,33%	B
103	101067	195,00	0,07%	13,41%	55,40%	B
104	106308	337,00	0,13%	13,54%	55,53%	B
105	105288	484,00	0,18%	13,67%	55,71%	B
106	102367	717,00	0,27%	13,80%	55,98%	B
107	105703	165,00	0,06%	13,93%	56,05%	B
108	105813	826,00	0,31%	14,06%	56,36%	B
109	105335	103,00	0,04%	14,19%	56,40%	B
110	105230	309,00	0,12%	14,32%	56,51%	B
111	106204	105,00	0,04%	14,45%	56,55%	B
112	104132	1 671,00	0,63%	14,58%	57,18%	B
113	104564	1 288,00	0,49%	14,71%	57,67%	B
114	10177	794,00	0,30%	14,84%	57,97%	B
115	108578	4 473,00	1,69%	14,97%	59,66%	B
116	105422	189,00	0,07%	15,10%	59,73%	B
117	104202	693,00	0,26%	15,23%	59,99%	B
118	104029	922,00	0,35%	15,36%	60,34%	B
119	103697	275,00	0,10%	15,49%	60,44%	B
120	105109	107,00	0,04%	15,63%	60,48%	B
121	102192	263,00	0,10%	15,76%	60,58%	B
122	106317	650,00	0,25%	15,89%	60,83%	B
123	105279	500,00	0,19%	16,02%	61,02%	B
124	106610	247,00	0,09%	16,15%	61,11%	B
125	105705	192,00	0,07%	16,28%	61,18%	B
126	104839	785,00	0,30%	16,41%	61,48%	B
127	105704	112,00	0,04%	16,54%	61,52%	B
128	106609	229,00	0,09%	16,67%	61,61%	B
129	106194	215,00	0,08%	16,80%	61,69%	B
130	104844	507,00	0,19%	16,93%	61,88%	B
131	104595	137,00	0,05%	17,06%	61,93%	B
132	105136	236,00	0,09%	17,19%	62,02%	B
133	107295	348,00	0,13%	17,32%	62,15%	B
134	105016	69,00	0,03%	17,45%	62,18%	B
135	106315	479,00	0,18%	17,58%	62,36%	B
136	105423	145,00	0,05%	17,71%	62,41%	B

137	104678	104,00	0,04%	17,84%	62,45%	B
138	106314	578,00	0,22%	17,97%	62,67%	B
139	106400	317,00	0,12%	18,10%	62,79%	B
140	105880	73,00	0,03%	18,23%	62,82%	B
141	106752	250,00	0,09%	18,36%	62,91%	B
142	104870	235,00	0,09%	18,49%	63,00%	B
143	104842	502,00	0,19%	18,62%	63,19%	B
144	105538	210,00	0,08%	18,75%	63,27%	B
145	104855	666,00	0,25%	18,88%	63,52%	B
146	104444	1 427,00	0,54%	19,01%	64,06%	B
147	106364	625,00	0,24%	19,14%	64,30%	B
148	106434	95,00	0,04%	19,27%	64,33%	B
149	107022	4 747,00	1,79%	19,40%	66,13%	B
150	106597	498,00	0,19%	19,53%	66,31%	B
151	10567	164,00	0,06%	19,66%	66,38%	B
152	105702	119,00	0,04%	19,79%	66,42%	B
153	105647	382,00	0,14%	19,92%	66,56%	B
154	105229	160,00	0,06%	20,05%	66,62%	B
155	106198	109,00	0,04%	20,18%	66,67%	B
156	105535	247,00	0,09%	20,31%	66,76%	B
157	104885	290,00	0,11%	20,44%	66,87%	B
158	10454	902,00	0,34%	20,57%	67,21%	B
159	102097	685,00	0,26%	20,70%	67,47%	B
160	105450	2 809,00	1,06%	20,83%	68,53%	B
161	103092	513,00	0,19%	20,96%	68,72%	B
162	104840	680,00	0,26%	21,09%	68,98%	B
163	10156	699,00	0,26%	21,22%	69,24%	B
164	103225	83,00	0,03%	21,35%	69,27%	B
165	104841	346,00	0,13%	21,48%	69,40%	B
166	103963	278,00	0,10%	21,61%	69,51%	B
167	105632	543,00	0,21%	21,74%	69,71%	B
168	104194	122,00	0,05%	21,88%	69,76%	B
169	104866	271,00	0,10%	22,01%	69,86%	B
170	105452	579,00	0,22%	22,14%	70,08%	B
171	104993	68,00	0,03%	22,27%	70,11%	B
172	105757	44,00	0,02%	22,40%	70,12%	B
173	105451	537,00	0,20%	22,53%	70,33%	B
174	10180	350,00	0,13%	22,66%	70,46%	B
175	104765	443,00	0,17%	22,79%	70,63%	B
176	104641	268,00	0,10%	22,92%	70,73%	B
177	104823	365,00	0,14%	23,05%	70,87%	B
178	105267	475,00	0,18%	23,18%	71,04%	B
179	105674	197,00	0,07%	23,31%	71,12%	B
180	105438	177,00	0,07%	23,44%	71,19%	B
181	104845	354,00	0,13%	23,57%	71,32%	B
182	106150	205,00	0,08%	23,70%	71,40%	B
183	104856	392,00	0,15%	23,83%	71,54%	B
184	105712	451,00	0,17%	23,96%	71,71%	B
185	104858	115,00	0,04%	24,09%	71,76%	B
186	102285	1 524,00	0,58%	24,22%	72,33%	B
187	10695	213,00	0,08%	24,35%	72,41%	B
188	104860	121,00	0,05%	24,48%	72,46%	B
189	104851	220,00	0,08%	24,61%	72,54%	B
190	106246	109,00	0,04%	24,74%	72,58%	B
191	105648	250,00	0,09%	24,87%	72,68%	B
192	104886	517,00	0,20%	25,00%	72,87%	B
193	106366	291,00	0,11%	25,13%	72,98%	B
194	106206	391,00	0,15%	25,26%	73,13%	B
195	105713	407,00	0,15%	25,39%	73,28%	B
196	105487	402,00	0,15%	25,52%	73,44%	B
197	106199	87,00	0,03%	25,65%	73,47%	B
198	106148	175,00	0,07%	25,78%	73,54%	B
199	103890	312,00	0,12%	25,91%	73,65%	B
200	106408	65,00	0,02%	26,04%	73,68%	B
201	106600	463,00	0,17%	26,17%	73,85%	B
202	105651	54,00	0,02%	26,30%	73,87%	B
203	10399	84,00	0,03%	26,43%	73,90%	B
204	105628	400,00	0,15%	26,56%	74,06%	B
205	105649	129,00	0,05%	26,69%	74,10%	B
206	104770	571,00	0,22%	26,82%	74,32%	B
207	104526	372,00	0,14%	26,95%	74,46%	B
208	104192	364,00	0,14%	27,08%	74,60%	B
209	104862	405,00	0,15%	27,21%	74,75%	B
210	104205	210,00	0,08%	27,34%	74,83%	B
211	105756	49,00	0,02%	27,47%	74,85%	B
212	104863	448,00	0,17%	27,60%	75,02%	B
213	106291	361,00	0,14%	27,73%	75,15%	B
214	104757	218,00	0,08%	27,86%	75,24%	B

215	106113	380,00	0,14%	27,99%	75,38%	B
216	106399	107,00	0,04%	28,13%	75,42%	B
217	106294	367,00	0,14%	28,26%	75,56%	B
218	104195	46,00	0,02%	28,39%	75,58%	B
219	106599	177,00	0,07%	28,52%	75,64%	B
220	103678	142,00	0,05%	28,65%	75,70%	B
221	105655	989,00	0,37%	28,78%	76,07%	B
222	102098	159,00	0,06%	28,91%	76,13%	B
223	106502	3 242,00	1,22%	29,04%	77,35%	B
224	105634	233,00	0,09%	29,17%	77,44%	B
225	104849	281,00	0,11%	29,30%	77,55%	B
226	104133	298,00	0,11%	29,43%	77,66%	B
227	104277	122,00	0,05%	29,56%	77,71%	B
228	106598	284,00	0,11%	29,69%	77,81%	B
229	106295	261,00	0,10%	29,82%	77,91%	B
230	105714	249,00	0,09%	29,95%	78,01%	B
231	104201	179,00	0,07%	30,08%	78,07%	B
232	104695	200,00	0,08%	30,21%	78,15%	B
233	104888	42,00	0,02%	30,34%	78,17%	B
234	105715	278,00	0,10%	30,47%	78,27%	B
235	10563	532,00	0,20%	30,60%	78,47%	B
236	105671	243,00	0,09%	30,73%	78,56%	B
237	105123	53,00	0,02%	30,86%	78,58%	B
238	106292	293,00	0,11%	30,99%	78,69%	B
239	107283	841,00	0,32%	31,12%	79,01%	B
240	103679	143,00	0,05%	31,25%	79,07%	B
241	104688	325,00	0,12%	31,38%	79,19%	B
242	105633	274,00	0,10%	31,51%	79,29%	B
243	10155	384,00	0,14%	31,64%	79,44%	B
244	105707	2 972,00	1,12%	31,77%	80,56%	B
245	105716	247,00	0,09%	31,90%	80,65%	B
246	104716	166,00	0,06%	32,03%	80,71%	B
247	106151	137,00	0,05%	32,16%	80,77%	B
248	104850	226,00	0,09%	32,29%	80,85%	B
249	104689	331,00	0,12%	32,42%	80,98%	B
250	106766	325,00	0,12%	32,55%	81,10%	B
251	102094	54,00	0,02%	32,68%	81,12%	B
252	105668	49,00	0,02%	32,81%	81,14%	B
253	104889	403,00	0,15%	32,94%	81,29%	B
254	106561	304,00	0,11%	33,07%	81,40%	B
255	104709	131,00	0,05%	33,20%	81,45%	B
256	105271	185,00	0,07%	33,33%	81,52%	B
257	105484	31,00	0,01%	33,46%	81,54%	B
258	105935	108,00	0,04%	33,59%	81,58%	B
259	103865	71,00	0,03%	33,72%	81,60%	B
260	105209	79,00	0,03%	33,85%	81,63%	B
261	106195	145,00	0,05%	33,98%	81,69%	B
262	105210	129,00	0,05%	34,11%	81,74%	B
263	105819	241,00	0,09%	34,24%	81,83%	B
264	104692	182,00	0,07%	34,37%	81,90%	B
265	104759	174,00	0,07%	34,51%	81,96%	B
266	105608	57,00	0,02%	34,64%	81,98%	B
267	106293	150,00	0,06%	34,77%	82,04%	B
268	10184	658,00	0,25%	34,90%	82,29%	B
269	105719	147,00	0,06%	35,03%	82,34%	B
270	105700	63,00	0,02%	35,16%	82,37%	B
271	104771	167,00	0,06%	35,29%	82,43%	B
272	106503	351,00	0,13%	35,42%	82,56%	B
273	105629	267,00	0,10%	35,55%	82,66%	B
274	105708	1 392,00	0,53%	35,68%	83,19%	B
275	104395	57,00	0,02%	35,81%	83,21%	B
276	104853	39,00	0,01%	35,94%	83,23%	B
277	105654	455,00	0,17%	36,07%	83,40%	B
278	105226	107,00	0,04%	36,20%	83,44%	B
279	106367	300,00	0,11%	36,33%	83,55%	B
280	104857	160,00	0,06%	36,46%	83,61%	B
281	105721	204,00	0,08%	36,59%	83,69%	B
282	105720	182,00	0,07%	36,72%	83,76%	B
283	104693	173,00	0,07%	36,85%	83,82%	B
284	106197	236,00	0,09%	36,98%	83,91%	B
285	105698	39,00	0,01%	37,11%	83,93%	B
286	105816	273,00	0,10%	37,24%	84,03%	B
287	106200	60,00	0,02%	37,37%	84,05%	B
288	106274	74,00	0,03%	37,50%	84,08%	B
289	104256	70,00	0,03%	37,63%	84,11%	B
290	10181	347,00	0,13%	37,76%	84,24%	B
291	104826	30,00	0,01%	37,89%	84,25%	B
292	105449	85,00	0,03%	38,02%	84,28%	B

293	106504	240,00	0,09%	38,15%	84,37%	B
294	105852	102,00	0,04%	38,28%	84,41%	B
295	106338	297,00	0,11%	38,41%	84,52%	B
296	105780	172,00	0,06%	38,54%	84,59%	B
297	104872	180,00	0,07%	38,67%	84,66%	B
298	106511	44,00	0,02%	38,80%	84,67%	B
299	106558	258,00	0,10%	38,93%	84,77%	B
300	105607	40,00	0,02%	39,06%	84,78%	B
301	105609	73,00	0,03%	39,19%	84,81%	B
302	105630	108,00	0,04%	39,32%	84,85%	B
303	105941	633,00	0,24%	39,45%	85,09%	B
304	105284	88,00	0,03%	39,58%	85,13%	B
305	105328	79,00	0,03%	39,71%	85,15%	B
306	104691	129,00	0,05%	39,84%	85,20%	B
307	106149	90,00	0,03%	39,97%	85,24%	B
308	104707	28,00	0,01%	40,10%	85,25%	B
309	105669	132,00	0,05%	40,23%	85,30%	B
310	106559	224,00	0,08%	40,36%	85,38%	B
311	108214	2 706,00	1,02%	40,49%	86,40%	B
312	105659	109,00	0,04%	40,62%	86,45%	B
313	106157	311,00	0,12%	40,76%	86,56%	B
314	105874	114,00	0,04%	40,89%	86,61%	B
315	107025	1 301,00	0,49%	41,02%	87,10%	B
316	104859	58,00	0,02%	41,15%	87,12%	B
317	106562	141,00	0,05%	41,28%	87,17%	B
318	105347	28,00	0,01%	41,41%	87,18%	C
319	105845	29,00	0,01%	41,54%	87,19%	C
320	105701	9,00	0,00%	41,67%	87,20%	C
321	105697	26,00	0,01%	41,80%	87,21%	C
322	106560	131,00	0,05%	41,93%	87,26%	C
323	106250	554,00	0,21%	42,06%	87,47%	C
324	106276	33,00	0,01%	42,19%	87,48%	C
325	106196	103,00	0,04%	42,32%	87,52%	C
326	106676	311,00	0,12%	42,45%	87,63%	C
327	106483	549,00	0,21%	42,58%	87,84%	C
328	10808	367,00	0,14%	42,71%	87,98%	C
329	106216	52,00	0,02%	42,84%	88,00%	C
330	104694	76,00	0,03%	42,97%	88,03%	C
331	106368	184,00	0,07%	43,10%	88,10%	C
332	106739	46,00	0,02%	43,23%	88,12%	C
333	107426	73,00	0,03%	43,36%	88,14%	C
334	107287	338,00	0,13%	43,49%	88,27%	C
335	103979	379,00	0,14%	43,62%	88,41%	C
336	106158	382,00	0,14%	43,75%	88,56%	C
337	105868	9,00	0,00%	43,88%	88,56%	C
338	107026	1 060,00	0,40%	44,01%	88,96%	C
339	105389	779,00	0,29%	44,14%	89,26%	C
340	10788	469,00	0,18%	44,27%	89,43%	C
341	105776	113,00	0,04%	44,40%	89,48%	C
342	104237	59,00	0,02%	44,53%	89,50%	C
343	103475	50,00	0,02%	44,66%	89,52%	C
344	108248	285,00	0,11%	44,79%	89,62%	C
345	104710	15,00	0,01%	44,92%	89,63%	C
346	106251	363,00	0,14%	45,05%	89,77%	C
347	106340	164,00	0,06%	45,18%	89,83%	C
348	105869	17,00	0,01%	45,31%	89,83%	C
349	107285	180,00	0,07%	45,44%	89,90%	C
350	104215	76,00	0,03%	45,57%	89,93%	C
351	104216	45,00	0,02%	45,70%	89,95%	C
352	104213	58,00	0,02%	45,83%	89,97%	C
353	106978	4 326,00	1,63%	45,96%	91,60%	C
354	104517	31,00	0,01%	46,09%	91,62%	C
355	104051	6,00	0,00%	46,22%	91,62%	C
356	106254	318,00	0,12%	46,35%	91,74%	C
357	106253	384,00	0,14%	46,48%	91,88%	C
358	107284	147,00	0,06%	46,61%	91,94%	C
359	104181	60,00	0,02%	46,74%	91,96%	C
360	104276	27,00	0,01%	46,87%	91,97%	C
361	107427	47,00	0,02%	47,01%	91,99%	C
362	104214	54,00	0,02%	47,14%	92,01%	C
363	105216	28,00	0,01%	47,27%	92,02%	C
364	106201	19,00	0,01%	47,40%	92,03%	C
365	107423	170,00	0,06%	47,53%	92,09%	C
366	106305	423,00	0,16%	47,66%	92,25%	C
367	105611	43,00	0,02%	47,79%	92,27%	C
368	107003	57,00	0,02%	47,92%	92,29%	C
369	107425	50,00	0,02%	48,05%	92,31%	C
370	106629	181,00	0,07%	48,18%	92,38%	C

