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GRADUATE SCHOOL OF SOCIAL SCIENCES

MASTER IN BUSINESS ADMINISTRATION



**DATA ANALYSIS OF SUPPLY CHAIN STRATEGIES IN SMALL  
COMPANIES:**

**A CASE OF A CANADIAN COMPANY**

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May 2017



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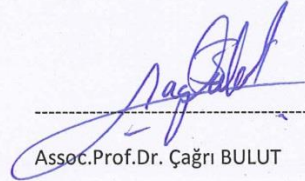


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## **ABSTRACT**

### **DATA ANALYSIS OF SUPPLY CHAIN STRATEGIES IN SMALL COMPANIES: A CASE OF A CANADIAN COMPANY**

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Data analysis is one of the key factors separating small and large enterprises. Large enterprise revolve their strategies around the data they gather during the years, while most small companies do not even keep a clear record of their data. Small companies based their future strategies based on gut, while larger and more successful companies have actual data and analysis validating their next strategy. This is a big factor why some companies succeed, while the others fail. In this research, data was collected and interpreted in order to have a better understanding of the company, Delice Vert. With the data collected, different hypothesis were formulated in order to see how the company has evolved over the years. Based on the findings, we could conclude that the company has had a steady production and revenue stream since its conception. This is not an ideal situation as most small businesses are highly susceptible to fail, and also the percentage increases for the ones that are not able to grow. Different strategies can be used in order to increase the demand, allowing the company to grow. Selling the product to companies that are not in a near proximity and financial aid from government institutions are two avenues that could be used by Delice Vert, in order to grow, which should also be examined in future studies.

**Key Words:** Data analysis, Demand Forecasting, ABC analysis, Small-sized business

## ÖZ

### **Küçük ölçekli firmalarda tedarik zinciri stratejileri veri analizi:**

#### **Kanada firması örneği**

Veri analizi büyük ve küçük ölçekli firmaları birbirinden ayırt eden önemli faktörlerden biridir. Büyük ölçekli firmalar stratejilerini belirlerken gözlemlenen gerçek verilerden yararlanırken, küçük ölçekli firmalar veri toplama konusunda dahi yetersiz kalmaktadır. Büyük ve başarılı firmalar gelecek stratejilerini belirlerken gözlemlenen veriyi kullanır ve çok doğru bir şekilde analiz etmeye çalışırlar. Doğru istatistiksel analiz sonucunda oluşturulan stratejilerin de başarıya giden yolda yadsınamaz etkisi görülmektedir. Bu çalışmada Delice Vert isimli gıda sektöründe çalışan küçük bir Kanada işletmesinden gerçek veriler toplanıp analiz edilmiş ve bu şekilde firmanın stratejileri hakkında yorumlamalar yapılmıştır. Firmanın yıllar içindeki gelişimini analiz etmek için farklı hipotezler test edilmiştir. Çalışmanın sonuçlarına bakıldığında firmanın istikrarlı bir üretim hacmi ve gelir akışı gözlenmiştir. Bu başarısız olma ihtimali çok yüksek olan küçük ölçekli firmalara kıyasla çok olağan bir durum değildir. Firmanın talebini arttırıp büyümesini sağlamak için de farklı stratejiler önerilmiştir. Fiziksel olarak çok yakın olmayan firmalarla da çalışmak ve devletten finansal fon taleplerinde bulunmak gibi etkenlerin Delice Vert gibi küçük ölçekli firmalarda gelişmeyi sağlayıcı olduğu öngörülmüştür.


**Anahtar kelimeler:** Veri analizi, Talep tahmin, ABC analizi, Kobi

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Yashar Eskandari  
İzmir, 2017

## TEXT OF OATH

I declare and honestly confirm that my study, titled “Data analysis of supply chain strategies in small companies: A case of a Canadian company” and presented as a Master’s Thesis, has been written without any assistance inconsistent with scientific ethics and traditions. I declare, to the best of my knowledge and belief, that all content and ideas drawn directly or indirectly from external sources are indicated in the text and listed in the list of references.



Yashar Eskandari

Signature

.....

May 30, 2017

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# **CHAPTER ONE**

## **SMALL BUSSINESSES IN IN GENERAL AND IN CANADA**

### **1.1. Introduction**

The main reason why someone will launch a business is to be able to make a profit and be able to grow the business, in the future, in order to get a bigger share. There will be many obstacles which the owners will face during the process, making them unable to grow or even fail at doing so. When it comes to data analysis, any small business owner will say that they do not have time to do such task, because they are busy running other aspects of the company which they believe to be more important. Data analysis is time consuming and costly, which is why most owners will omit to do such process. The main aspect small business owners do not seem to grasp is the fact that data analysis is a must, in today's business world if you want to have a chance to succeed and be able to grow your company in the future. By being able to see and better understand your data, new opportunities will be presented to you. You will be able to turn your clients into a loyal client, have the right promotions at the appropriate moments, be able to better price your products in order to maximize profits, which will lead you to have a better supply chain system.

Based on the data you have gathered, you could also help build a better supply chain system in your company, but building an effective supply chain management system is not an easy task. It takes time and financial commitment to acquire appropriate software. Business procedures and policies must adapt to the new software and personnel must be properly trained to use the software and adapt to the new policies. Small business must accept and adapt to this new changes in order to survive in the 21st century. If proper adaptation is made, it will allow the company to have success in the long-term.

Supply chain management was established by Keith Oliver in 1982, but it has started to play a major role in the early 20<sup>th</sup> century. This is where the major shift has started, where the need of the consumer were more important to satisfy and not the suppliers needs. The characteristic of this area was driven by the needs of large-scale changes, re-engineering and downsizing, which

was driven by cost reduction program. These are the changes, which large enterprises are taking in order to best utilize their supply chain system, but what about small business.

Small businesses are a vital part of the global economy. While they may not generate as much revenues as large firms, they provide major strength to the global economy by providing employment opportunities. Since 1995, small business have generated 64 percent of new jobs, and paid 44 percent of the total United States private payroll, according to the SBA. They provide employment opportunities to people that may not be employable by larger companies. These employees provide the opportunities for growth and innovation as they have more freedom to create in smaller companies. This is also beneficial for larger enterprises as they may utilize their system in the future (Brown, M).

Being part of the Canadian food manufacturing industry has been a challenge in recent years because of the recession, rise of the Canadian dollar, increase in competition, local and foreign, retail concentration and higher input cost. These factors diminish margins, putting more pressure on the firms (Sparling & LeGrow, 2014). This is a critical situation because it will lead many businesses to go bankrupt and this will greatly affect the Canadian economy as 70% of the food products that Canadians consume come from food manufacturers in Canada (Sparling & Cheney, 2014). This situation has led many industries to close down or reorganize their manufacturing in order to better compete with local and foreign markets.

The case of this research revolves around a food manufacturing company based in Montreal, Quebec called Delice Vert. Delice Vert is a small food manufacturing company owned by Bijan and Ziad. It was established in 2012. Ziad is responsible for the packaging, deliveries, consumer acquisition and human relations and Bijan is responsible to manufacture the food. There are also three sales agents, whom help Ziad with costumer acquisition. The company produces different types of salads and dips, which have a Mediterranean taste. They then sell to restaurants and super markets. The main product they produce is tzatziki and mayonnaise. Their main customers are Daily Freeze, Adonis and Mansabi. Their revenue is approximately between 100 to 150 thousand dollars per year. This is good for a company that is operating for only 4 years as there is a lot of competition, in this sector.

The goal of this research is to analyse the past data of Delice Vert. With the data collected, we will have a better global image of how the company operates, which will allow Delice Vert to receive positive feedbacks on how they could improve their supply chain system in order to maximize and better serve their consumers' needs. The business world is rapidly changing. If you do not keep up with the trends and the technological advancements, there will be a stronger possibility for your company to fail.

Based on the above mentioned, the following research question can be set up: *“How is it possible to utilize data collection in order to better understand the supply chain system of a small food manufacturing company”*.

This research is relevant for the company because by being able to see and understand the data, it will allow the company to better understand how a proper supply chain system will lead to more efficiency. By having more efficiency, it will allow the company to gain competitive advantage over its direct and indirect competitors. Also, most businesses do not survive past five years, they start staggering and are forced to close down, this business is going into its fourth year of operation and the growth cycle is slowing down, it must adapt itself in order to keep on growing and be successful in the long run.

This research is also relevant for science because we will better understand how some companies are able to grow and be successful, while others fail. In this paper, a data analysis on Delice Vert current operations will be conducted. Based on the data gathered, an interpretation of the data will be formulated. Then changes will be suggested in order to make the system more efficient. If the company adopts the changes in their supply chain system and if those changes improve the bottom line of the company, we could then conclude the level of importance into doing a proper data analysis.

## **1.2. Literature Review**

This chapter is dedicated to the theoretical framework of this research. In this chapter, one is able to find the necessary literature information and theories that are required in order to conduct this research in a proper way.

The first part of the theoretical framework revolves around small businesses. The second part is dedicated to theories about supply chain management. The third part is about optimization and performance in relation to supply chain management. The fourth part is devoted to food manufacturing. The fifth and final part is to understand and analyse data.

### **1.2.1. Small businesses characteristics**

Small business consists of partnerships, sole-proprietorship or corporations. In the case of partnership and sole-proprietorship, the owners are liable for the companies dept. If the company owes money and goes bankrupt, the owners have to pay it out of their own pocket, which is not the case for a corporation. If your company is incorporated, the company becomes its own identity, taking all the risk, but now it has become a type of owner-managed firms because in order to get a loan, lenders will ask personal guaranties, which makes the managers liable (Shailer, 1993).

In order to be considered as a small business, you must have a maximum of 500 employees. This is the standard for most manufacturing companies and you must generate a maximum of 7.5 million dollars yearly. This size standard is applicable to any North American Industry Classification System (NAICS) (SBA).

### **1.2.2. Small business in Canada**

Small businesses play a critical role in the Canadian economy. There are more than 7 million people in Canada that are employed in small businesses and 89.9% of employment is related to small and medium size companies. The third largest industry in Canada, for small business, is the food manufacturing sector. There are about 863,111 employees that work in small food manufacturing company, across Canada, in 2012 (small business statistics, 2013). This statistic leads us to believe that there is a demand/opportunity in the food manufacturing sector, which needs to be explored, but there is always risk.

Although small businesses are vital for the economy, they have a high probability of failure. Almost half of the new small businesses are forced to close after a five year period. The major reason for such circumstances is because of lack of resources, such as sufficient financial

reserves, available credit lines, management expertise and technical support, which most large companies dispose (Leenders et al., 2006). Therefore, in order to maximize your chances of success and minimize risk of failure, effective management is of utmost importance. They should optimize their financial resources appropriately and one of the key ways to do such process is to create a good supply chain system by using as much resources as possible.

### **1.2.3. General characteristics of small business**

Small businesses have a more flexible organizational structure with a higher centralized decision making, compared to large enterprise. They have limited resources and a minimal process planning (Carrier, 1994). There is great uncertainty when it comes to partners as you are depended of them. The business structure is simplistic as there are not many employees or positions that are occupied. Strategies are focused on the short term, usually wanting to survive and not how to grow and decision making is made based on a reaction. Environmental factors such as competitors are not well studied. Products and services are not looked at closely due to financial and time constraints. They are also more sensitive in their environment compared to larger firms. The impact is larger, in an unfortunate event, compared to larger firms, which are able to surpass it with more ease (Fann & Smeltzer, 1989; Pearce, Chapman, & David, 1982; Raymond, Julien, & Ramangalahy, 2001).

### **1.2.4. Small business growth**

Growth is an essential part of small business. A study has shown that it is actually beneficial for small business to grow over the years. Phillips and Kirchhoff (1989) conducted a study from 1976 throughout 1984, which concluded that small businesses that have the ability to grow are twice as much likely to survive than the ones that do not grow (66.3 % vs 27.5%). This being the case, there are still small business owner that prefer not to grow their business for different factors. One of the reasons is that they are scared of change. The change in work conditions is the main reason why they prefer to keep the business as is and not expend. They are comfortable to way they are. They see they are doing well and they do not want to add on more work. They also do not want to risk losing what they have as they see growing as a risk, which is

counterproductive as they are more likely fail if they do not try to grow (Wiklund & Shepherd, 2003).