371	105152	260,00	0,10%	48,31%	92,47%	C
372	107012	48,00	0,02%	48,44%	92,49%	C
373	10786	301,00	0,11%	48,57%	92,61%	C
374	105421	18,00	0,01%	48,70%	92,61%	C
375	105506	37,00	0,01%	48,83%	92,63%	C
376	106337	54,00	0,02%	48,96%	92,65%	C
377	104524	64,00	0,02%	49,09%	92,67%	C
378	104238	19,00	0,01%	49,22%	92,68%	C
379	105505	30,00	0,01%	49,35%	92,69%	C
380	102248	2,00	0,00%	49,48%	92,69%	C
381	105606	238,00	0,09%	49,61%	92,78%	C
382	104523	20,00	0,01%	49,74%	92,79%	C
383	105610	12,00	0,00%	49,87%	92,79%	C
384	105626	109,00	0,04%	50,00%	92,83%	C
385	106580	383,00	0,14%	50,13%	92,98%	C
386	104157	19,00	0,01%	50,26%	92,99%	C
387	107015	51,00	0,02%	50,39%	93,00%	C
388	105447	12,00	0,00%	50,52%	93,01%	C
389	106903	73,00	0,03%	50,65%	93,04%	C
390	104504	7,00	0,00%	50,78%	93,04%	C
391	106336	136,00	0,05%	50,91%	93,09%	C
392	104982	15,00	0,01%	51,04%	93,10%	C
393	106009	612,00	0,23%	51,17%	93,33%	C
394	10827	17,00	0,01%	51,30%	93,33%	C
395	104212	27,00	0,01%	51,43%	93,34%	C
396	105432	105,00	0,04%	51,56%	93,38%	C
397	103557	206,00	0,08%	51,69%	93,46%	C
398	104631	21,00	0,01%	51,82%	93,47%	C
399	107011	57,00	0,02%	51,95%	93,49%	C
400	104522	18,00	0,01%	52,08%	93,50%	C
401	104226	41,00	0,02%	52,21%	93,51%	C
402	10752	26,00	0,01%	52,34%	93,52%	C
403	104217	24,00	0,01%	52,47%	93,53%	C
404	106988	43,00	0,02%	52,60%	93,55%	C
405	103474	8,00	0,00%	52,73%	93,55%	C
406	106301	66,00	0,02%	52,86%	93,58%	C
407	106902	56,00	0,02%	52,99%	93,60%	C
408	106040	323,00	0,12%	53,12%	93,72%	C
409	10459	160,00	0,06%	53,26%	93,78%	C
410	106339	75,00	0,03%	53,39%	93,81%	C
411	107014	34,00	0,01%	53,52%	93,82%	C
412	107428	38,00	0,01%	53,65%	93,84%	C
413	104145	28,00	0,01%	53,78%	93,85%	C
414	104221	19,00	0,01%	53,91%	93,85%	C
415	106632	109,00	0,04%	54,04%	93,89%	C
416	107429	32,00	0,01%	54,17%	93,91%	C
417	1043349	2,00	0,00%	54,30%	93,91%	C
418	105121	64,00	0,02%	54,43%	93,93%	C
419	104224	31,00	0,01%	54,56%	93,94%	C
420	107002	19,00	0,01%	54,69%	93,95%	C
421	10458	11,00	0,00%	54,82%	93,95%	C
422	107007	45,00	0,02%	54,95%	93,97%	C
423	104151	44,00	0,02%	55,08%	93,99%	C
424	104984	101,00	0,04%	55,21%	94,03%	C
425	104150	35,00	0,01%	55,34%	94,04%	C
426	103476	28,00	0,01%	55,47%	94,05%	C
427	104983	134,00	0,05%	55,60%	94,10%	C
428	104966	101,00	0,04%	55,73%	94,14%	C
429	104922	30,00	0,01%	55,86%	94,15%	C
430	104236	17,00	0,01%	55,99%	94,16%	C
431	104156	22,00	0,01%	56,12%	94,16%	C
432	104657	1,00	0,00%	56,25%	94,16%	C
433	104225	22,00	0,01%	56,38%	94,17%	C
434	106908	34,00	0,01%	56,51%	94,19%	C
435	105509	22,00	0,01%	56,64%	94,19%	C
436	104219	19,00	0,01%	56,77%	94,20%	C
437	106631	88,00	0,03%	56,90%	94,23%	C
438	104154	28,00	0,01%	57,03%	94,25%	C
439	106738	148,00	0,06%	57,16%	94,30%	C
440	106630	89,00	0,03%	57,29%	94,33%	C
441	106019	123,00	0,05%	57,42%	94,38%	C
442	107431	22,00	0,01%	57,55%	94,39%	C
443	103867	6,00	0,00%	57,68%	94,39%	C
444	107430	16,00	0,01%	57,81%	94,40%	C
445	104613	101,00	0,04%	57,94%	94,44%	C
446	104612	100,00	0,04%	58,07%	94,47%	C
447	105329	5,00	0,00%	58,20%	94,48%	C
448	103480	6,00	0,00%	58,33%	94,48%	C

449	105513	14,00	0,01%	58,46%	94,48%	C
450	106575	324,00	0,12%	58,59%	94,61%	C
451	104218	14,00	0,01%	58,72%	94,61%	C
452	105508	16,00	0,01%	58,85%	94,62%	C
453	106038	128,00	0,05%	58,98%	94,66%	C
454	106633	74,00	0,03%	59,11%	94,69%	C
455	106578	132,00	0,05%	59,24%	94,74%	C
456	104763	9,00	0,00%	59,38%	94,75%	C
457	105330	32,00	0,01%	59,51%	94,76%	C
458	104062	7,00	0,00%	59,64%	94,76%	C
459	107006	40,00	0,02%	59,77%	94,78%	C
460	106574	275,00	0,10%	59,90%	94,88%	C
461	107013	12,00	0,00%	60,03%	94,88%	C
462	106020	88,00	0,03%	60,16%	94,92%	C
463	105543	32,00	0,01%	60,29%	94,93%	C
464	106223	63,00	0,02%	60,42%	94,95%	C
465	102185	4,00	0,00%	60,55%	94,95%	C
466	105635	15,00	0,01%	60,68%	94,96%	C
467	106907	20,00	0,01%	60,81%	94,97%	C
468	103529	292,00	0,11%	60,94%	95,08%	C
469	106222	52,00	0,02%	61,07%	95,10%	C
470	105062	18,00	0,01%	61,20%	95,10%	C
471	106041	9,00	0,00%	61,33%	95,11%	C
472	108464	78,00	0,03%	61,46%	95,14%	C
473	104614	88,00	0,03%	61,59%	95,17%	C
474	103478	6,00	0,00%	61,72%	95,17%	C
475	105220	19,00	0,01%	61,85%	95,18%	C
476	106022	343,00	0,13%	61,98%	95,31%	C
477	105507	14,00	0,01%	62,11%	95,32%	C
478	105992	209,00	0,08%	62,24%	95,39%	C
479	106576	139,00	0,05%	62,37%	95,45%	C
480	10789	158,00	0,06%	62,50%	95,51%	C
481	107603	306,00	0,12%	62,63%	95,62%	C
482	105542	86,00	0,03%	62,76%	95,65%	C
483	105221	6,00	0,00%	62,89%	95,66%	C
484	104179	6,00	0,00%	63,02%	95,66%	C
485	104211	8,00	0,00%	63,15%	95,66%	C
486	105805	15,00	0,01%	63,28%	95,67%	C
487	104147	34,00	0,01%	63,41%	95,68%	C
488	105120	2 402,00	0,91%	63,54%	96,59%	C
489	105061	25,00	0,01%	63,67%	96,60%	C
490	105993	193,00	0,07%	63,80%	96,67%	C
491	106737	84,00	0,03%	63,93%	96,70%	C
492	103477	5,00	0,00%	64,06%	96,70%	C
493	104227	16,00	0,01%	64,19%	96,71%	C
494	105807	15,00	0,01%	64,32%	96,71%	C
495	106016	80,00	0,03%	64,45%	96,74%	C
496	106225	45,00	0,02%	64,58%	96,76%	C
497	107450	4,00	0,00%	64,71%	96,76%	C
498	10754	18,00	0,01%	64,84%	96,77%	C
499	106573	75,00	0,03%	64,97%	96,80%	C
500	104152	12,00	0,00%	65,10%	96,80%	C
501	105657	28,00	0,01%	65,23%	96,81%	C
502	105986	143,00	0,05%	65,36%	96,87%	C
503	105774	26,00	0,01%	65,49%	96,88%	C
504	104146	23,00	0,01%	65,63%	96,89%	C
505	107004	8,00	0,00%	65,76%	96,89%	C
506	106224	33,00	0,01%	65,89%	96,90%	C
507	107432	20,00	0,01%	66,02%	96,91%	C
508	105806	14,00	0,01%	66,15%	96,91%	C
509	104220	13,00	0,00%	66,28%	96,92%	C
510	104140	18,00	0,01%	66,41%	96,93%	C
511	106002	81,00	0,03%	66,54%	96,96%	C
512	104148	123,00	0,05%	66,67%	97,00%	C
513	105904	30,00	0,01%	66,80%	97,01%	C
514	103579	51,00	0,02%	66,93%	97,03%	C
515	106226	59,00	0,02%	67,06%	97,06%	C
516	107433	8,00	0,00%	67,19%	97,06%	C
517	106037	275,00	0,10%	67,32%	97,16%	C
518	105369	52,00	0,02%	67,45%	97,18%	C
519	105994	142,00	0,05%	67,58%	97,24%	C
520	104279	14,00	0,01%	67,71%	97,24%	C
521	104235	3,00	0,00%	67,84%	97,24%	C
522	104222	5,00	0,00%	67,97%	97,24%	C
523	105119	16,00	0,01%	68,10%	97,25%	C
524	106003	79,00	0,03%	68,23%	97,28%	C
525	106026	286,00	0,11%	68,36%	97,39%	C
526	106994	152,00	0,06%	68,49%	97,45%	C

527	106025	62,00	0,02%	68,62%	97,47%	C
528	104615	36,00	0,01%	68,75%	97,48%	C
529	103482	9,00	0,00%	68,88%	97,49%	C
530	106004	68,00	0,03%	69,01%	97,51%	C
531	105368	12,00	0,00%	69,14%	97,52%	C
532	108391	59,00	0,02%	69,27%	97,54%	C
533	105996	99,00	0,04%	69,40%	97,58%	C
534	105370	13,00	0,00%	69,53%	97,58%	C
535	108392	47,00	0,02%	69,66%	97,60%	C
536	10617	5,00	0,00%	69,79%	97,60%	C
537	106577	118,00	0,04%	69,92%	97,64%	C
538	108394	49,00	0,02%	70,05%	97,66%	C
539	105905	13,00	0,00%	70,18%	97,67%	C
540	104611	42,00	0,02%	70,31%	97,68%	C
541	106017	81,00	0,03%	70,44%	97,71%	C
542	105997	57,00	0,02%	70,57%	97,74%	C
543	106032	52,00	0,02%	70,70%	97,76%	C
544	104164	212,00	0,08%	70,83%	97,84%	C
545	108393	50,00	0,02%	70,96%	97,85%	C
546	106001	45,00	0,02%	71,09%	97,87%	C
547	104143	68,00	0,03%	71,22%	97,90%	C
548	108107	7,00	0,00%	71,35%	97,90%	C
549	105976	160,00	0,06%	71,48%	97,96%	C
550	105995	102,00	0,04%	71,61%	98,00%	C
551	108389	57,00	0,02%	71,74%	98,02%	C
552	101611	4,00	0,00%	71,88%	98,02%	C
553	105981	90,00	0,03%	72,01%	98,06%	C
554	104176	5,00	0,00%	72,14%	98,06%	C
555	104223	5,00	0,00%	72,27%	98,06%	C
556	103745	21,00	0,01%	72,40%	98,07%	C
557	105980	83,00	0,03%	72,53%	98,10%	C
558	105975	66,00	0,02%	72,66%	98,12%	C
559	106000	54,00	0,02%	72,79%	98,14%	C
560	105977	73,00	0,03%	72,92%	98,17%	C
561	105982	59,00	0,02%	73,05%	98,19%	C
562	105415	91,00	0,03%	73,18%	98,23%	C
563	105987	77,00	0,03%	73,31%	98,26%	C
564	106027	35,00	0,01%	73,44%	98,27%	C
565	108396	33,00	0,01%	73,57%	98,28%	C
566	106227	20,00	0,01%	73,70%	98,29%	C
567	104986	14,00	0,01%	73,83%	98,30%	C
568	105978	151,00	0,06%	73,96%	98,35%	C
569	105998	18,00	0,01%	74,09%	98,36%	C
570	105979	156,00	0,06%	74,22%	98,42%	C
571	107449	5,00	0,00%	74,35%	98,42%	C
572	108395	32,00	0,01%	74,48%	98,43%	C
573	103483	8,00	0,00%	74,61%	98,44%	C
574	108398	27,00	0,01%	74,74%	98,45%	C
575	104616	24,00	0,01%	74,87%	98,46%	C
576	105988	54,00	0,02%	75,00%	98,48%	C
577	105741	5,00	0,00%	75,13%	98,48%	C
578	108388	31,00	0,01%	75,26%	98,49%	C
579	105516	7,00	0,00%	75,39%	98,49%	C
580	103746	47,00	0,02%	75,52%	98,51%	C
581	102341	6,00	0,00%	75,65%	98,51%	C
582	105263	31,00	0,01%	75,78%	98,52%	C
583	108390	29,00	0,01%	75,91%	98,53%	C
584	10814	51,00	0,02%	76,04%	98,55%	C
585	105985	29,00	0,01%	76,17%	98,56%	C
586	106228	13,00	0,00%	76,30%	98,57%	C
587	108401	19,00	0,01%	76,43%	98,58%	C
588	106551	10,00	0,00%	76,56%	98,58%	C
589	105991	31,00	0,01%	76,69%	98,59%	C
590	103744	23,00	0,01%	76,82%	98,60%	C
591	106034	75,00	0,03%	76,95%	98,63%	C
592	1043945	8,00	0,00%	77,08%	98,63%	C
593	106031	27,00	0,01%	77,21%	98,64%	C
594	105367	17,00	0,01%	77,34%	98,65%	C
595	105374	35,00	0,01%	77,47%	98,66%	C
596	103481	3,00	0,00%	77,60%	98,66%	C
597	107434	3,00	0,00%	77,73%	98,66%	C
598	108108	2,00	0,00%	77,86%	98,67%	C
599	105371	54,00	0,02%	77,99%	98,69%	C
600	108399	14,00	0,01%	78,13%	98,69%	C
601	10742	39,00	0,01%	78,26%	98,71%	C
602	108402	8,00	0,00%	78,39%	98,71%	C
603	105949	4,00	0,00%	78,52%	98,71%	C
604	101300	5,00	0,00%	78,65%	98,71%	C

605	105742	3,00	0,00%	78,78%	98,71%	C
606	108403	13,00	0,00%	78,91%	98,72%	C
607	101303	2,00	0,00%	79,04%	98,72%	C
608	105135	26,00	0,01%	79,17%	98,73%	C
609	108404	6,00	0,00%	79,30%	98,73%	C
610	105930	15,00	0,01%	79,43%	98,74%	C
611	105073	17,00	0,01%	79,56%	98,74%	C
612	108397	3,00	0,00%	79,69%	98,74%	C
613	1043350	101,00	0,04%	79,82%	98,78%	C
614	1043915	28,00	0,01%	79,95%	98,79%	C
615	108400	2,00	0,00%	80,08%	98,79%	C
616	107290	38,00	0,01%	80,21%	98,81%	C
617	101296	1,00	0,00%	80,34%	98,81%	C
618	101297	1,00	0,00%	80,47%	98,81%	C
619	106842	1,00	0,00%	80,60%	98,81%	C
620	105134	1,00	0,00%	80,73%	98,81%	C
621	101290	14,00	0,01%	80,86%	98,81%	C
622	102328	691,00	0,26%	80,99%	99,08%	C
623	104764	964,00	0,36%	81,12%	99,44%	C
624	105242	0,82	0,00%	81,25%	99,44%	C
625	105243	0,82	0,00%	81,38%	99,44%	C
626	105280	875,00	0,33%	81,51%	99,77%	C
627	105437	0,82	0,00%	81,64%	99,77%	C
628	105645	288,00	0,11%	81,77%	99,88%	C
629	106237	0,82	0,00%	81,90%	99,88%	C
630	106470	0,82	0,00%	82,03%	99,88%	C
631	106843	0,82	0,00%	82,16%	99,88%	C
632	106844	0,82	0,00%	82,29%	99,88%	C
633	106846	0,82	0,00%	82,42%	99,88%	C
634	106847	0,82	0,00%	82,55%	99,88%	C
635	106848	0,82	0,00%	82,68%	99,88%	C
636	106849	0,82	0,00%	82,81%	99,88%	C
637	106850	0,82	0,00%	82,94%	99,88%	C
638	106851	0,82	0,00%	83,07%	99,88%	C
639	106852	0,82	0,00%	83,20%	99,88%	C
640	106853	0,82	0,00%	83,33%	99,88%	C
641	106855	0,82	0,00%	83,46%	99,88%	C
642	107040	0,82	0,00%	83,59%	99,88%	C
643	107041	0,82	0,00%	83,72%	99,88%	C
644	107042	0,82	0,00%	83,85%	99,88%	C
645	107055	0,82	0,00%	83,98%	99,88%	C
646	107301	0,82	0,00%	84,11%	99,88%	C
647	107302	0,82	0,00%	84,24%	99,89%	C
648	107303	0,82	0,00%	84,38%	99,89%	C
649	107304	0,82	0,00%	84,51%	99,89%	C
650	107306	0,82	0,00%	84,64%	99,89%	C
651	107320	0,82	0,00%	84,77%	99,89%	C
652	107327	0,82	0,00%	84,90%	99,89%	C
653	107378	0,82	0,00%	85,03%	99,89%	C
654	107380	0,82	0,00%	85,16%	99,89%	C
655	107381	0,82	0,00%	85,29%	99,89%	C
656	107382	0,82	0,00%	85,42%	99,89%	C
657	107383	0,82	0,00%	85,55%	99,89%	C
658	107384	0,82	0,00%	85,68%	99,89%	C
659	107385	0,82	0,00%	85,81%	99,89%	C
660	107387	0,82	0,00%	85,94%	99,89%	C
661	107436	0,82	0,00%	86,07%	99,89%	C
662	107437	0,82	0,00%	86,20%	99,89%	C
663	107438	0,82	0,00%	86,33%	99,89%	C
664	107439	0,82	0,00%	86,46%	99,89%	C
665	107440	0,82	0,00%	86,59%	99,89%	C
666	108032	0,82	0,00%	86,72%	99,89%	C
667	108127	0,82	0,00%	86,85%	99,89%	C
668	108129	0,82	0,00%	86,98%	99,89%	C
669	108130	0,82	0,00%	87,11%	99,89%	C
670	108131	0,82	0,00%	87,24%	99,89%	C
671	108150	0,82	0,00%	87,37%	99,89%	C
672	108151	0,82	0,00%	87,50%	99,89%	C
673	108277	0,82	0,00%	87,63%	99,89%	C
674	108278	0,82	0,00%	87,76%	99,89%	C
675	108279	0,82	0,00%	87,89%	99,89%	C
676	108280	0,82	0,00%	88,02%	99,89%	C
677	108281	0,82	0,00%	88,15%	99,89%	C
678	108408	0,82	0,00%	88,28%	99,89%	C
679	108410	0,82	0,00%	88,41%	99,90%	C
680	108469	0,82	0,00%	88,54%	99,90%	C
681	108484	0,82	0,00%	88,67%	99,90%	C
682	108485	0,82	0,00%	88,80%	99,90%	C

683	108486	0,82	0,00%	88,93%	99,90%	C
684	108487	0,82	0,00%	89,06%	99,90%	C
685	108489	0,82	0,00%	89,19%	99,90%	C
686	108491	0,82	0,00%	89,32%	99,90%	C
687	108497	0,82	0,00%	89,45%	99,90%	C
688	108564	0,82	0,00%	89,58%	99,90%	C
689	108565	0,82	0,00%	89,71%	99,90%	C
690	108566	0,82	0,00%	89,84%	99,90%	C
691	108642	0,82	0,00%	89,97%	99,90%	C
692	108643	0,82	0,00%	90,10%	99,90%	C
693	108662	0,82	0,00%	90,23%	99,90%	C
694	108864	0,82	0,00%	90,36%	99,90%	C
695	108993	0,82	0,00%	90,49%	99,90%	C
696	108994	0,82	0,00%	90,63%	99,90%	C
697	109038	0,82	0,00%	90,76%	99,90%	C
698	109042	0,82	0,00%	90,89%	99,90%	C
699	109044	0,82	0,00%	91,02%	99,90%	C
700	109045	0,82	0,00%	91,15%	99,90%	C
701	109123	0,82	0,00%	91,28%	99,90%	C
702	109124	0,82	0,00%	91,41%	99,90%	C
703	109128	0,82	0,00%	91,54%	99,90%	C
704	109496	0,82	0,00%	91,67%	99,90%	C
705	109499	0,82	0,00%	91,80%	99,90%	C
706	109555	0,82	0,00%	91,93%	99,90%	C
707	109562	0,82	0,00%	92,06%	99,90%	C
708	109564	0,82	0,00%	92,19%	99,90%	C
709	109647	0,82	0,00%	92,32%	99,90%	C
710	109655	0,82	0,00%	92,45%	99,90%	C
711	109656	0,82	0,00%	92,58%	99,91%	C
712	109684	0,82	0,00%	92,71%	99,91%	C
713	109691	0,82	0,00%	92,84%	99,91%	C
714	109707	0,82	0,00%	92,97%	99,91%	C
715	109715	0,82	0,00%	93,10%	99,91%	C
716	109903	0,82	0,00%	93,23%	99,91%	C
717	109946	0,82	0,00%	93,36%	99,91%	C
718	1010008	0,82	0,00%	93,49%	99,91%	C
719	1010009	0,82	0,00%	93,62%	99,91%	C
720	1010010	0,82	0,00%	93,75%	99,91%	C
721	1010011	0,82	0,00%	93,88%	99,91%	C
722	1010014	0,82	0,00%	94,01%	99,91%	C
723	1010015	0,82	0,00%	94,14%	99,91%	C
724	1010016	0,82	0,00%	94,27%	99,91%	C
725	1010134	0,82	0,00%	94,40%	99,91%	C
726	1010175	0,82	0,00%	94,53%	99,91%	C
727	1010177	0,82	0,00%	94,66%	99,91%	C
728	1010178	0,82	0,00%	94,79%	99,91%	C
729	1010185	0,82	0,00%	94,92%	99,91%	C
730	1010186	0,82	0,00%	95,05%	99,91%	C
731	1010188	0,82	0,00%	95,18%	99,91%	C
732	1010191	0,82	0,00%	95,31%	99,91%	C
733	1010214	0,82	0,00%	95,44%	99,91%	C
734	1010215	0,82	0,00%	95,57%	99,91%	C
735	1010259	0,82	0,00%	95,70%	99,91%	C
736	1010260	0,82	0,00%	95,83%	99,91%	C
737	1010261	0,82	0,00%	95,96%	99,91%	C
738	1010350	0,82	0,00%	96,09%	99,91%	C
739	1010353	0,82	0,00%	96,22%	99,91%	C
740	1010468	0,82	0,00%	96,35%	99,91%	C
741	1010521	0,82	0,000%	96,48%	99,91%	C
742	1010545	0,82	0,00%	96,61%	99,91%	C
743	1010602	0,82	0,00%	96,74%	99,91%	C
744	1010652	0,82	0,00%	96,88%	99,92%	C
745	1010657	0,82	0,00%	97,01%	99,92%	C
746	1010706	0,82	0,00%	97,14%	99,92%	C
747	1010785	0,82	0,00%	97,27%	99,92%	C
748	1011342	0,82	0,00%	97,40%	99,92%	C
749	10201712	11,00	0,00%	97,53%	99,92%	C
750	10201915	16,00	0,01%	97,66%	99,93%	C
751	101000019	47,00	0,02%	97,79%	99,94%	C
752	101000222	0,82	0,00%	97,92%	99,94%	C
753	109990569	0,82	0,00%	98,05%	99,95%	C
754	109990786	0,82	0,00%	98,18%	99,95%	C
755	109999980	134,00	0,05%	98,31%	100,00%	C
756	1099901877	0,82	0,00%	98,44%	100,00%	C
757	1099902216	0,82	0,00%	98,57%	100,00%	C
758	1099904140	0,82	0,00%	98,70%	100,00%	C
759	1099904145	0,82	0,00%	98,83%	100,00%	C
760	1099904146	0,82	0,00%	98,96%	100,00%	C

761	1099904147	0,82	0,00%	99,09%	100,00%	C
762	1099904151	0,82	0,00%	99,22%	100,00%	C
763	1099904156	0,82	0,00%	99,35%	100,00%	C
764	1099904181	0,82	0,00%	99,48%	100,00%	C
765	1099904279	0,82	0,00%	99,61%	100,00%	C
766	1099904750	0,82	0,00%	99,74%	100,00%	C
767	1099905805	0,82	0,00%	99,87%	100,00%	C
768	1099905807	0,82	0,00%	100,00%	100,00%	C
	TOTAL	264 867,98				

Appendix 4 - Inventory's ABC Analysis of GB2.

#	SKU	Yearly Total	Value (%)	Cumulative Percent of Total Items	Cumulative Percent of Total Value	Class
1	107080	2 609,00	4,71%	0,21%	4,71%	A
2	105739	2 433,43	4,39%	0,43%	9,10%	A
3	106132	215,80	0,39%	0,64%	9,49%	A
4	105718	846,50	1,53%	0,85%	11,01%	A
5	105615	807,50	1,46%	1,07%	12,47%	A
6	106261	1 039,00	1,87%	1,28%	14,35%	A
7	105394	2 214,33	4,00%	1,49%	18,34%	A
8	105322	715,71	1,29%	1,71%	19,63%	A
9	105393	842,67	1,52%	1,92%	21,15%	A
10	105162	694,63	1,25%	2,13%	22,41%	A
11	106489	310,60	0,56%	2,35%	22,97%	A
12	106463	604,00	1,09%	2,56%	24,06%	A
13	106462	678,60	1,22%	2,77%	25,28%	A
14	105883	47,00	0,08%	2,99%	25,36%	A
15	106158	1 136,14	2,05%	3,20%	27,41%	A
16	106260	442,73	0,80%	3,41%	28,21%	A
17	105529	303,56	0,55%	3,62%	28,76%	A
18	105361	491,20	0,89%	3,84%	29,65%	A
19	107104	274,50	0,50%	4,05%	30,14%	A
20	106419	63,00	0,11%	4,26%	30,26%	A
21	105740	408,73	0,74%	4,48%	30,99%	A
22	105360	621,00	1,12%	4,69%	32,11%	A
23	105306	236,89	0,43%	4,90%	32,54%	A
24	105142	124,83	0,23%	5,12%	32,77%	A
25	105352	251,57	0,45%	5,33%	33,22%	A
26	105772	132,83	0,24%	5,54%	33,46%	A
27	106514	29,00	0,05%	5,76%	33,51%	A
28	105685	348,83	0,63%	5,97%	34,14%	A
29	107079	851,33	1,54%	6,18%	35,68%	A
30	105525	278,00	0,50%	6,40%	36,18%	A
31	105618	240,41	0,43%	6,61%	36,61%	A
32	107348	466,95	0,84%	6,82%	37,46%	A
33	105277	211,67	0,38%	7,04%	37,84%	A
34	106090	211,00	0,38%	7,25%	38,22%	A
35	106091	206,90	0,37%	7,46%	38,59%	A
36	107350	411,00	0,74%	7,68%	39,33%	A
37	106490	185,33	0,33%	7,89%	39,67%	A
38	107351	89,88	0,16%	8,10%	39,83%	A
39	106484	31,00	0,06%	8,32%	39,89%	A
40	107349	66,67	0,12%	8,53%	40,01%	A
41	105359	219,17	0,40%	8,74%	40,40%	A
42	105691	253,33	0,46%	8,96%	40,86%	A
43	105569	124,17	0,22%	9,17%	41,08%	A
44	107271	213,20	0,38%	9,38%	41,47%	A
45	105600	107,28	0,19%	9,59%	41,66%	A
46	106093	87,13	0,16%	9,81%	41,82%	A
47	106159	206,20	0,37%	10,02%	42,19%	A
48	105798	301,56	0,54%	10,23%	42,73%	A
49	106513	45,00	0,08%	10,45%	42,81%	A
50	105793	252,00	0,45%	10,66%	43,27%	A
51	106581	147,67	0,27%	10,87%	43,54%	A
52	106119	206,67	0,37%	11,09%	43,91%	A
53	106156	232,70	0,42%	11,30%	44,33%	A
54	105877	138,30	0,25%	11,51%	44,58%	A
55	105768	64,33	0,12%	11,73%	44,69%	A