### **1.2.5. Small business innovation**

Entrepreneurship is usually associated with innovation. Even do small and large businesses possess entrepreneurship, small business are usually the most innovated as they lack of bureaucratic structures, which large firms possess. They are also more flexible and management tend to work closely together allowing more ideas and thoughts to circulate, which tend to lead to quicker innovative ideas compared to larger firms (Carrier, 1994). The one main problem for the small firms are that innovation cost capital, which most small firms do not have much. This aspect restricts the amount of innovation a small company could perform. Some companies are also unable to innovate as the risk is too high to tolerate. If the idea does not work, the company could fail and never recuperate (Rosenbusch, Brinckmann, & Bausch, 2011).

### **1.2.6. Small business finance**

The main concern small business have when it comes to finance is their lack of information compared to larger firms, which has for result a restrain in the amount of credits they are able to acquire. Small businesses do not change banks because of their lack of time and financial savviness (Howorth, Peel, & Wilson, 2003). When the small firms have a strong and good relationship with their banks, they tend to have lower interest rates, which also results into having less late payments (Berger & Udell, 1995). By not having access to such capital, small businesses are mostly depended on the cash flow that is coming in the company, not allowing much room for innovation. Credit limitations and the scare to lose control of their company makes small business owner have more liabilities than larger firms (Hughes, 1994). Furthermore, balance sheets are not properly managed by small business owner as most of the time personal and business financial activities are entwined. This makes the situation harder to analyse compared to larger business which have to follow stricter rules and regulation as they are more scrutinised (Ang, 1991).



### **1.3. Supply chain management**

Supply chain is a system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to the end customer. The activities involve transforming raw materials into finished good, which will then be sold to the consumer (Nagurney, 2006).

Supply chain must also be effective and efficient in order to work. Efficient that the company minimises resources, while receiving a decent outcome. Effective in the way to have the proper distribution channels in order to accomplish such task. Efficiency measures inventory level, product quality and delivery performance, while effective measures the service quality (Domenica, 2002).

In order to survive and be competitive in the long-term, companies must satisfy consumers' expectations in terms of price, quality, service and flexibility. This is done by designing a more effective and efficient supply chain system than your competitors (Ernst, 2002). In order to optimise the supply chain system, the four main entities, company, competitors, suppliers and consumers, must be constantly monitored and strategic decision must be coordinated according to their needs and wants as the company has a direct up and downstream flow with the products, finance and services, from the supplier to the consumers (Mentzer, 2001).

External division is needed, but internal as well. Suppliers may also help you in such divisions, as they provide valuable input on your company. They work in a field that is linked to yours and they also have their own suppliers, which provided them with information. When information circulates across the entire network, it is easier to come up with better strategies in order to improve the supply chain (Handfiel, 2002). The supply chain could be simple or complex, but it could be defined in to 3 categories according to Mentzer (2001):

- Direct link between the company, supplier and consumer.
- An extended link which also includes the suppliers of our main supplier and the customers of our customers.

- And the ultimate supply chain which includes, which includes all the actors from the upper stream always to the bottom stream.

### **1.3.1. Management in supply chain**

Managed or not, there are different supply chain system in the world. If management will not apply or develop a supply chain system, it will still exist, but it will most probably not act in a rational or coordinated way. In order to have a proper supply chain system, management must be active and establishing a proper supply chain system within the organization. There are three processes that must be taken in order to reach our rational goals (Rozman, 2000):

- Organizational process: this is the goal oriented process where we ensure the rationality of our employees and the rationality of our goals.
- Coordination process: this stage is where we take care of the problem. The company must coordinate goals, activities, employees and interest.
- Decision making process: this is the final step where we decide what action we will take, in order to have future success.

Planning is the primary and most important function that managers must undertake. Outline the goals of the company and to find ways on how to achieve it. This is where the managers have to come up with creative ideas in order to best achieve their goals, coming up with different alternatives (Rozman, 1993) in order to be able to create an organizational process. This is where the plans come to fruition. The structure becomes permanent and it will be established in the company so that employees could execute the planned activities in order to reach the goal established. Then the manager needs to control the process. Managers must supervise, in order to help employees not to deviate from the plan and correct their mistakes.

After establishing the process, we also need to measure it, because if we do not measure, there will be no improvement. It is important to measure the right thing at the right time, as timing variable have a great effect on the outcome. Therefore, managers must be able to monitor and control their daily operating activities in order to achieve their desired performance from their supply chain (Gunasekaran and Kobu 2007, p.2820).

Supply chain performance is one of the key elements in order to monitor and improve your supply chain and gain competitive advantage in your industry (Taylor, 2004, p.173). In order to measure supply chain performance, a key performance indicator (KPI) may be used. KPIs evaluate the success of the organization based on a predefined activity, which the company engages (Carol, 1990). The definition of success may differ from a company to another. Some have goals of increase sales, decrease in lead time, consumer satisfaction and many more. When the goal is defined, we need to establish the performance indicator that we are going to utilise and find a way to evaluate it. One of the most common ways to evaluate such measure is the usage of balance score cards. These indicators that have been chosen to evaluate supply chain performance have an important part to play as they are the ones that will help to set future objectives, evaluate performance and set future course of action (Lee, Kwon & Severance, 2007, p.444).

The food manufacturing sector is a huge category which contains different sectors such as fresh food products, organic food products, processed food products, halal food products and many more. Each segment needs a different supply chain strategy such as procurement and sourcing, inventory management, warehouse management, packaging and labeling system, and distribution management, thus, the uniqueness characteristics of food supply chain (Georgiadis et al. 2005).

### **1.3.2. Optimization and performance**

Performance is a global term when it comes to supply chain management. As demonstrated previously, there are many steps in the supply chain process. In order to optimize the system for better performance, many factors should be considered.

It is the manager's job to overcome these various obstacles. He is the one responsible for the flow of product, services and information from sourcing, to manufacturing, to distribution to the end-consumer. By having a proper integration, managers are able to decrease waste, excessive work delays and redundancy. Their objective is to lower daily activity cost without sacrificing on the quality and service. Data was collected by the Supply Chain Council, which indicated that having an excellent supply chain performance; the company can lower its cost by up to 7% and increase its cash flow by more than 30% (Integrated Supply Chain Benchmarking Study, 1997).