56	106139	133,86	0,24%	11,94%	44,94%	A
57	106485	21,00	0,04%	12,15%	44,97%	A
58	107345	120,60	0,22%	12,37%	45,19%	A
59	106352	130,75	0,24%	12,58%	45,43%	A
60	107148	166,50	0,30%	12,79%	45,73%	A
61	105164	271,25	0,49%	13,01%	46,22%	A
62	106155	115,91	0,21%	13,22%	46,43%	A
63	106285	105,83	0,19%	13,43%	46,62%	A
64	107151	10,00	0,02%	13,65%	46,63%	A
65	105690	154,22	0,28%	13,86%	46,91%	A
66	105333	131,40	0,24%	14,07%	47,15%	A
67	105141	133,00	0,24%	14,29%	47,39%	A
68	105728	152,00	0,27%	14,50%	47,66%	A
69	106501	115,67	0,21%	14,71%	47,87%	A
70	106361	110,38	0,20%	14,93%	48,07%	A
71	106138	93,00	0,17%	15,14%	48,24%	A
72	105076	129,83	0,23%	15,35%	48,47%	A
73	106121	89,59	0,16%	15,57%	48,64%	A
74	106098	76,38	0,14%	15,78%	48,77%	A
75	105016	141,00	0,25%	15,99%	49,03%	A
76	106174	143,00	0,26%	16,20%	49,29%	A
77	105128	125,40	0,23%	16,42%	49,51%	A
78	105175	36,00	0,06%	16,63%	49,58%	A
79	106282	147,29	0,27%	16,84%	49,84%	A
80	106092	382,67	0,69%	17,06%	50,53%	A
81	106277	63,20	0,11%	17,27%	50,65%	A
82	105077	102,83	0,19%	17,48%	50,83%	A
83	105516	7,60	0,01%	17,70%	50,85%	A
84	105079	135,67	0,24%	17,91%	51,09%	A
85	106172	157,77	0,28%	18,12%	51,38%	A
86	105156	109,33	0,20%	18,34%	51,57%	A
87	105171	32,33	0,06%	18,55%	51,63%	A
88	105726	209,50	0,38%	18,76%	52,01%	A
89	105046	150,00	0,27%	18,98%	52,28%	A
90	105082	404,67	0,73%	19,19%	53,01%	A
91	106577	95,50	0,17%	19,40%	53,18%	A
92	106360	28,67	0,05%	19,62%	53,23%	A
93	105452	98,00	0,18%	19,83%	53,41%	A
94	106351	87,80	0,16%	20,04%	53,57%	A
95	106100	71,86	0,13%	20,26%	53,70%	B
96	105521	165,00	0,30%	20,47%	54,00%	B
97	105417	150,50	0,27%	20,68%	54,27%	B
98	105337	128,71	0,23%	20,90%	54,50%	B
99	105081	364,00	0,66%	21,11%	55,16%	B
100	107153	3,25	0,01%	21,32%	55,16%	B
101	105154	77,50	0,14%	21,54%	55,30%	B
102	106413	7,20	0,01%	21,75%	55,32%	B
103	105747	107,50	0,19%	21,96%	55,51%	B
104	106353	103,86	0,19%	22,17%	55,70%	B
105	105143	73,14	0,13%	22,39%	55,83%	B
106	106191	52,77	0,10%	22,60%	55,92%	B
107	105468	60,50	0,11%	22,81%	56,03%	B
108	106278	64,33	0,12%	23,03%	56,15%	B
109	105340	80,75	0,15%	23,24%	56,30%	B
110	105144	89,33	0,16%	23,45%	56,46%	B
111	106580	103,80	0,19%	23,67%	56,64%	B
112	105565	89,40	0,16%	23,88%	56,80%	B
113	106508	16,00	0,03%	24,09%	56,83%	B
114	105806	199,17	0,36%	24,31%	57,19%	B
115	105278	71,50	0,13%	24,52%	57,32%	B
116	106237	75,20	0,14%	24,73%	57,46%	B
117	106039	27,67	0,05%	24,95%	57,51%	B
118	106192	51,80	0,09%	25,16%	57,60%	B
119	106194	74,11	0,13%	25,37%	57,73%	B
120	105173	12,00	0,02%	25,59%	57,76%	B
121	106350	648,00	1,17%	25,80%	58,93%	B
122	105761	62,00	0,11%	26,01%	59,04%	B
123	105033	95,00	0,17%	26,23%	59,21%	B
124	105319	61,83	0,11%	26,44%	59,32%	B
125	106044	69,25	0,12%	26,65%	59,45%	B
126	105779	38,75	0,07%	26,87%	59,52%	B
127	105426	53,67	0,10%	27,08%	59,61%	B
128	106358	30,67	0,06%	27,29%	59,67%	B
129	105566	60,60	0,11%	27,51%	59,78%	B
130	106087	62,25	0,11%	27,72%	59,89%	B
131	105013	35,33	0,06%	27,93%	59,95%	B
132	105976	22,00	0,04%	28,14%	59,99%	B
133	105174	93,00	0,17%	28,36%	60,16%	B

134	105010	78,00	0,14%	28,57%	60,30%	B
135	106537	6,56	0,01%	28,78%	60,31%	B
136	105344	105,00	0,19%	29,00%	60,50%	B
137	106099	41,38	0,07%	29,21%	60,58%	B
138	105828	53,80	0,10%	29,42%	60,67%	B
139	106193	38,00	0,07%	29,64%	60,74%	B
140	106359	66,00	0,12%	29,85%	60,86%	B
141	106123	50,71	0,09%	30,06%	60,95%	B
142	105583	252,00	0,45%	30,28%	61,41%	B
143	106120	66,00	0,12%	30,49%	61,53%	B
144	106012	42,67	0,08%	30,70%	61,60%	B
145	105777	46,41	0,08%	30,92%	61,69%	B
146	105430	75,33	0,14%	31,13%	61,82%	B
147	105454	77,67	0,14%	31,34%	61,96%	B
148	106280	56,25	0,10%	31,56%	62,07%	B
149	106037	44,00	0,08%	31,77%	62,14%	B
150	106372	11,48	0,02%	31,98%	62,17%	B
151	106494	8,31	0,01%	32,20%	62,18%	B
152	105153	60,75	0,11%	32,41%	62,29%	B
153	106491	179,00	0,32%	32,62%	62,61%	B
154	106538	7,91	0,01%	32,84%	62,63%	B
155	105461	53,75	0,10%	33,05%	62,72%	B
156	105320	42,83	0,08%	33,26%	62,80%	B
157	106173	90,50	0,16%	33,48%	62,96%	B
158	107463	402,71	0,73%	33,69%	63,69%	B
159	107105	439,00	0,79%	33,90%	64,48%	B
160	105022	104,50	0,19%	34,12%	64,67%	B
161	105895	87,17	0,16%	34,33%	64,83%	B
162	105325	39,80	0,07%	34,54%	64,90%	B
163	105070	113,67	0,21%	34,75%	65,11%	B
164	105769	56,50	0,10%	34,97%	65,21%	B
165	106094	46,67	0,08%	35,18%	65,29%	B
166	105090	477,00	0,86%	35,39%	66,15%	B
167	105738	7,15	0,01%	35,61%	66,17%	B
168	105146	72,67	0,13%	35,82%	66,30%	B
169	106190	30,83	0,06%	36,03%	66,35%	B
170	105655	115,75	0,21%	36,25%	66,56%	B
171	105085	505,00	0,91%	36,46%	67,47%	B
172	106084	28,43	0,05%	36,67%	67,52%	B
173	105124	48,17	0,09%	36,89%	67,61%	B
174	105467	47,75	0,09%	37,10%	67,70%	B
175	105523	52,63	0,09%	37,31%	67,79%	B
176	105369	51,43	0,09%	37,53%	67,88%	B
177	106086	57,44	0,10%	37,74%	67,99%	B
178	105780	24,81	0,04%	37,95%	68,03%	B
179	106220	25,67	0,05%	38,17%	68,08%	B
180	105888	38,50	0,07%	38,38%	68,15%	B
181	105364	40,50	0,07%	38,59%	68,22%	B
182	105517	93,38	0,17%	38,81%	68,39%	B
183	106239	43,60	0,08%	39,02%	68,47%	B
184	106496	13,52	0,02%	39,23%	68,49%	B
185	106509	10,27	0,02%	39,45%	68,51%	B
186	107272	55,00	0,10%	39,66%	68,61%	B
187	106436	9,43	0,02%	39,87%	68,63%	B
188	106095	26,50	0,05%	40,09%	68,68%	B
189	105766	34,44	0,06%	40,30%	68,74%	B
190	105592	41,50	0,07%	40,51%	68,81%	B
191	105776	19,17	0,03%	40,72%	68,85%	B
192	105058	20,42	0,04%	40,94%	68,88%	B
193	105762	30,91	0,06%	41,15%	68,94%	B
194	106221	21,30	0,04%	41,36%	68,98%	B
195	106124	18,28	0,03%	41,58%	69,01%	B
196	106276	16,00	0,03%	41,79%	69,04%	B
197	105601	16,20	0,03%	42,00%	69,07%	B
198	105512	61,50	0,11%	42,22%	69,18%	B
199	106201	16,50	0,03%	42,43%	69,21%	B
200	105808	46,50	0,08%	42,64%	69,29%	B
201	106083	25,44	0,05%	42,86%	69,34%	B
202	106097	26,00	0,05%	43,07%	69,39%	B
203	105438	46,67	0,08%	43,28%	69,47%	B
204	105582	623,00	1,12%	43,50%	70,59%	B
205	105042	8,80	0,02%	43,71%	70,61%	B
206	106122	19,50	0,04%	43,92%	70,65%	B
207	105802	56,67	0,10%	44,14%	70,75%	B
208	105008	23,20	0,04%	44,35%	70,79%	B
209	105520	19,75	0,04%	44,56%	70,83%	B
210	105366	40,00	0,07%	44,78%	70,90%	B
211	105145	38,20	0,07%	44,99%	70,97%	B

212	105804	18,67	0,03%	45,20%	71,00%	B
213	105909	40,00	0,07%	45,42%	71,07%	B
214	105463	36,00	0,06%	45,63%	71,14%	B
215	106495	14,36	0,03%	45,84%	71,16%	B
216	105771	19,88	0,04%	46,06%	71,20%	B
217	105367	41,50	0,07%	46,27%	71,27%	B
218	106202	18,57	0,03%	46,48%	71,31%	B
219	105074	52,50	0,09%	46,70%	71,40%	B
220	105362	30,83	0,06%	46,91%	71,46%	B
221	105054	124,57	0,22%	47,12%	71,68%	B
222	105148	7,44	0,01%	47,33%	71,70%	B
223	105778	17,20	0,03%	47,55%	71,73%	B
224	105774	21,17	0,04%	47,76%	71,77%	B
225	105783	16,75	0,03%	47,97%	71,80%	B
226	106412	12,14	0,02%	48,19%	71,82%	B
227	105282	32,88	0,06%	48,40%	71,88%	B
228	106219	23,29	0,04%	48,61%	71,92%	B
229	105001	42,83	0,08%	48,83%	72,00%	B
230	105830	10,73	0,02%	49,04%	72,02%	B
231	106515	10,50	0,02%	49,25%	72,03%	B
232	105773	16,50	0,03%	49,47%	72,06%	B
233	106189	14,61	0,03%	49,68%	72,09%	B
234	105829	23,00	0,04%	49,89%	72,13%	B
235	105932	9,00	0,02%	50,11%	72,15%	B
236	106013	76,00	0,14%	50,32%	72,29%	C
237	105573	374,00	0,67%	50,53%	72,96%	C
238	105575	309,71	0,56%	50,75%	73,52%	C
239	105568	38,67	0,07%	50,96%	73,59%	C
240	105745	18,00	0,03%	51,17%	73,62%	C
241	105410	65,27	0,12%	51,39%	73,74%	C
242	105368	34,00	0,06%	51,60%	73,80%	C
243	106206	31,80	0,06%	51,81%	73,86%	C
244	106421	5,75	0,01%	52,03%	73,87%	C
245	105801	4,23	0,01%	52,24%	73,88%	C
246	105702	25,83	0,05%	52,45%	73,92%	C
247	105781	18,00	0,03%	52,67%	73,95%	C
248	105510	48,63	0,09%	52,88%	74,04%	C
249	105692	66,00	0,12%	53,09%	74,16%	C
250	106211	17,50	0,03%	53,30%	74,19%	C
251	106518	9,70	0,02%	53,52%	74,21%	C
252	106126	11,67	0,02%	53,73%	74,23%	C
253	105021	17,83	0,03%	53,94%	74,26%	C
254	106203	20,33	0,04%	54,16%	74,30%	C
255	106101	132,33	0,24%	54,37%	74,54%	C
256	106096	16,88	0,03%	54,58%	74,57%	C
257	105444	8,55	0,02%	54,80%	74,59%	C
258	106045	8,50	0,02%	55,01%	74,60%	C
259	105004	48,33	0,09%	55,22%	74,69%	C
260	105152	3,18	0,01%	55,44%	74,69%	C
261	105904	27,00	0,05%	55,65%	74,74%	C
262	105283	53,75	0,10%	55,86%	74,84%	C
263	105169	10,75	0,02%	56,08%	74,86%	C
264	105017	7,41	0,01%	56,29%	74,87%	C
265	106539	5,77	0,01%	56,50%	74,88%	C
266	106410	7,57	0,01%	56,72%	74,90%	C
267	105129	8,80	0,02%	56,93%	74,91%	C
268	105050	22,73	0,04%	57,14%	74,95%	C
269	105701	24,50	0,04%	57,36%	75,00%	C
270	106519	23,64	0,04%	57,57%	75,04%	C
271	106195	11,60	0,02%	57,78%	75,06%	C
272	105284	20,00	0,04%	58,00%	75,10%	C
273	105506	11,50	0,02%	58,21%	75,12%	C
274	105884	12,00	0,02%	58,42%	75,14%	C
275	105867	24,56	0,04%	58,64%	75,18%	C
276	105370	24,50	0,04%	58,85%	75,23%	C
277	105363	30,14	0,05%	59,06%	75,28%	C
278	106238	8,19	0,01%	59,28%	75,30%	C
279	106279	10,60	0,02%	59,49%	75,32%	C
280	105594	10,67	0,02%	59,70%	75,34%	C
281	105365	36,33	0,07%	59,91%	75,40%	C
282	106127	9,50	0,02%	60,13%	75,42%	C
283	105462	13,33	0,02%	60,34%	75,44%	C
284	105859	34,33	0,06%	60,55%	75,50%	C
285	105071	40,00	0,07%	60,77%	75,58%	C
286	105445	10,67	0,02%	60,98%	75,60%	C
287	105513	9,60	0,02%	61,19%	75,61%	C
288	105861	27,83	0,05%	61,41%	75,66%	C
289	105045	27,50	0,05%	61,62%	75,71%	C

290	105775	10,46	0,02%	61,83%	75,73%	C
291	105007	24,67	0,04%	62,05%	75,78%	C
292	106104	20,57	0,04%	62,26%	75,81%	C
293	105457	11,00	0,02%	62,47%	75,83%	C
294	105180	6,00	0,01%	62,69%	75,84%	C
295	105043	10,67	0,02%	62,90%	75,86%	C
296	106107	19,29	0,03%	63,11%	75,90%	C
297	106113	39,05	0,07%	63,33%	75,97%	C
298	105782	12,22	0,02%	63,54%	75,99%	C
299	105371	32,00	0,06%	63,75%	76,05%	C
300	106105	11,27	0,02%	63,97%	76,07%	C
301	105860	21,67	0,04%	64,18%	76,11%	C
302	106102	15,00	0,03%	64,39%	76,13%	C
303	105744	10,67	0,02%	64,61%	76,15%	C
304	106125	6,67	0,01%	64,82%	76,17%	C
305	106209	8,50	0,02%	65,03%	76,18%	C
306	105552	6,09	0,01%	65,25%	76,19%	C
307	105651	5,20	0,01%	65,46%	76,20%	C
308	105863	27,57	0,05%	65,67%	76,25%	C
309	105653	53,50	0,10%	65,88%	76,35%	C
310	105451	9,00	0,02%	66,10%	76,36%	C
311	106243	11,78	0,02%	66,31%	76,38%	C
312	105150	3,27	0,01%	66,52%	76,39%	C
313	105155	18,00	0,03%	66,74%	76,42%	C
314	106242	14,71	0,03%	66,95%	76,45%	C
315	106215	10,00	0,02%	67,16%	76,47%	C
316	106520	33,59	0,06%	67,38%	76,53%	C
317	105862	21,33	0,04%	67,59%	76,57%	C
318	106047	7,71	0,01%	67,80%	76,58%	C
319	105788	8,00	0,01%	68,02%	76,60%	C
320	106204	18,00	0,03%	68,23%	76,63%	C
321	105055	31,00	0,06%	68,44%	76,68%	C
322	105078	43,83	0,08%	68,66%	76,76%	C
323	105509	28,60	0,05%	68,87%	76,81%	C
324	105029	8,00	0,01%	69,08%	76,83%	C
325	105650	3,09	0,01%	69,30%	76,83%	C
326	106216	21,00	0,04%	69,51%	76,87%	C
327	106198	10,10	0,02%	69,72%	76,89%	C
328	105792	6,25	0,01%	69,94%	76,90%	C
329	105280	26,25	0,05%	70,15%	76,95%	C
330	106435	15,00	0,03%	70,36%	76,98%	C
331	105790	8,48	0,02%	70,58%	76,99%	C
332	105865	13,57	0,02%	70,79%	77,02%	C
333	106207	11,25	0,02%	71,00%	77,04%	C
334	105184	9,55	0,02%	71,22%	77,05%	C
335	106247	34,33	0,06%	71,43%	77,12%	C
336	106241	17,67	0,03%	71,64%	77,15%	C
337	105357	14,44	0,03%	71,86%	77,17%	C
338	105826	15,82	0,03%	72,07%	77,20%	C
339	106029	8,50	0,02%	72,28%	77,22%	C
340	105784	10,05	0,02%	72,49%	77,24%	C
341	105465	12,00	0,02%	72,71%	77,26%	C
342	105147	13,00	0,02%	72,92%	77,28%	C
343	106240	15,25	0,03%	73,13%	77,31%	C
344	105823	22,17	0,04%	73,35%	77,35%	C
345	106222	9,80	0,02%	73,56%	77,37%	C
346	105931	6,11	0,01%	73,77%	77,38%	C
347	106103	19,78	0,04%	73,99%	77,41%	C
348	106004	2,00	0,00%	74,20%	77,42%	C
349	105864	10,75	0,02%	74,41%	77,44%	C
350	105786	10,14	0,02%	74,63%	77,45%	C
351	105789	12,43	0,02%	74,84%	77,48%	C
352	105285	44,80	0,08%	75,05%	77,56%	C
353	105835	7,00	0,01%	75,27%	77,57%	C
354	105649	45,50	0,08%	75,48%	77,65%	C
355	105014	15,83	0,03%	75,69%	77,68%	C
356	106199	9,72	0,02%	75,91%	77,70%	C
357	106208	11,50	0,02%	76,12%	77,72%	C
358	105593	11,00	0,02%	76,33%	77,74%	C
359	105652	8,50	0,02%	76,55%	77,75%	C
360	106210	14,14	0,03%	76,76%	77,78%	C
361	105003	6,22	0,01%	76,97%	77,79%	C
362	105431	5,00	0,01%	77,19%	77,80%	C
363	105469	8,23	0,01%	77,40%	77,81%	C
364	106205	8,73	0,02%	77,61%	77,83%	C
365	105025	4,50	0,01%	77,83%	77,84%	C
366	105281	15,17	0,03%	78,04%	77,87%	C
367	106246	4,10	0,01%	78,25%	77,87%	C

368	105315	5,29	0,01%	78,46%	77,88%	C
369	106109	98,56	0,18%	78,68%	78,06%	C
370	105287	4,50	0,01%	78,89%	78,07%	C
371	106128	8,43	0,02%	79,10%	78,08%	C
372	106227	3,27	0,01%	79,32%	78,09%	C
373	106223	8,68	0,02%	79,53%	78,11%	C
374	106523	6,50	0,01%	79,74%	78,12%	C
375	105800	2,90	0,01%	79,96%	78,12%	C
376	106196	12,44	0,02%	80,17%	78,14%	C
377	106197	5,23	0,01%	80,38%	78,15%	C
378	105309	4,79	0,01%	80,60%	78,16%	C
379	106110	6,93	0,01%	80,81%	78,18%	C
380	105030	4,78	0,01%	81,02%	78,18%	C
381	106214	8,38	0,02%	81,24%	78,20%	C
382	105905	4,09	0,01%	81,45%	78,21%	C
383	105038	6,86	0,01%	81,66%	78,22%	C
384	105286	22,75	0,04%	81,88%	78,26%	C
385	105414	149,91	0,27%	82,09%	78,53%	C
386	105314	4,83	0,01%	82,30%	78,54%	C
387	106225	7,50	0,01%	82,52%	78,55%	C
388	106129	28,47	0,05%	82,73%	78,60%	C
389	106108	6,14	0,01%	82,94%	78,61%	C
390	106521	37,50	0,07%	83,16%	78,68%	C
391	105791	4,42	0,01%	83,37%	78,69%	C
392	105032	3,54	0,01%	83,58%	78,70%	C
393	106213	13,25	0,02%	83,80%	78,72%	C
394	106212	13,00	0,02%	84,01%	78,74%	C
395	105449	2,11	0,00%	84,22%	78,75%	C
396	106226	3,67	0,01%	84,43%	78,75%	C
397	105511	3,00	0,01%	84,65%	78,76%	C
398	105170	8,00	0,01%	84,86%	78,77%	C
399	105127	6,00	0,01%	85,07%	78,79%	C
400	106106	6,64	0,01%	85,29%	78,80%	C
401	105748	3,60	0,01%	85,50%	78,80%	C
402	106046	3,70	0,01%	85,71%	78,81%	C
403	105047	3,00	0,01%	85,93%	78,82%	C
404	106422	3,33	0,01%	86,14%	78,82%	C
405	106437	4,18	0,01%	86,35%	78,83%	C
406	105446	3,36	0,01%	86,57%	78,84%	C
407	105181	1,23	0,00%	86,78%	78,84%	C
408	105590	3,33	0,01%	86,99%	78,84%	C
409	106200	5,68	0,01%	87,21%	78,85%	C
410	105787	11,23	0,02%	87,42%	78,87%	C
411	105839	1,25	0,00%	87,63%	78,88%	C
412	105785	10,00	0,02%	87,85%	78,89%	C
413	105052	2,90	0,01%	88,06%	78,90%	C
414	105316	2,40	0,00%	88,27%	78,90%	C
415	106244	5,89	0,01%	88,49%	78,91%	C
416	105866	6,60	0,01%	88,70%	78,93%	C
417	105019	8,89	0,02%	88,91%	78,94%	C
418	105053	1,90	0,00%	89,13%	78,95%	C
419	106229	1,46	0,00%	89,34%	78,95%	C
420	105610	2,70	0,00%	89,55%	78,95%	C
421	105663	3,32	0,01%	89,77%	78,96%	C
422	105858	14,50	0,03%	89,98%	78,99%	C
423	105135	4,20	0,01%	90,19%	78,99%	C
424	106112	4,80	0,01%	90,41%	79,00%	C
425	106224	4,44	0,01%	90,62%	79,01%	C
426	105857	6,82	0,01%	90,83%	79,02%	C
427	105151	2,33	0,00%	91,04%	79,03%	C
428	105840	3,82	0,01%	91,26%	79,03%	C
429	106111	6,68	0,01%	91,47%	79,05%	C
430	105841	6,55	0,01%	91,68%	79,06%	C
431	105413	1,59	0,00%	91,90%	79,06%	C
432	105185	5,73	0,01%	92,11%	79,07%	C
433	105037	1,67	0,00%	92,32%	79,07%	C
434	105409	3,00	0,01%	92,54%	79,08%	C
435	105677	1,80	0,00%	92,75%	79,08%	C
436	105165	1,20	0,00%	92,96%	79,08%	C
437	105178	1,50	0,00%	93,18%	79,09%	C
438	105838	21,00	0,04%	93,39%	79,12%	C
439	105899	4,23	0,01%	93,60%	79,13%	C
440	105166	2,00	0,00%	93,82%	79,14%	C
441	107436	37,50	0,07%	94,03%	79,20%	C
442	107437	162,27	0,29%	94,24%	79,50%	C
443	107438	413,00	0,75%	94,46%	80,24%	C
444	107439	52,32	0,09%	94,67%	80,34%	C
445	107326	949,50	1,71%	94,88%	82,05%	C

446	107323	208,91	0,38%	95,10%		82,43%	C
447	107325	223,88	0,40%	95,31%		82,83%	C
448	107324	162,09	0,29%	95,52%		83,12%	C
449	107198	342,46	0,62%	95,74%		83,74%	C
450	107273	29,00	0,05%	95,95%		83,79%	C
451	105820	1,50	0,00%	96,16%		83,80%	C
452	105057	6,25	0,01%	96,38%		83,81%	C
453	105182	1,09	0,00%	96,59%		83,81%	C
454	105799	2,27	0,00%	96,80%		83,81%	C
455	107260	127,78	0,23%	97,01%		84,04%	C
456	107294	113,86	0,21%	97,23%		84,25%	C
457	101000171	542,50	0,98%	97,44%		85,23%	C
458	101000173	2 393,00	4,32%	97,65%		89,54%	C
459	101000172	21,50	0,04%	97,87%		89,58%	C
460	101000175	1 632,57	2,95%	98,08%		92,53%	C
461	101000174	379,00	0,68%	98,29%		93,21%	C
462	101000177	1 296,29	2,34%	98,51%		95,55%	C
463	101000176	74,64	0,13%	98,72%		95,69%	C
464	101000170	1 543,00	2,78%	98,93%		98,47%	C
465	107575	366,67	0,66%	99,15%		99,13%	C
466	107661	145,50	0,26%	99,36%		99,39%	C
467	107658	112,50	0,20%	99,57%		99,60%	C
468	107660	92,22	0,17%	99,79%		99,76%	C
469	107659	131,11	0,24%	100,00%		100,00%	C
	TOTAL	55 427,00					

Appendix 5 – Q Value of GB1 before optimization.

#	Product	D	Q	N
1	10597	11636	1257,0	9,26
2	104987	5252	1250,0	4,20
3	10592	2225	192,7	11,55
4	101968	4659	833,3	5,59
5	101975	3362	708,3	4,75
6	105641	2939	1343,3	2,19
7	101876	4118	1020,8	4,03
8	104989	5611	100,0	56,11
9	101877	2920	875,0	3,34
10	101591	1179	316,7	3,72
11	10569	898	250,0	3,59
12	103087	1312	666,7	1,97
13	106311	1898	83,3	22,78
14	10598	2428	341,7	7,11
15	105937	2909	304,8	9,54
16	104992	4240	347,0	12,22
17	105275	3050	441,7	6,91
18	106306	1166	230,0	5,07
19	106432	304	169,2	1,80
20	102360	1466	258,3	5,67
21	10562	455	162,5	2,80
22	101907	725	383,3	1,89
23	104021	2295	150,0	15,30
24	104884	1779	252,2	7,05
25	103056	1369	308,3	4,44
26	10400	475	112,0	4,24
27	105666	263	40,0	6,58
28	104634	2367	288,8	8,20
29	104027	1324	200,0	6,62
30	107019	12971	316,7	40,96

31	104991	1923	76,0	25,30
32	105287	351	116,7	3,01
33	106310	1026	35,0	29,31
34	104715	377	225,0	1,68
35	10737	410	61,4	6,68
36	104636	1597	916,7	1,74
37	10618	3280	125,0	26,24
38	106383	1901	108,3	17,55
39	104990	662	458,3	1,44
40	105334	919	483,3	1,90
41	105408	246	286,7	0,86
42	104028	1149	624,2	1,84
43	106262	347	382,9	0,91
44	106312	1141	23,3	48,90
45	104813	1364	125,0	10,91
46	10704	256	63,3	4,04
47	105841	242	83,3	2,90
48	105333	287	130,4	2,20
49	102275	319	51,7	6,17
50	104822	1227	181,7	6,75
51	1076	586	133,3	4,40
52	10141	357	282,5	1,26
53	105643	668	195,0	3,43
54	108601	589	375,0	1,57
55	104745	1319	126,9	10,39
56	10629	328	141,7	2,32
57	105278	1348	250,0	5,39
58	10158	896	201,3	4,45
59	106530	176	129,2	1,36
60	103439	1531	375,0	4,08
61	10615	327	33,0	9,91
62	104565	1174	351,7	3,34
63	10154	3123	125,0	24,98
64	104749	1365	117,5	11,62
65	105101	234	51,7	4,53
66	106361	1097	278,3	3,94
67	104640	531	48,3	10,99
68	102216	519	375,0	1,38
69	103930	896	471,3	1,90
70	103852	205	60,4	3,39
71	105231	227	50,0	4,54
72	105486	563	74,6	7,55
73	102082	289	377,1	0,77
74	10398	184	200,4	0,92
75	104128	1364	443,3	3,08
76	102873	167	277,9	0,60
77	104742	266	355,4	0,75
78	104750	1790	350,4	5,11
79	105944	953	132,5	7,19
80	10397	651	340,8	1,91
81	104815	1595	131,7	12,11
82	104996	990	222,5	4,45
83	101587	413	63,3	6,52

84	104661	265	355,0	0,75
85	105130	197	406,3	0,48
86	104843	1119	372,5	3,00
87	10142	253	74,6	3,39
88	106309	408	425,8	0,96

Appendix 6 - Q Value of GB2 before optimization.