Contingency theory states that no method or theory could be applied in all instances; there is no one model fits all (Scott and Cole, 2000). The environment that the company operates is what shapes its structure and process. In order to optimize performance the organization has to match its structure and process to the environment where it operates (Donaldson, 2001; Lawrence and Lorsch, 1967). The proper alignment between the strategy and performance is called “fit” (Drazin et al., 1985; Venkatraman and Prescott, 1990; Milgrom and Roberts, 1995). The proper fit is what will allow the company to optimize its performance.

Partnerships and strategical alliances are another ways to optimize performance not only for your company, but others as well. Having an exclusive relationship with your up-stream suppliers and down-stream consumer will increase financial and operational performance of each channel members. It will reduce total cost .inventory cost and increase sharing of information (Maloni and Benton, 1997). Rather than concentrating only on price, this strategy will allow you to work with your supplier in order to come up with a better solution on how you could improve your service, product design, quality and much more.

#### **1.4. Food manufacturing**

Food manufacturing is the process of transforming raw ingredients, by physical or chemical means into food products. These products are then easily prepared and served to the consumer. The process usually involves activities such as mincing, liquefaction, emulsification and cooking. The product is then packed and ready for shipping (Common Methods of Processing, 2015).

The advantage of process food is that it is less susceptible to early spoilage. They have a longer shelf live compared to fresh foods, which is why they are better suited for long distance transportation. The primary reason for its introduction was to improve the overall nutrition of the population and introduce diverse types of food to the masses. Another advantage is that mass production of food is much cheaper compared to an individual meal production from raw material (Laudan, 2010). This allows a large profit potential for manufacturers and suppliers of process foods, but also for the consumers. It will also be in their advantage to buy from them as it will not only cost them less money, but it will also save them time, by avoiding spending time cooking and cleaning the dishes (Laudan, 2010). This free time allows the people to do other

productive activities, which they would not have time to do, if they had to cook at home. This is a great incentive for them to purchase processed food.

#### **1.4.1. Food manufacturing in Canada**

When it comes down to food, Canada holds a great advantage by possessing a waste land, water and people to produce food. They also possess proximity to major markets such as the USA, but in the recent years, there were many challenges for the food manufacturing market in Canada. Rise of the Canadian dollar reduced competitiveness against foreign markets. High commodity prices, increased cost of production, diminishing profit margins. These factors have led the food industry to refocus their strategies (Sparling, D., Cheney, E., & LeGrow, S, 2012).

Food manufacturing is a huge employment sector in Canada as it accounts for 236000 jobs and produces 88 billion dollars in revenue, in 2011 (Sparling and Chenny, 2014). Even with all the opportunities presented itself, there are still challenges such as the instability of the exchange rate, strict environmental laws, competition on the international level, increase in domestic competition and an increase in the cost of raw materials. These issues raise concern on the industries long term viability (Sparling and Chenny, 2014). In order to survive with the increase of local and international competition, necessary adjustments must be made. Provinces such as Alberta, Saskatchewan, Manitoba and Nova Scotia saw this as an opportunity and changed. Many first reconstructed their operations, while many companies in Ontario and Quebec decided to close down or relocate (Sparling, D., Cheney, E., & LeGrow, S, 2012).

#### **1.4.2. Food Manufacturing revenue and cost**

Over the last decade, as opposed to other manufacturing sectors, food manufacturing experienced a steady growth in revenue. Nominal revenue doubled from \$47.39 billion in 1992 to \$89.32 billion in 2012. Real revenue increased by 29% in that same period from \$47.39 in 1992 billion to \$61.82 billion. This is why food manufacturing is the largest employer in the manufacturing industry. The increase in technology and automations has lead in a decrease in employment for most manufacturing industries, but the food manufacturing sector has stability, over the past decade (Sparling and Cheney, 2014). According to Statistics Canada, employment in the food manufacturing sectors has experienced a small increase from 232,735 employees in 2004 to

234,563 employees in 2012. This had for result a smaller share of the revenue, per employee, compared to the other manufacturing sectors.

Even do there is an increase in revenue; the food manufacturing sector experienced an increase in cost. Between the years of 1990 and 2012, Canadian food manufacturing company experienced an increase in cost of raw materials and energy prices. Cost of raw material and supplies are a major cost of the food manufacturing sector, consisting 67% of the total cost. During that period, we find an increase of 5.6% in the cost of raw materials and 0.7% increase in energy bills, which concerns of water, electricity and fuel. This is not the cases for labour wages. The fact that technology has improved over the years, the food manufacturing sector was able to cut down on wages. We find a 3% decrease over the past two decades (Statistics Canada, 2012).

## **1.5. Data Analysis**

Data analysis is a process of gathering, organizing, understanding, interpreting, making future prediction, analysing and making conclusions on what actions should be taken based on the results gathered. John Tukey defined data analysis in 1961 as a "*procedures for analyzing data, techniques for interpreting the results of such procedures, ways of planning the gathering of data to make its analysis easier, more precise or more accurate, and all the machinery and results of (mathematical) statistics which apply to analyzing data.*" (John, 1961). There are different ways to analyze data and the way to do such analysis is based on a scale.

### **1.5.1. Data collection**

Before being able to analyze the date, we need to gather it. We also need to put some boundaries in our study. Are we going to gather our information in a structured, semi-structure or unstructured observation and by the means of interviews, questionnaire or direct observations? A questionnaire could be structured or semi-structured and an interview could be all of the above.

The difference between a structured and unstructured interview is that a structure interview is more formal. The questions are asked in sets and they do not deviate, such as a script. They are also closed-ended questions. The advantage of a structured interview is that it is easily replicable,

reliable and quick, but there are also disadvantages. As structural interviews are not flexible, this does not allow the interviewer to ask impromptu questions, which may help give a better overall picture in different instances. Also, the answers from a structured interview are not very detail as it is closed-ended questions. This will not allow the interviewer to understand why a person behaves a certain way (McLeod, 1970).

In an unstructured interview, there is no order. An interview schedule will not be used and questions will be open-ended. The advantage of unstructured interviews is that it is more flexible, able to adapt to the respondent's answers. Data is also more accurate as it is the respondent's own words, giving us a better sense of the situation and if you are not able to understand the answer of the responded, you will also have the opportunity to ask for clarifications, allowing you to steer the conversation in the proper direction. There are also some disadvantages, the major one being time consuming. Analysing all the data gathered could be a challenge. And it is also expensive to train the interviewer, compare to collecting data via a questionnaire (McLeod, 1970).