#	Product	D	Q	N
1	107080	2609	150,0	17,39
2	105739	2433	241,7	10,07
3	106132	216	125,0	1,73
4	105718	847	250,0	3,39
5	105615	808	110,8	7,29
6	106261	1039	66,7	15,59
7	105394	2214	30,2	73,40
8	105322	716	75,0	9,54
9	105393	843	17,7	47,70
10	105162	695	18,2	38,24
11	106489	311	150,0	2,07
12	106463	604	81,7	7,40
13	106462	679	75,0	9,05
14	105883	47	68,8	0,68
15	106158	1136	57,5	19,76
16	106260	443	45,8	9,66
17	105529	304	30,8	9,85
18	105361	491	9,1	54,08
19	107104	275	104,2	2,64
20	106419	63	52,0	1,21
21	105740	409	29,2	14,01
22	105360	621	16,7	37,26
23	105306	237	31,4	7,54
24	105142	125	40,8	3,06
25	105352	252	45,8	5,49
26	105772	133	5,8	22,77
27	106514	29	38,9	0,75
28	105685	349	29,2	11,96
29	107079	851	22,5	37,84
30	105525	278	22,7	12,26
31	105618	240	7,5	32,05
32	107348	467	38,3	12,18
33	105277	212	19,7	10,76
34	106090	211	20,2	10,46
35	106091	207	47,8	4,33
36	107350	411	33,8	12,15
37	106490	185	12,5	14,83
38	107351	90	8,3	10,79
39	106484	31	50,0	0,62
40	107349	67	52,5	1,27

41	105359	219	33,3	6,58
42	105691	253	44,1	5,75
43	105569	124	48,3	2,57
44	107271	213	15,0	14,21
45	105600	107	37,5	2,86
46	106093	87	48,7	1,79
47	106159	206	3,2	63,58
48	105798	302	20,8	14,47
49	106513	45	8,3	5,40
50	105793	252	4,2	60,48
51	106581	148	25,0	5,91
52	106119	207	50,0	4,13
53	106156	233	5,8	39,89
54	105877	138	75,8	1,82
55	105768	64	25,0	2,57
56	106139	134	12,3	10,93
57	106485	21	41,7	0,50

Appendix 7 – Total Cost of stock management for GB1.

#	Product	D	Q	S	I	C	TC
1	10597	11636	1257,0	1,00 €	25,00%	3,22	515,20
2	104987	5252	1250,0	1,00 €	25,00%	1,23	196,39
3	10592	2225	192,7	1,00 €	25,00%	7,71	197,23
4	101968	4659	833,3	1,00 €	25,00%	0,99	108,72
5	101975	3362	708,3	1,00 €	25,00%	1,05	97,72
6	105641	2939	1343,3	1,00 €	25,00%	2,20	371,60
7	101876	4118	1020,8	1,00 €	25,00%	1,99	257,97
8	104989	5611	100,0	1,00 €	25,00%	2,16	83,11
9	101877	2920	875,0	1,00 €	25,00%	1,89	210,06
10	101591	1179	316,7	1,00 €	25,00%	3,40	138,31
11	10569	898	250,0	1,00 €	25,00%	2,40	78,59
12	103087	1312	666,7	1,00 €	25,00%	1,15	97,80
13	106311	1898	83,3	1,00 €	25,00%	3,96	64,03
14	10598	2428	341,7	1,00 €	25,00%	3,22	144,63
15	105937	2909	304,8	1,00 €	25,00%	1,61	70,89
16	104992	4240	347,0	1,00 €	25,00%	0,79	46,49
17	105275	3050	441,7	1,00 €	25,00%	1,29	78,12
18	106306	1166	230,0	1,00 €	25,00%	2,75	84,19
19	106432	304	169,2	1,00 €	25,00%	7,71	164,83
20	102360	1466	258,3	1,00 €	25,00%	0,92	35,53
21	10562	455	162,5	1,00 €	25,00%	6,50	134,83
22	101907	725	383,3	1,00 €	25,00%	0,33	17,70
23	104021	2295	150,0	1,00 €	25,00%	1,48	43,05
24	104884	1779	252,2	1,00 €	25,00%	1,50	54,34
25	103056	1369	308,3	1,00 €	25,00%	1,13	47,99
26	10400	475	112,0	1,00 €	25,00%	4,08	61,36
27	105666	263	40,0	1,00 €	25,00%	2,83	20,73
28	104634	2367	288,8	1,00 €	25,00%	1,38	58,01
29	104027	1324	200,0	1,00 €	25,00%	1,65	47,87

30	107019	12971	316,7	1,00 €	25,00%	1,42	97,17
31	104991	1923	76,0	1,00 €	25,00%	1,50	39,55
32	105287	351	116,7	1,00 €	25,00%	3,94	60,47
33	106310	1026	35,0	1,00 €	25,00%	2,83	41,70
34	104715	377	225,0	1,00 €	25,00%	2,99	85,77
35	10737	410	61,4	1,00 €	25,00%	2,58	26,51
36	104636	1597	916,7	1,00 €	25,00%	1,83	211,43
37	10618	3280	125,0	1,00 €	25,00%	3,11	74,90
38	106383	1901	108,3	1,00 €	25,00%	4,55	79,16
39	104990	662	458,3	1,00 €	25,00%	0,37	22,64
40	105334	919	483,3	1,00 €	25,00%	3,29	200,67
41	105408	246	286,7	1,00 €	25,00%	3,63	130,93
42	104028	1149	624,2	1,00 €	25,00%	1,50	118,87
43	106262	347	382,9	1,00 €	25,00%	3,03	145,94
44	106312	1141	23,3	1,00 €	25,00%	2,61	56,51
45	104813	1364	125,0	1,00 €	25,00%	3,56	66,54
46	10704	256	63,3	1,00 €	25,00%	1,65	17,10
47	105841	242	83,3	1,00 €	25,00%	4,49	49,67
48	105333	287	130,4	1,00 €	25,00%	8,18	135,55
49	102275	319	51,7	1,00 €	25,00%	5,92	44,41
50	104822	1227	181,7	1,00 €	25,00%	1,46	39,91
51	1076	586	133,3	1,00 €	25,00%	1,92	36,40
52	10141	357	282,5	1,00 €	25,00%	2,45	87,78
53	105643	668	195,0	1,00 €	25,00%	0,53	16,34
54	108601	589	375,0	1,00 €	25,00%	2,71	128,60
55	104745	1319	126,9	1,00 €	25,00%	0,51	18,40
56	10629	328	141,7	1,00 €	25,00%	2,73	50,66
57	105278	1348	250,0	1,00 €	25,00%	2,40	80,39
58	10158	896	201,3	1,00 €	25,00%	1,07	31,37
59	106530	176	129,2	1,00 €	25,00%	5,22	85,64
60	103439	1531	375,0	1,00 €	25,00%	2,79	134,86
61	10615	327	33,0	1,00 €	25,00%	3,58	24,68
62	104565	1174	351,7	1,00 €	25,00%	3,23	145,32
63	10154	3123	125,0	1,00 €	25,00%	0,46	32,17
64	104749	1365	117,5	1,00 €	25,00%	1,87	39,08
65	105101	234	51,7	1,00 €	25,00%	1,15	11,96
66	106361	1097	278,3	1,00 €	25,00%	1,22	46,39
67	104640	531	48,3	1,00 €	25,00%	5,31	43,07
68	102216	519	375,0	1,00 €	25,00%	2,77	131,23
69	103930	896	471,3	1,00 €	25,00%	3,41	202,77
70	103852	205	60,4	1,00 €	25,00%	8,41	66,91
71	105231	227	50,0	1,00 €	25,00%	3,12	24,04
72	105486	563	74,6	1,00 €	25,00%	1,16	18,36
73	102082	289	377,1	1,00 €	25,00%	2,57	121,90
74	10398	184	200,4	1,00 €	25,00%	3,72	94,11
75	104128	1364	443,3	1,00 €	25,00%	1,07	62,37
76	102873	167	277,9	1,00 €	25,00%	5,12	178,47
77	104742	266	355,4	1,00 €	25,00%	0,40	18,52
78	104750	1790	350,4	1,00 €	25,00%	2,43	111,55
79	105944	953	132,5	1,00 €	25,00%	2,30	45,29
80	10397	651	340,8	1,00 €	25,00%	3,77	162,53
81	104815	1595	131,7	1,00 €	25,00%	2,17	47,83
82	104996	990	222,5	1,00 €	25,00%	0,78	26,14

83	101587	413	63,3	1,00 €	25,00%	0,78	12,70
84	104661	265	355,0	1,00 €	25,00%	4,15	184,90
85	105130	197	406,3	1,00 €	25,00%	4,55	231,70
86	104843	1119	372,5	1,00 €	25,00%	1,81	87,28
87	10142	253	74,6	1,00 €	25,00%	3,35	34,62
88	106309	408	425,8	1,00 €	25,00%	2,98	159,53

Appendix 8 - Total Cost of stock management for GB2.

#	Product	D	Q	S	I	C	TC
1	107080	2609	12,5	1,00 €	25,00%	1,00	210,28
2	105739	2433	20,1	1,00 €	25,00%	2,50	127,13
3	106132	216	10,4	1,00 €	25,00%	1,92	23,22
4	105718	847	20,8	1,00 €	25,00%	0,70	42,45
5	105615	808	9,2	1,00 €	25,00%	1,04	88,63
6	106261	1039	5,6	1,00 €	25,00%	2,40	188,69
7	105394	2214	2,5	1,00 €	25,00%	1,21	881,22
8	105322	716	6,3	1,00 €	25,00%	0,63	115,01
9	105393	843	1,5	1,00 €	25,00%	0,39	572,45
10	105162	695	1,5	1,00 €	25,00%	1,17	459,06
11	106489	311	12,5	1,00 €	25,00%	0,24	25,22
12	106463	604	6,8	1,00 €	25,00%	1,06	89,65
13	106462	679	6,3	1,00 €	25,00%	1,13	109,46
14	105883	47	5,7	1,00 €	25,00%	3,69	10,84
15	106158	1136	4,8	1,00 €	25,00%	3,76	239,36
16	106260	443	3,8	1,00 €	25,00%	2,02	116,88
17	105529	304	2,6	1,00 €	25,00%	1,00	118,46
18	105361	491	0,8	1,00 €	25,00%	1,67	649,08
19	107104	275	8,7	1,00 €	25,00%	0,74	32,43
20	106419	63	4,3	1,00 €	25,00%	1,73	15,48
21	105740	409	2,4	1,00 €	25,00%	1,57	168,64
22	105360	621	1,4	1,00 €	25,00%	1,35	447,35
23	105306	237	2,6	1,00 €	25,00%	1,01	90,81
24	105142	125	3,4	1,00 €	25,00%	1,16	37,18
25	105352	252	3,8	1,00 €	25,00%	0,56	66,13
26	105772	133	0,5	1,00 €	25,00%	0,85	273,31
27	106514	29	3,2	1,00 €	25,00%	0,74	9,24
28	105685	349	2,4	1,00 €	25,00%	1,87	144,09
29	107079	851	1,9	1,00 €	25,00%	3,00	454,75
30	105525	278	1,9	1,00 €	25,00%	1,17	147,45
31	105618	240	0,6	1,00 €	25,00%	1,00	384,73
32	107348	467	3,2	1,00 €	25,00%	1,70	146,86
33	105277	212	1,6	1,00 €	25,00%	1,34	129,43
34	106090	211	1,7	1,00 €	25,00%	1,08	125,78
35	106091	207	4,0	1,00 €	25,00%	0,92	52,36
36	107350	411	2,8	1,00 €	25,00%	1,70	146,37
37	106490	185	1,0	1,00 €	25,00%	0,64	178,00
38	107351	90	0,7	1,00 €	25,00%	1,70	129,57
39	106484	31	4,2	1,00 €	25,00%	1,92	8,44
40	107349	67	4,4	1,00 €	25,00%	1,70	16,17
41	105359	219	2,8	1,00 €	25,00%	1,31	79,35
42	105691	253	3,7	1,00 €	25,00%	1,20	69,51

43	105569	124	4,0	1,00 €	25,00%	0,85	31,26
44	107271	213	1,3	1,00 €	25,00%	1,70	170,83
45	105600	107	3,1	1,00 €	25,00%	2,95	35,48
46	106093	87	4,1	1,00 €	25,00%	1,03	22,01
47	106159	206	0,3	1,00 €	25,00%	1,46	763,03
48	105798	302	1,7	1,00 €	25,00%	1,83	174,09
49	106513	45	0,7	1,00 €	25,00%	0,74	64,86
50	105793	252	0,3	1,00 €	25,00%	1,77	725,84
51	106581	148	2,1	1,00 €	25,00%	1,65	71,31
52	106119	207	4,2	1,00 €	25,00%	1,24	50,25
53	106156	233	0,5	1,00 €	25,00%	1,98	478,82
54	105877	138	2,7	1,00 €	25,00%	3,54	52,26
55	105768	64	2,1	1,00 €	25,00%	1,69	31,32
56	106139	134	1,0	1,00 €	25,00%	0,91	131,24
57	106485	21	3,5	1,00 €	25,00%	1,03	6,50

Appendix 9 – Economic Order Quantity for GB1.

#	Product	D	S	I	C	EOQ
1	10597	11636	1,00 €	25,00%	3,22	170,03
2	104987	5252	1,00 €	25,00%	1,23	184,82
3	10592	2225	1,00 €	25,00%	7,71	48,05
4	101968	4659	1,00 €	25,00%	0,99	194,03
5	101975	3362	1,00 €	25,00%	1,05	160,05
6	105641	2939	1,00 €	25,00%	2,20	103,38
7	101876	4118	1,00 €	25,00%	1,99	128,67
8	104989	5611	1,00 €	25,00%	2,16	144,16
9	101877	2920	1,00 €	25,00%	1,89	111,17
10	101591	1179	1,00 €	25,00%	3,40	52,67
11	10569	898	1,00 €	25,00%	2,40	54,71
12	103087	1312	1,00 €	25,00%	1,15	95,54
13	106311	1898	1,00 €	25,00%	3,96	61,92
14	10598	2428	1,00 €	25,00%	3,22	77,67
15	105937	2909	1,00 €	25,00%	1,61	120,23
16	104992	4240	1,00 €	25,00%	0,79	207,21
17	105275	3050	1,00 €	25,00%	1,29	137,53
18	106306	1166	1,00 €	25,00%	2,75	58,22
19	106432	304	1,00 €	25,00%	7,71	17,76
20	102360	1466	1,00 €	25,00%	0,92	112,63
21	10562	455	1,00 €	25,00%	6,50	23,66
22	101907	725	1,00 €	25,00%	0,33	132,57
23	104021	2295	1,00 €	25,00%	1,48	111,38
24	104884	1779	1,00 €	25,00%	1,50	97,41
25	103056	1369	1,00 €	25,00%	1,13	98,45
26	10400	475	1,00 €	25,00%	4,08	30,52
27	105666	263	1,00 €	25,00%	2,83	27,27
28	104634	2367	1,00 €	25,00%	1,38	117,14
29	104027	1324	1,00 €	25,00%	1,65	80,12
30	107019	12971	1,00 €	25,00%	1,42	270,33
31	104991	1923	1,00 €	25,00%	1,50	101,27
32	105287	351	1,00 €	25,00%	3,94	26,70

33	106310	1026	1,00 €	25,00%	2,83	53,85
34	104715	377	1,00 €	25,00%	2,99	31,76
35	10737	410	1,00 €	25,00%	2,58	35,63
36	104636	1597	1,00 €	25,00%	1,83	83,55
37	10618	3280	1,00 €	25,00%	3,11	91,80
38	106383	1901	1,00 €	25,00%	4,55	57,81
39	104990	662	1,00 €	25,00%	0,37	119,64
40	105334	919	1,00 €	25,00%	3,29	47,27
41	105408	246	1,00 €	25,00%	3,63	23,28
42	104028	1149	1,00 €	25,00%	1,50	78,28
43	106262	347	1,00 €	25,00%	3,03	30,27
44	106312	1141	1,00 €	25,00%	2,61	59,14
45	104813	1364	1,00 €	25,00%	3,56	55,36
46	10704	256	1,00 €	25,00%	1,65	35,23
47	105841	242	1,00 €	25,00%	4,49	20,76
48	105333	287	1,00 €	25,00%	8,18	16,75
49	102275	319	1,00 €	25,00%	5,92	20,76
50	104822	1227	1,00 €	25,00%	1,46	82,00
51	1076	586	1,00 €	25,00%	1,92	49,41
52	10141	357	1,00 €	25,00%	2,45	34,14
53	105643	668	1,00 €	25,00%	0,53	100,41
54	108601	589	1,00 €	25,00%	2,71	41,70
55	104745	1319	1,00 €	25,00%	0,51	144,55
56	10629	328	1,00 €	25,00%	2,73	31,00
57	105278	1348	1,00 €	25,00%	2,40	67,03
58	10158	896	1,00 €	25,00%	1,07	81,85
59	106530	176	1,00 €	25,00%	5,22	16,42
60	103439	1531	1,00 €	25,00%	2,79	66,26
61	10615	327	1,00 €	25,00%	3,58	27,03
62	104565	1174	1,00 €	25,00%	3,23	53,92
63	10154	3123	1,00 €	25,00%	0,46	233,05
64	104749	1365	1,00 €	25,00%	1,87	76,42
65	105101	234	1,00 €	25,00%	1,15	40,35
66	106361	1097	1,00 €	25,00%	1,22	84,81
67	104640	531	1,00 €	25,00%	5,31	28,28
68	102216	519	1,00 €	25,00%	2,77	38,72
69	103930	896	1,00 €	25,00%	3,41	45,85
70	103852	205	1,00 €	25,00%	8,41	13,96
71	105231	227	1,00 €	25,00%	3,12	24,13
72	105486	563	1,00 €	25,00%	1,16	62,31
73	102082	289	1,00 €	25,00%	2,57	29,99
74	10398	184	1,00 €	25,00%	3,72	19,89
75	104128	1364	1,00 €	25,00%	1,07	100,99
76	102873	167	1,00 €	25,00%	5,12	16,15
77	104742	266	1,00 €	25,00%	0,40	72,94
78	104750	1790	1,00 €	25,00%	2,43	76,77
79	105944	953	1,00 €	25,00%	2,30	57,57
80	10397	651	1,00 €	25,00%	3,77	37,17
81	104815	1595	1,00 €	25,00%	2,17	76,68
82	104996	990	1,00 €	25,00%	0,78	100,77
83	101587	413	1,00 €	25,00%	0,78	65,08
84	104661	265	1,00 €	25,00%	4,15	22,60
85	105130	197	1,00 €	25,00%	4,55	18,60

86	104843	1119	1,00 €	25,00%	1,81	70,33
87	10142	253	1,00 €	25,00%	3,35	24,58
88	106309	408	1,00 €	25,00%	2,98	33,10

Appendix 10 – Economic Order Quantity for GB2

#	Product	D	S	I	C	EOQ
1	107080	2609,0	1,00 €	25,00%	1,00	144,47
2	105739	2433,4	1,00 €	25,00%	2,50	88,24
3	106132	215,8	1,00 €	25,00%	1,92	29,99
4	105718	846,5	1,00 €	25,00%	0,70	98,36
5	105615	807,5	1,00 €	25,00%	1,04	78,81
6	106261	1039,0	1,00 €	25,00%	2,40	58,85
7	105394	2214,3	1,00 €	25,00%	1,21	121,00
8	105322	715,7	1,00 €	25,00%	0,63	95,33
9	105393	842,7	1,00 €	25,00%	0,39	131,47
10	105162	694,6	1,00 €	25,00%	1,17	68,92
11	106489	310,6	1,00 €	25,00%	0,24	101,75
12	106463	604,0	1,00 €	25,00%	1,06	67,52
13	106462	678,6	1,00 €	25,00%	1,13	69,31
14	105883	47,0	1,00 €	25,00%	3,69	10,09
15	106158	1136,1	1,00 €	25,00%	3,76	49,17
16	106260	442,7	1,00 €	25,00%	2,02	41,87
17	105529	303,6	1,00 €	25,00%	1,00	49,28
18	105361	491,2	1,00 €	25,00%	1,67	48,51
19	107104	274,5	1,00 €	25,00%	0,74	54,48
20	106419	63,0	1,00 €	25,00%	1,73	17,07
21	105740	408,7	1,00 €	25,00%	1,57	45,64
22	105360	621,0	1,00 €	25,00%	1,35	60,66
23	105306	236,9	1,00 €	25,00%	1,01	43,32
24	105142	124,8	1,00 €	25,00%	1,16	29,34
25	105352	251,6	1,00 €	25,00%	0,56	59,95
26	105772	132,8	1,00 €	25,00%	0,85	35,36
27	106514	29,0	1,00 €	25,00%	0,74	17,71
28	105685	348,8	1,00 €	25,00%	1,87	38,63
29	107079	851,3	1,00 €	25,00%	3,00	47,65
30	105525	278,0	1,00 €	25,00%	1,17	43,60
31	105618	240,4	1,00 €	25,00%	1,00	43,86
32	107348	467,0	1,00 €	25,00%	1,70	46,88
33	105277	211,7	1,00 €	25,00%	1,34	35,55
34	106090	211,0	1,00 €	25,00%	1,08	39,53
35	106091	206,9	1,00 €	25,00%	0,92	42,42
36	107350	411,0	1,00 €	25,00%	1,70	43,98
37	106490	185,3	1,00 €	25,00%	0,64	48,13
38	107351	89,9	1,00 €	25,00%	1,70	20,57
39	106484	31,0	1,00 €	25,00%	1,92	11,37
40	107349	66,7	1,00 €	25,00%	1,70	17,71
41	105359	219,2	1,00 €	25,00%	1,31	36,58
42	105691	253,3	1,00 €	25,00%	1,20	41,10
43	105569	124,2	1,00 €	25,00%	0,85	34,19
44	107271	213,2	1,00 €	25,00%	1,70	31,67
45	105600	107,3	1,00 €	25,00%	2,95	17,06

46	106093	87,1	1,00 €	25,00%	1,03	26,01
47	106159	206,2	1,00 €	25,00%	1,46	33,61
48	105798	301,6	1,00 €	25,00%	1,83	36,31
49	106513	45,0	1,00 €	25,00%	0,74	22,06
50	105793	252,0	1,00 €	25,00%	1,77	33,75
51	106581	147,7	1,00 €	25,00%	1,65	26,76
52	106119	206,7	1,00 €	25,00%	1,24	36,51
53	106156	232,7	1,00 €	25,00%	1,98	30,66
54	105877	138,3	1,00 €	25,00%	3,54	17,68
55	105768	64,3	1,00 €	25,00%	1,69	17,45
56	106139	133,9	1,00 €	25,00%	0,91	34,30
57	106485	21,0	1,00 €	25,00%	1,03	12,77

Appendix 11 - Variables N, T, LT e ROP for GB1

#	Product	D	EOQ	N	T	d	LT	ROP
1	10597	11636	170,03	9,26	0,11	31,90	4,00	127,60
2	104987	5252	184,82	4,20	0,24	14,40	4,00	57,60
3	10592	2225	48,05	11,55	0,09	6,10	4,00	24,40
4	101968	4659	194,03	5,59	0,18	12,80	4,00	51,20
5	101975	3362	160,05	4,75	0,21	9,20	4,00	36,80
6	105641	2939	103,38	2,19	0,46	8,10	4,00	32,40
7	101876	4118	128,67	4,03	0,25	11,30	4,00	45,20
8	104989	5611	144,16	56,11	0,02	15,40	4,00	61,60
9	101877	2920	111,17	3,34	0,30	8,00	4,00	32,00
10	101591	1179	52,67	3,72	0,27	3,20	4,00	12,80
11	10569	898	54,71	3,59	0,28	2,50	4,00	10,00
12	103087	1312	95,54	1,97	0,51	3,60	4,00	14,40
13	106311	1898	61,92	22,78	0,04	5,20	4,00	20,80
14	10598	2428	77,67	7,11	0,14	6,70	4,00	26,80
15	105937	2909	120,23	9,54	0,10	8,00	4,00	32,00
16	104992	4240	207,21	12,22	0,08	11,60	4,00	46,40
17	105275	3050	137,53	6,91	0,14	8,40	4,00	33,60
18	106306	1166	58,22	5,07	0,20	3,20	4,00	12,80
19	106432	304	17,76	1,80	0,56	0,80	4,00	3,20
20	102360	1466	112,63	5,67	0,18	4,00	4,00	16,00
21	10562	455	23,66	2,80	0,36	1,20	4,00	4,80
22	101907	725	132,57	1,89	0,53	2,00	4,00	8,00
23	104021	2295	111,38	15,30	0,07	6,30	4,00	25,20
24	104884	1779	97,41	7,05	0,14	4,90	4,00	19,60
25	103056	1369	98,45	4,44	0,23	3,80	4,00	15,20
26	10400	475	30,52	4,24	0,24	1,30	4,00	5,20
27	105666	263	27,27	6,58	0,15	0,70	4,00	2,80
28	104634	2367	117,14	8,20	0,12	6,50	4,00	26,00
29	104027	1324	80,12	6,62	0,15	3,60	4,00	14,40
30	107019	12971	270,33	40,96	0,02	35,50	4,00	142,00
31	104991	1923	101,27	25,30	0,04	5,30	4,00	21,20
32	105287	351	26,70	3,01	0,33	1,00	4,00	4,00
33	106310	1026	53,85	29,31	0,03	2,80	4,00	11,20
34	104715	377	31,76	1,68	0,60	1,00	4,00	4,00

35	10737	410	35,63	6,68	0,15	1,10	4,00	4,40
36	104636	1597	83,55	1,74	0,57	4,40	4,00	17,60
37	10618	3280	91,80	26,24	0,04	9,00	4,00	36,00
38	106383	1901	57,81	17,55	0,06	5,20	4,00	20,80
39	104990	662	119,64	1,44	0,69	1,80	4,00	7,20
40	105334	919	47,27	1,90	0,53	2,50	4,00	10,00
41	105408	246	23,28	0,86	1,17	0,70	4,00	2,80
42	104028	1149	78,28	1,84	0,54	3,10	4,00	12,40
43	106262	347	30,27	0,91	1,10	1,00	4,00	4,00
44	106312	1141	59,14	48,90	0,02	3,10	4,00	12,40
45	104813	1364	55,36	10,91	0,09	3,70	4,00	14,80
46	10704	256	35,23	4,04	0,25	0,70	4,00	2,80
47	105841	242	20,76	2,90	0,34	0,70	4,00	2,80
48	105333	287	16,75	2,20	0,45	0,80	4,00	3,20
49	102275	319	20,76	6,17	0,16	0,90	4,00	3,60
50	104822	1227	82,00	6,75	0,15	3,40	4,00	13,60
51	1076	586	49,41	4,40	0,23	1,60	4,00	6,40
52	10141	357	34,14	1,26	0,79	1,00	4,00	4,00
53	105643	668	100,41	3,43	0,29	1,80	4,00	7,20
54	108601	589	41,70	1,57	0,64	1,60	4,00	6,40
55	104745	1319	144,55	10,39	0,10	3,60	4,00	14,40
56	10629	328	31,00	2,32	0,43	0,90	4,00	3,60
57	105278	1348	67,03	5,39	0,19	3,70	4,00	14,80
58	10158	896	81,85	4,45	0,22	2,50	4,00	10,00
59	106530	176	16,42	1,36	0,73	0,50	4,00	2,00
60	103439	1531	66,26	4,08	0,24	4,20	4,00	16,80
61	10615	327	27,03	9,91	0,10	0,90	4,00	3,60
62	104565	1174	53,92	3,34	0,30	3,20	4,00	12,80
63	10154	3123	233,05	24,98	0,04	8,60	4,00	34,40
64	104749	1365	76,42	11,62	0,09	3,70	4,00	14,80
65	105101	234	40,35	4,53	0,22	0,60	4,00	2,40
66	106361	1097	84,81	3,94	0,25	3,00	4,00	12,00
67	104640	531	28,28	10,99	0,09	1,50	4,00	6,00
68	102216	519	38,72	1,38	0,72	1,40	4,00	5,60
69	103930	896	45,85	1,90	0,53	2,50	4,00	10,00
70	103852	205	13,96	3,39	0,29	0,60	4,00	2,40
71	105231	227	24,13	4,54	0,22	0,60	4,00	2,40
72	105486	563	62,31	7,55	0,13	1,50	4,00	6,00
73	102082	289	29,99	0,77	1,30	0,80	4,00	3,20
74	10398	184	19,89	0,92	1,09	0,50	4,00	2,00
75	104128	1364	100,99	3,08	0,33	3,70	4,00	14,80
76	102873	167	16,15	0,60	1,66	0,50	4,00	2,00
77	104742	266	72,94	0,75	1,34	0,70	4,00	2,80
78	104750	1790	76,77	5,11	0,20	4,90	4,00	19,60
79	105944	953	57,57	7,19	0,14	2,60	4,00	10,40
80	10397	651	37,17	1,91	0,52	1,80	4,00	7,20
81	104815	1595	76,68	12,11	0,08	4,40	4,00	17,60
82	104996	990	100,77	4,45	0,22	2,70	4,00	10,80
83	101587	413	65,08	6,52	0,15	1,10	4,00	4,40
84	104661	265	22,60	0,75	1,34	0,70	4,00	2,80
85	105130	197	18,60	0,48	2,06	0,50	4,00	2,00
86	104843	1119	70,33	3,00	0,33	3,10	4,00	12,40
87	10142	253	24,58	3,39	0,29	0,70	4,00	2,80