A semi-structured interview is a combination of structured and unstructured interviews. There is a clear set of rules that must be followed but the interviewer, could sometimes deviate from the question when he sees fit. In the semi-structure interviews we also find open-ended questions. Many researchers prefer using this type of interview because not only questions could be prepared ahead of time, allowing the interviewer to know what he is talking about, but also he has the freedom to ask questions of the topic if he feels it may have some use in the study. Data is also reliable and comparable (Flick, 2010).

There are other ways to record data, such by using questionnaires or doing direct observation. A questionnaire is a form, which needs to be completed by the respondent. The main reason this method is used is because it is inexpensive and accessible to a large sample. Once you have created the questionnaire, there is no more capital needed to invest and you could also give it to your respondents in paper or online. When the questionnaire is done online, you have access to a larger pool of people. The main disadvantages are that if the respondents do not understand the questions properly, they will not give you a proper answer and also you have no idea if they will be lying to you. Some people may not even read the question and give an answer (Fisheries, 1995). In a direct observation study, this will not be the case. When doing a direct observation

study, you are observing the activities of your respondents, in their natural settings, which help you better understand the subject and the reasons behind the different actions taken. This study provides a more accurate result. The reason why it is not used as often as the other owns is because it is expensive and time consuming. Observation must be done constantly and it could also be susceptible to observer bias (Performance Evaluation and Monitoring, 1996).

Primary data is a vital part of any study, but secondary data is also used. Secondary data consists of other research, documents, books and literature (Bryman and Bell, 2007). Data is collected from other researchers in order to give more insides on the research subject. Secondary data saves time and resources, which would otherwise be used to gather data, mainly in a quantitative research. Having access to a large data base allows researchers to draw better conclusions, which would be impossible to do if the researcher must gather the data. The other major advantage of having access to different database is the ability to compare it with the data you have gathered. This is the perfect base for comparison, but it could also be a disadvantage. If the data is not accurate or outdated, it will falsify the results (Blumberg et al., 2005). The use and credibility of secondary data must be taken into considerations, before being used in the research.

### **1.5.2. Data recording**

After gathering all our data, we need to start recording it in order to be able to understand the meaning of it and to be able to draw a conclusion. All forms and questionnaire should be put in the same place. The researcher must check if the questionnaires where answered properly and completed, if not, it must be discarded, while still keeping records of the proses (Mertens and McLaughlin, 1995). These actions must be taken by a properly trained researcher. The research must also be recorded and the procedures must be integrated into the standard operating protocol (SOP). The reason for such actions is because in a long term study, changes in procedure may occur, such as a change of the main researcher (Guzman, Sirbrian, and Flores).

Errors may occur during the data collection stage. This may lead to a bias result which may affect the interpretation of such result. Errors usually arise “with failure to complete interviews, missing data, interviewer mistakes, and conceptual misunderstandings, lack of knowledge, and intentional misrepresentations of truth by the respondents.” (Guzman, Sirbrian, Flores). In order to minimize the risk of such errors to occur, proper supervision must be taken during the data



collection process. Supervision could consist of direct supervision or the recording of each interview. In the case of live recording, all aspect of the interview must be recorded, as all activities are essential to the end result. These aspects consist of “field procedures, and data collection, editing, input and analysis. In particular, causes of missing data must be fully documented, since such information is essential for identifying possible biases arising from sample attrition.” (Guzman, Sirbrian, Flores).



## CHAPTER TWO

### 2.1. Case Study

After living his life in Iran and Turkey, Bijan came to Canada in 1988. The reason why Bijan came to Canada was because he was a political activist in Iran and if he would have stayed there, they were going to kill him, which is why he left his country. The reason why he chose to come to Canada was because, at that time, Canada was accepting refugees much easier than other countries and he came to Montreal because one of his friends from Iran was living there at the moment, which will help him with his adaptation to the country and the culture. When he arrived to Montreal, the degree he had earned in Turkey, textile engineering was not accepted according to Canadian standards of education. He had two choices at that moment: go back to school or start working. At that time, he was 30 years old and he had to bring his wife from Iran, which cost lots of money, so he decided that it was a better idea to start working. Bijan never worked before coming to Canada, which is why he took the first job he could find at that moment, which was to work at a pizza restaurant with other Persian immigrants.

In 1990, an opportunity presented itself to Bijan. He got a job in a food manufacturing companies called Fontaine Santé. Fontaine Santé is one of the biggest food manufacturing companies in Canada at the moment. It makes healthy products that are ready to eat. Bijan always cooked, when he was younger and had a true passion for cooking. This helped him learn how to do the job faster and in a more efficient way. He quickly became one of the best employees of the company, helping them grow to the biggest food manufacturing company in Canada.

In 1993, the management of the company and Bijan had different vision for the company, which resulted in Bijan wanting to go work for one of Fontaine Santé competitors. Bijan was a smart man who had ideas to help the company. He saw a few flaws in the business model Fontaine Santé had at that moment and was trying to help them fix it. He had ideas to make different type of products, such as tzatziki and hummus, which was not heard of in Canada, in that period of time. He has seen it and tasted it because of his Middle Eastern background. He knew the products were good and that if the Canadian market will get to know such products they would

love it and adapt it and when it will happen, Fontaine Santé will control the market. The main reason why the managers at Fontaine Santé did not listen or apply the information and knowledge that Bijan was providing them was because it was a risky and a costly idea. Fontaine Santé is a big company, they rely on data and facts before applying a new strategy and because Bijan did not have such information, they decided not to go forward with his plan. Fontaine Santé was already profitable, they did not want to risk such investment based on one immigrant's idea and on top of that Bijan wanted a stake in this new venture, which was not worth it for Fontaine Santé. This had for result a mutual separation between both parties.

Then, Bijan decided to go to talk to the owner of Hanna Foods. Hana Foods was a direct competitor with Fontaine Santé. They were both food manufacturing companies, preparing ready to eat products. Hanna Foods was about to go bankrupt, at that period of time. Fontaine Santé had gain a large part of the market because they had a better business plan than the owner of Hanna foods. The owner of Hanna Foods went into business because he saw how fast Fontaine Santé is getting bigger and more profitable and he thought he could do the same. He was a business man, but he had not so much knowledge about the food manufacturing sector, that is why he could not help the company grow. Not only was it not growing, he was on the verge of failing. That is why Bijan went to talk to him. He had the knowledge of the food manufacturing sector and the owner of Hanna Foods was a savvy business man. Both parties knew, at that moment, the company will fail soon that is why they made a deal with each other. They became partners. Bijan now owned 50% of the company, but he had to start working day and night in order to put the company back on track. He was working 20 hours a day seven days a week, in order to make this company successful.

In 1996, the company was starting to be more profitable because of the hard work Bijan has put into the company, but he was still working long hours in order for the company to directly compete with Fontaine Santé. Bijan did not have so much knowledge about the economical side of the business because he was a foreigner and did not study in a business field. He did not know much about the Canadian economy and how it worked and he did not have time to learn much about it because he was putting all his time to develop the manufacturing side of the business and because of that reason his business partner took advantage of Bijan. During this period, Bijan's partner was hiding most of the profits, keeping it to himself and Bijan did not know what was

happening. His partner was manipulating the data in order to keep most of the money for himself.

In 1999, Bijan's wife died in a car accident. This was the worse day in his life. At that period in time, he stops working for a few months to be with his son. After a few months, he saw that the company's earnings drastically decreased when he was gone, so he decided to investigate the matter. He started to look closely at the books and started to find discrepancies. He then went to see an independent accountant whom confirmed his suspicions. He confronted his partner about it, but he was denying the accusations and this was the end of their partnership. Hanna Foods went bankrupt soon after Bijan had left the company, as he was the main reason why it was starting to work so well. The owner could not find a proper replacement, forcing him to close down.

After this incident, in 2000, Bijan started his own company called Bijan Green Garden. He realised how valuable he was and that he did not need a partner to be successful. That is why he went on his solo venture. He also thought that based on his previous experiences, he had learned more about the economic factors of the food manufacturing sector in order for him to take advantage of future opportunities when it will present itself to him. The first major advantage he had was that he knew most of the clients that buy ready to eat food because of his time working in Fontaine Santé and Hanna Foods and because of such knowledge, he went and talked to most of their customers, trying to persuade them to come and buy from his company, Bijan Green Garden, most of the clients from Hanna Foods decided to buy from him now instead of Hanna Foods because Bijan was the chef creating the products. He was the one that knew how to make the recipes the way they like it. The owner at Hanna could not make it in the same way as Bijan was making it, because Bijan never showed anyone how to do the different types of recipes. Then he started to be profitable again after one year, but he still wanted to grow the business even more. He wanted to find new customers, but it was hard for him to do because his main speciality is to manufacture the products or to create new products. He was not a god salesman.

He found out that a company called Mediterranean, also a food manufacturing company, was about to go bankrupt and it did not cost too much money to acquire it. He decided to acquire it for sole purpose to gain their consumers, but he got more than that in the end. After this acquisition, Bijan had so many consumers that he could not do everything by himself, so he

decided to bring the two owners of Mediterranean to work with him because they also possessed knowledge about the business and how to operate. They made a deal where both parties will own 40% of the company and Bijan will still be the majority stake holder. At that point, they also took the decision to change the name of the company to Mediterranean because Bijan was not the sole owner of the Business anymore and Mediterranean had more name recognition, while the costumers from Bijan Green Garden did not mind, they stayed loyal because Bijan was part of that new company. After this business deal took place, Mediterranean had a large amount of clientele that even if Bijan and the two other partners, Ziad and Almir, worked none stop, they would still not be able to fulfill all the demand that was expected from them. They had to start hiring new employees. Before being bought from Bijan Green Garden, Mediterranean had 20 employees under their payroll. Those employees where welcomed back to work for the new company. They also hired 10 more employees as in this line of work, turnover is huge as it is a hard job to do and employees are generally not compensated properly.

After 8 years, the owners at Mediterranean started to realise that they are not making as much money as they thought they will be making. They realised that all clientele where not profitable for the company. This situation was due to the fact that they did not keep their books. They only do the minimum necessary, for tax purposes, but not more. They do not look at their data in order to see any trends, which will help them improve their time and cost management. They had one client whom ordered two kilos of tzatziki. This was costing them more money than they were making because the cost to bring the product to the consumer was more than the profit margin. They had on fixed price for everyone and they did not adjusted according to the quantity purchased. The company was also losing money on that order because the order came only when the client sold the product, which is not predictable. If there was not tzatziki in inventory, someone needs to prepare the order at that moment. They also need a special packaging according to that consumers need and finally they need to deliver that product to them, which is costly and time consuming. The reason why the managers did not want to stop selling to does clients was because of the fact that they believed if they will keep the client, maybe one day they will start buying more and they will become profitable. They trusted their instincts instead of their data. The situation never changed and the company started to struggle. It started to lose more money than before. The owners then decided to explore the idea of selling the company

and because the company was starting to lose money, it was hard to find an interested party to buy the company.

In the year of 2009, they finally had an interested buyer, that was giving them a good offer, the only condition he had was that the owner work for him as regular employees until he learned how to operate by himself and then they would have separated way. Bijan and Ziad where happy with those terms, but Almir was not. He wanted to stay and still own a certain percentage of the company. The buyer wanted to own 100% of the company and because of that, the sell never happened. This made the situation at work complicated. Bijan and Ziad could not work with Almir anymore because of this incident, resulting in them buying his shares out in order to be able to sell the company in the future.

They continued to operate the same way until 2011, where there was another buyer that came along. This buyer was willing to give them the money they were asking for, but they also did not need to stay in the company to teach the buyer how to operate the business. The reason why the buyer did not want them was because he had a friend, whom works for a big food company. His friend promised to give him all the contracts from his company, if he would have a facility to produce the food. The contract would have been to produce different kind of food, which Mediterranean was not producing, but the facility and equipment's provided them with the possibility to produce such products. This was perfect for all parties and the company was finally sold.