| 88 | 106309 | 408 | 33,10 | 0,96 | 1,04 | 1,10 | 4,00 | 4,40 |

Appendix 12 - Variables N, T, LT e ROP for GB1

#	Product	D	EOQ	N	T	d	LT	ROP
1	107080	2609	144,47	208,72	0,00	7,10	4,00	28,40
2	105739	2433	88,24	120,83	0,01	6,70	4,00	26,80
3	106132	216	29,99	20,72	0,05	0,60	4,00	2,40
4	105718	847	98,36	40,63	0,02	2,30	4,00	9,20
5	105615	808	78,81	87,43	0,01	2,20	4,00	8,80
6	106261	1039	58,85	187,02	0,01	2,80	4,00	11,20
7	105394	2214	121,00	880,84	0,00	6,10	4,00	24,40
8	105322	716	95,33	114,51	0,01	2,00	4,00	8,00
9	105393	843	131,47	572,38	0,00	2,30	4,00	9,20
10	105162	695	68,92	458,83	0,00	1,90	4,00	7,60
11	106489	311	101,75	24,85	0,04	0,90	4,00	3,60
12	106463	604	67,52	88,75	0,01	1,70	4,00	6,80
13	106462	679	69,31	108,58	0,01	1,90	4,00	7,60
14	105883	47	10,09	8,19	0,12	0,10	4,00	0,40
15	106158	1136	49,17	237,11	0,00	3,10	4,00	12,40
16	106260	443	41,87	115,91	0,01	1,20	4,00	4,80
17	105529	304	49,28	118,14	0,01	0,80	4,00	3,20
18	105361	491	48,51	648,92	0,00	1,30	4,00	5,20
19	107104	275	54,48	31,62	0,03	0,80	4,00	3,20
20	106419	63	17,07	14,54	0,07	0,20	4,00	0,80
21	105740	409	45,64	168,16	0,01	1,10	4,00	4,40
22	105360	621	60,66	447,12	0,00	1,70	4,00	6,80
23	105306	237	43,32	90,48	0,01	0,60	4,00	2,40
24	105142	125	29,34	36,69	0,03	0,30	4,00	1,20
25	105352	252	59,95	65,87	0,02	0,70	4,00	2,80
26	105772	133	35,36	273,26	0,00	0,40	4,00	1,60
27	106514	29	17,71	8,94	0,11	0,10	4,00	0,40
28	105685	349	38,63	143,52	0,01	1,00	4,00	4,00
29	107079	851	47,65	454,04	0,00	2,30	4,00	9,20
30	105525	278	43,60	147,18	0,01	0,80	4,00	3,20
31	105618	240	43,86	384,65	0,00	0,70	4,00	2,80
32	107348	467	46,88	146,18	0,01	1,30	4,00	5,20
33	105277	212	35,55	129,15	0,01	0,60	4,00	2,40
34	106090	211	39,53	125,55	0,01	0,60	4,00	2,40
35	106091	207	42,42	51,91	0,02	0,60	4,00	2,40
36	107350	411	43,98	145,77	0,01	1,10	4,00	4,40
37	106490	185	48,13	177,92	0,01	0,50	4,00	2,00
38	107351	90	20,57	129,42	0,01	0,20	4,00	0,80
39	106484	31	11,37	7,44	0,13	0,10	4,00	0,40
40	107349	67	17,71	15,24	0,07	0,20	4,00	0,80
41	105359	219	36,58	78,90	0,01	0,60	4,00	2,40
42	105691	253	41,10	68,96	0,01	0,70	4,00	2,80
43	105569	124	34,19	30,83	0,03	0,30	4,00	1,20
44	107271	213	31,67	170,56	0,01	0,60	4,00	2,40
45	105600	107	17,06	34,33	0,03	0,30	4,00	1,20
46	106093	87	26,01	21,48	0,05	0,20	4,00	0,80

47	106159	206	33,61	762,98	0,00	0,60	4,00	2,40
48	105798	302	36,31	173,70	0,01	0,80	4,00	3,20
49	106513	45	22,06	64,80	0,02	0,10	4,00	0,40
50	105793	252	33,75	725,76	0,00	0,70	4,00	2,80
51	106581	148	26,76	70,88	0,01	0,40	4,00	1,60
52	106119	207	36,51	49,60	0,02	0,60	4,00	2,40
53	106156	233	30,66	478,70	0,00	0,60	4,00	2,40
54	105877	138	17,68	38,30	0,03	0,40	4,00	1,60
55	105768	64	17,45	30,88	0,03	0,20	4,00	0,80
56	106139	134	34,30	131,13	0,01	0,40	4,00	1,60
57	106485	21	12,77	6,05	0,17	0,10	4,00	0,40

Appendix 13 – Total Costs for GB1

#	Product	D	EOQ	S	I	C	TC
1	10597	11636	170,03	1,00 €	25,00%	3,22	136,87
2	104987	5252	184,82	1,00 €	25,00%	1,23	56,83
3	10592	2225	48,05	1,00 €	25,00%	7,71	92,61
4	101968	4659	194,03	1,00 €	25,00%	0,99	48,02
5	101975	3362	160,05	1,00 €	25,00%	1,05	42,01
6	105641	2939	103,38	1,00 €	25,00%	1,18	43,68
7	101876	4118	128,67	1,00 €	25,00%	1,99	64,01
8	104989	5611	144,16	1,00 €	25,00%	2,16	77,85
9	101877	2920	111,17	1,00 €	25,00%	1,89	52,53
10	101591	1179	52,67	1,00 €	25,00%	3,40	44,77
11	10569	898	54,71	1,00 €	25,00%	2,40	32,83
12	103087	1312	95,54	1,00 €	25,00%	1,15	27,47
13	106311	1898	61,92	1,00 €	25,00%	3,96	61,30
14	10598	2428	77,67	1,00 €	25,00%	3,22	62,52
15	105937	2909	120,23	1,00 €	25,00%	1,61	48,39
16	104992	4240	207,21	1,00 €	25,00%	0,79	40,92
17	105275	3050	137,53	1,00 €	25,00%	1,29	44,35
18	106306	1166	58,22	1,00 €	25,00%	2,75	40,06
19	106432	304	17,76	1,00 €	25,00%	7,71	34,23
20	102360	1466	112,63	1,00 €	25,00%	0,92	26,03
21	10562	455	23,66	1,00 €	25,00%	6,50	38,45
22	101907	725	132,57	1,00 €	25,00%	0,33	10,94
23	104021	2295	111,38	1,00 €	25,00%	1,48	41,21
24	104884	1779	97,41	1,00 €	25,00%	1,50	36,53
25	103056	1369	98,45	1,00 €	25,00%	1,13	27,81
26	10400	475	30,52	1,00 €	25,00%	4,08	31,13
27	105666	263	27,27	1,00 €	25,00%	2,83	19,29
28	104634	2367	117,14	1,00 €	25,00%	1,38	40,41
29	104027	1324	80,12	1,00 €	25,00%	1,65	33,05
30	107019	12971	270,33	1,00 €	25,00%	1,42	95,97
31	104991	1923	101,27	1,00 €	25,00%	1,50	37,98
32	105287	351	26,70	1,00 €	25,00%	3,94	26,30
33	106310	1026	53,85	1,00 €	25,00%	2,83	38,10
34	104715	377	31,76	1,00 €	25,00%	2,99	23,74
35	10737	410	35,63	1,00 €	25,00%	2,58	23,02

36	104636	1597	83,55	1,00 €	25,00%	1,83	38,23
37	10618	3280	91,80	1,00 €	25,00%	3,11	71,46
38	106383	1901	57,81	1,00 €	25,00%	4,55	65,76
39	104990	662	119,64	1,00 €	25,00%	0,37	11,07
40	105334	919	47,27	1,00 €	25,00%	3,29	38,88
41	105408	246	23,28	1,00 €	25,00%	3,63	21,13
42	104028	1149	78,28	1,00 €	25,00%	1,50	29,36
43	106262	347	30,27	1,00 €	25,00%	3,03	22,93
44	106312	1141	59,14	1,00 €	25,00%	2,61	38,59
45	104813	1364	55,36	1,00 €	25,00%	3,56	49,27
46	10704	256	35,23	1,00 €	25,00%	1,65	14,53
47	105841	242	20,76	1,00 €	25,00%	4,49	23,31
48	105333	287	16,75	1,00 €	25,00%	8,18	34,26
49	102275	319	20,76	1,00 €	25,00%	5,92	30,73
50	104822	1227	82,00	1,00 €	25,00%	1,46	29,93
51	1076	586	49,41	1,00 €	25,00%	1,92	23,72
52	10141	357	34,14	1,00 €	25,00%	2,45	20,91
53	105643	668	100,41	1,00 €	25,00%	0,53	13,30
54	108601	589	41,70	1,00 €	25,00%	2,71	28,25
55	104745	1319	144,55	1,00 €	25,00%	0,51	18,25
56	10629	328	31,00	1,00 €	25,00%	2,73	21,16
57	105278	1348	67,03	1,00 €	25,00%	2,40	40,22
58	10158	896	81,85	1,00 €	25,00%	1,07	21,89
59	106530	176	16,42	1,00 €	25,00%	5,22	21,43
60	103439	1531	66,26	1,00 €	25,00%	2,79	46,21
61	10615	327	27,03	1,00 €	25,00%	3,58	24,19
62	104565	1174	53,92	1,00 €	25,00%	3,23	43,54
63	10154	3123	233,05	1,00 €	25,00%	0,46	26,80
64	104749	1365	76,42	1,00 €	25,00%	1,87	35,72
65	105101	234	40,35	1,00 €	25,00%	1,15	11,60
66	106361	1097	84,81	1,00 €	25,00%	1,22	25,87
67	104640	531	28,28	1,00 €	25,00%	5,31	37,55
68	102216	519	38,72	1,00 €	25,00%	2,77	26,81
69	103930	896	45,85	1,00 €	25,00%	3,41	39,09
70	103852	205	13,96	1,00 €	25,00%	8,41	29,36
71	105231	227	24,13	1,00 €	25,00%	3,12	18,82
72	105486	563	62,31	1,00 €	25,00%	1,16	18,07
73	102082	289	29,99	1,00 €	25,00%	2,57	19,27
74	10398	184	19,89	1,00 €	25,00%	3,72	18,50
75	104128	1364	100,99	1,00 €	25,00%	1,07	27,01
76	102873	167	16,15	1,00 €	25,00%	5,12	20,68
77	104742	266	72,94	1,00 €	25,00%	0,40	7,29
78	104750	1790	76,77	1,00 €	25,00%	2,43	46,64
79	105944	953	57,57	1,00 €	25,00%	2,30	33,11
80	10397	651	37,17	1,00 €	25,00%	3,77	35,03
81	104815	1595	76,68	1,00 €	25,00%	2,17	41,60
82	104996	990	100,77	1,00 €	25,00%	0,78	19,65
83	101587	413	65,08	1,00 €	25,00%	0,78	12,69
84	104661	265	22,60	1,00 €	25,00%	4,15	23,45
85	105130	197	18,60	1,00 €	25,00%	4,55	21,18
86	104843	1119	70,33	1,00 €	25,00%	1,81	31,82
87	10142	253	24,58	1,00 €	25,00%	3,35	20,59
88	106309	408	33,10	1,00 €	25,00%	2,98	24,65

Appendix 14 – Total Costs for GB2

#	Product	D	EOQ	S	I	C	TC
1	107080	2609,00	144,47	1,00 €	25,00%	1,00	36,12
2	105739	2433,43	88,24	1,00 €	25,00%	2,50	55,15
3	106132	215,80	29,99	1,00 €	25,00%	1,92	14,39
4	105718	846,50	98,36	1,00 €	25,00%	0,70	17,21
5	105615	807,50	78,81	1,00 €	25,00%	1,04	20,49
6	106261	1039,00	58,85	1,00 €	25,00%	2,40	35,31
7	105394	2214,33	121,00	1,00 €	25,00%	1,21	36,60
8	105322	715,71	95,33	1,00 €	25,00%	0,63	15,01
9	105393	842,67	131,47	1,00 €	25,00%	0,39	12,82
10	105162	694,63	68,92	1,00 €	25,00%	1,17	20,16
11	106489	310,60	101,75	1,00 €	25,00%	0,24	6,11
12	106463	604,00	67,52	1,00 €	25,00%	1,06	17,89
13	106462	678,60	69,31	1,00 €	25,00%	1,13	19,58
14	105883	47,00	10,09	1,00 €	25,00%	3,69	9,31
15	106158	1136,14	49,17	1,00 €	25,00%	3,76	46,22
16	106260	442,73	41,87	1,00 €	25,00%	2,02	21,15
17	105529	303,56	49,28	1,00 €	25,00%	1,00	12,32
18	105361	491,20	48,51	1,00 €	25,00%	1,67	20,25
19	107104	274,50	54,48	1,00 €	25,00%	0,74	10,08
20	106419	63,00	17,07	1,00 €	25,00%	1,73	7,38
21	105740	408,73	45,64	1,00 €	25,00%	1,57	17,91
22	105360	621,00	60,66	1,00 €	25,00%	1,35	20,47
23	105306	236,89	43,32	1,00 €	25,00%	1,01	10,94
24	105142	124,83	29,34	1,00 €	25,00%	1,16	8,51
25	105352	251,57	59,95	1,00 €	25,00%	0,56	8,39
26	105772	132,83	35,36	1,00 €	25,00%	0,85	7,51
27	106514	29,00	17,71	1,00 €	25,00%	0,74	3,28
28	105685	348,83	38,63	1,00 €	25,00%	1,87	18,06
29	107079	851,33	47,65	1,00 €	25,00%	3,00	35,74
30	105525	278,00	43,60	1,00 €	25,00%	1,17	12,75
31	105618	240,41	43,86	1,00 €	25,00%	1,00	10,96
32	107348	466,95	46,88	1,00 €	25,00%	1,70	19,92
33	105277	211,67	35,55	1,00 €	25,00%	1,34	11,91
34	106090	211,00	39,53	1,00 €	25,00%	1,08	10,67
35	106091	206,90	42,42	1,00 €	25,00%	0,92	9,76
36	107350	411,00	43,98	1,00 €	25,00%	1,70	18,69
37	106490	185,33	48,13	1,00 €	25,00%	0,64	7,70
38	107351	89,88	20,57	1,00 €	25,00%	1,70	8,74
39	106484	31,00	11,37	1,00 €	25,00%	1,92	5,46
40	107349	66,67	17,71	1,00 €	25,00%	1,70	7,53
41	105359	219,17	36,58	1,00 €	25,00%	1,31	11,98
42	105691	253,33	41,10	1,00 €	25,00%	1,20	12,33
43	105569	124,17	34,19	1,00 €	25,00%	0,85	7,26
44	107271	213,20	31,67	1,00 €	25,00%	1,70	13,46
45	105600	107,28	17,06	1,00 €	25,00%	2,95	12,58
46	106093	87,13	26,01	1,00 €	25,00%	1,03	6,70

47	106159	206,20	33,61	1,00 €	25,00%	1,46	12,27
48	105798	301,56	36,31	1,00 €	25,00%	1,83	16,61
49	106513	45,00	22,06	1,00 €	25,00%	0,74	4,08
50	105793	252,00	33,75	1,00 €	25,00%	1,77	14,93
51	106581	147,67	26,76	1,00 €	25,00%	1,65	11,04
52	106119	206,67	36,51	1,00 €	25,00%	1,24	11,32
53	106156	232,70	30,66	1,00 €	25,00%	1,98	15,18
54	105877	138,30	17,68	1,00 €	25,00%	3,54	15,65
55	105768	64,33	17,45	1,00 €	25,00%	1,69	7,37
56	106139	133,86	34,30	1,00 €	25,00%	0,91	7,80
57	106485	21,00	12,77	1,00 €	25,00%	1,03	3,29