After the sale of the company, Bijan's son was still working for the new owner as a normal employee. He quickly realised that the owner did not know what he was doing and the only reason why he bought the company was to get the big contract, from his friend. He did not care about any of the old Mediterranean costumers. The costumers where starting to get impatient and some of them where starting to look at other food manufacturing companies to produce their goods. This is when Bijan's son pitched his idea to his dad. He told his dad to do the same thing as he did before when he opened up Bijan Green Garden for the first time, but to have a slightly different business model. He told his dad to not take all the clients Mediterranean has. He only needs to take the clients that gave him large orders, the ones that were really profitable. Bijan agreed with the logic because his son, being a business student, showed him actual data about the clients. The use of data, allowed Bijan to understand the opportunity he could gain by using his

sons business plan, but Bijan was unable to do all the work by himself and his son, being a student, was not able to work as much. This is where Bijan decided to talk to Ziad about the plan. After they had sold the company, Ziad was also not working. He was also looking at another business opportunity. When Bijan explained the situation to Ziad, he was interested to work on this new project with Bijan because of a few reasons. First, with the sale of Mediterranean, they bought have extra income to invest into a new business venture. They also worked together for a few years, knowing each other's strengths and weaknesses, being able to properly complement each other. They knew the clients and how to operate and finally it was a low risk investment as they only needed a space to rent and a buy a few tools in order to produce the goods, which do not cost so much money. They came to an understanding and became partners again in this new venture, but this time they were equal partners.

In 2012, Ziad and Bijan opened their new business called Delice Vert. Delice Vert is established in Lachine, which is located 15 minutes away from Bijan's house. Bijan always goes to work at 6:30 am because now that he does not have many customers, he knows the orders he has to prepare in advance and because he does not have any employees to work with, he could do his job at any time he pleases. The reason why he comes early is because of traffic in Montreal. If he decides to go to work one or two hours later like the rest of the people, he will be stuck in traffic for hours. This is not ideal for Bijan because if he goes earlier he finishes earlier and he will be able to enjoy the rest of the day. Another main reason why he comes to work earlier is because in business, sometimes there is an unexpected circumstance that may occur, like a last minute order, by coming to work early, if this situation occurs, Bijan is able to fulfill the order without any problems, satisfying the consumers, which is the main concern for Bijan. Bijan's main policy is to satisfy his clients as much as possible. He has a policy which guarantees the clients that their orders will be fulfilled in less than 3 days, after the order is placed. Another reason why he is able to do such promise is because he keeps inventory of most of the products that he sells and usually he anticipates the orders that he will receive. He also has strict rules on sanitation. The work area needs to be cleaned before starting to work and after the work is done. Equipment's that will be used to produce the food needs to also be cleaned before and after it was used. If the equipment is used to produce any other product it should be cleaned again. Food produce must be cleaned before transformation. Everyone entering the work station must have a suit, hair net and gloves. Gloves must be changed after each manipulation of any food product.

These rules are what separates Delice Vert from its competitor. The consumers are sure to have a clean product at a reasonable time, while not having to pay a premium price. Because of the fact that they not need to cater to many clients, 9 big clients, which consist of Daily Freeze, Adonis, Distribution Bakery, Delice, Canam, Debour and Renwel, Gourmet Vegetarian, Philipes Good and Mansaby. There are other clients that also order from Delice Vert, but they are usually small restaurants that do not order regularly, but that Bijan serve because of the proximity between bought Delice Vert and the clients. Sometimes Bijan gets a lot of orders at the same time and he is unable to fulfill all of them in 2 to 3 days. In these special cases, his son comes and helps him or one of his friends and old employee. If one of them is busy with studies or work, the other comes and helps, but this is an unusual case, which only happened two times since Delice Vert was established because Bijan's anticipates orders and keeps extra inventory.

The two main products produced by Delice Vert are Tzatziki, which consists of about 50% of the total production and Mayonnaise, which consists of about 20%. The rest of the products are Hummus, Tofu, Brocheta, Six Haricots, Chickpea Salad, Thai sauce, Cezare salad, Sauce de Maison, Tomato sauce and Rose sauce, which consist of the rest of the sales. The reason why Tzatziki is produced in such a large quantity is because not many companies are producing such product and the quality of the product differs greatly between the other companies and Delice Vert. The way Delice Vert produces and transforms its products in order to create Tzatziki was not been able to be reproduced by any company, for the same price. This is why Bijan never thought anyone how to make it. Even when he had employees, he never let one person do the entire job. He separates the tasks into small groups so the employees will not be able to reproduce it. Even his partner Ziad does not know how to make the products. Tzatziki is mainly sold to Adonis. Adonis purchase Tzatziki in a large quantity and that is why they are the only company that has a discount on the product. Adonis buys Tzatziki from Delice Vert for 4, 75\$ the kilogram, while all the other companies purchase it for 5\$ the Kilogram. Delice Vert also sells tzatziki to other big companies such as Daily Freeze, Distribution Bakery, Canam, Debourd and Renwel and many smaller companies, in minimal quantities. Delice Vert also sells their other products to other big companies such as: Delice, Gourmet Vegetarian, Philipes Good and Mansaby. These are all the major consumer of Delice Vert. There are also many other small companies that purchase from them, but only in small quantities and on irregular basis.



In the company, Ziad has the other key role. He is the one that packs all the products. When Bijan finishes producing the products, at around 3pm, Ziad comes and packs the products according to the companies' specification. Some companies are going to use the products in other products, so they do not need a special package, but for the others, that want to sell it directly to the end consumer, the packages must be made according to Canadian regulations. When the packaging is done, he goes and delivers the products to the company. Some companies prefer to get their products sent to them before they close and others before they open. According to their specifications, Ziad goes directly after packing the products or the next day early in the morning. Ziad is also responsible to acquire new clients because he is able to speak French, which is necessary in Montreal because not all people are able to speak English. Sometimes, when there is a lot of deliveries, Bijan is helping Ziad do the job in order to better serve the clients and because their schedule complements each other's, given him the time to do so.

This is how Delice Vert is operating at the moment and how it is able to be successful by just being open for less than 5 years, which is rare for a small business that just open up shop.

In order to obtain this information, an interview was conducted with Bijan and Ziad. Most of the time was concentrated on Bijan because he is the most pivotal part of the company and he also had more available time to conduct interviews. The interviews were conducted over skype as the interviewer was located in Turkey, Izmir, while Bijan and Ziad are in Montreal, Canada. There is a 7 hours' time difference between Montreal and Izmir, making it hard to find a common time that accommodates both parties in order to conduct an interview. Ziad's work schedule made it almost impossible to have contact with him, while Bijan was able to talk before he started work at 6:30 am, Canadian time, making it 13:30 in Turkey. This time worked for both parties. The interview was semi-structured. Questions about aspects of the company such as the products produced, the company purchasing the products were written before hand, while the others were asked according to the answers given. When the answers were given from the participant, they were annotated by the researcher. There were a total of 6 interviews that were conducted with Bijan because of their work times when he needed to go work and did not have time to answer all the questions and the other times, he was not sure about a fact, which he had to go verify later or ask the accountant before being able to answer as precisely as possible. With

the answers given, the researcher had a better idea about the operations of the company; how they are operating, why they are operating in a certain way, based on past experiences. This was the base used for the case study and the tools to establish different hypothesis.

## **2.2. The Purpose of the Study**

The main purpose of this study is to examine the case company, Delice Vert, and to provide the heads of the companies with different strategies in order to be competitive in the global economy. The case study allows us to understand why the managers are undertaking certain actions. Based on their actions and knowledge, appropriate suggestions will be provided. Data will also be gathered and interpreted in order to better understand the current situation Delice Vert is in. Based on the result concluded by different hypothesis testing and descriptive statistics, a clear image of the company will be provided to us and a final proposal could be made. Data is generally never used as a tool for small business owners. They omit to use it and they even do not record it properly, mostly for lack of time, resources and knowledge. Strategies are made based on instincts and not facts. This is the reason why most small businesses do not succeed. By examine the data of Delice Vert; we will be able to provide them with appropriate strategies, which will have a greater chance to help them in their bottom line.

## **2.3. Methodology**

In data analysis, two main types of data, qualitative and quantitative, are used.

Qualitative research is data that is usually represented by names, symbols or a number code (Australian Bureau of Statistics). There are typically three different kinds of data collection techniques when utilizing qualitative research, which consist of interviews, observations and written documents (Patton, 1990). Data is acquired from fieldwork, which is observed by researchers. The researchers will observe and engage themselves in the study to acquire valuable information (Patton, 1990, p. 10). Data is then acquired, analysed and sorted in order to make it

easily understandable. In some instances, a code is assigned to certain patterns that emerge frequently. Categories are then made and structured until we could find an appropriate relationship. Then the relationship should be clearly written (Strauss & Corbin, 1998).

Quantitative data is usually represented by numerical values (Australian Bureau of Statistics). Hypothesis are usually created and used as a base in order to determine what type of data will be collected. Numerical data are the representation of the social environment, which the study is taken place and will be used to better understand and analyse the context of the study. Objective reports are used to describe the quantitative research findings (Gall, et al., 1996). In order to design an appropriate study, we first need to decide which type of case or sample to use, which relevant factors must be gathered by the means of questionnaire or experiment (Neuman, 2006). Quantitative research helps create a correlation between the given data and the outcome. The data found will help validate your findings (Dudwick, Kuehnast, Jones and Woolcock, 2006).

The advantages of a quantitative study are that it could be given and evaluated quickly. No organisation is needed prior to administrating the survey and results are tabulated directly after the results are given. The second advantage is that because we only have numerical data, it is simple to put them into different group, allowing us to compare and see discrepancies (Yauch and Steudel, 2003).

The advantages could also sometimes be seen as a weakness. The social conditions which people are living in may influence results. Someone that is in a higher social class have different view and goal compared to the rest of the population (Dudwick, Kuehnast, Jones and Woolcock, 2006: 3). In order to minimise this error, a quantitative research needs a large pool of data, which is hard to obtain because of time and capital restraints (Dudwick, Kuehnast, Jones and Woolcock, 2006: 3). Finally, quantitative data do not consider special circumstances. At a certain period of time, such as after a natural disaster, people's opinions and priorities may differ and make the data useless (ACAPS, 2012: 6).

## 2.4. Descriptive Statistics

Descriptive statistics is used to represent basic data in a study. It consists of a summary of data that was collected, from the research. The data below was collected first hand by the researcher. The data was then imputed onto excel, which allowed to formulate such summary. The tables bellow provide us with the summary of the quantitative data, which was acquired from the manager, Bijan, of Delice Vert.

**Table 1 : Descriptive statistics of the different products**

Product name	2012		2013		2014	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
Tzatziki	541.69	704.79	543.32	703.08	443.90	458.68
Mayonnaise	708.02	289.83	760.31	348.26	821.25	435.36
Hummus	160.83	62.51	150.69	62.13	154.31	61.31
Tofu	207.08	14.92	233.33	20.95	228.33	13.74
Brocheta	207.08	14.92	233.33	20.95	228.33	13.74
Six Haricots	207.08	14.92	233.33	20.95	228.33	13.74
Chickpea Salad	207.08	14.92	233.33	20.95	228.33	13.74
Thai sauce	21.25	2.49	22.17	3.74	22.67	4.50
Cezare salad	25.67	3.12	24.58	4.77	34.33	4.05
Sauce de Maison	24.50	3.84	24.83	3.80	22.50	2.78
Tomato sauce	38.00	2.52	34.17	3.18	28.08	2.96
Rose sauce	27.92	4.25	26.42	4.33	23.17	3.39

In table 1, we find the quantity average (mean) and standard deviation of the different products, which is produced by Delice Vert. The average and standard deviation of Tzatziki and Mayonnaise are higher than the other products because of the fact that they are sold to more companies and in larger quantities. Tofu, brocheta, six haricots and chickpea salad have the same average and standard deviation every year because they are all sold to the same company, for the same price and quantity.

**Table 2: Descriptive statistics of the price for each products**

Product name	2012 (\$)		2013 (\$)		2014 (\$)	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
Tzatziki	2628.53	3329.74	2636.85	3321.52	2173.69	2172.53
Mayonnaise	1770.05	724.58	1900.78	870.66	2463.75	1306.08
Hummus	804.17	312.56	753.47	310.64	771.53	306.53
Tofu	1176.23	84.77	1325.33	118.99	1296.93	78.06
Brocheta	1176.23	84.77	1325.33	118.99	1296.93	78.06
Six Haricots	1176.23	84.77	1325.33	118.99	1296.93	78.06
Chickpea Salad	1176.23	84.77	1325.33	118.99	1296.93	78.06
Thai sauce	741.63	86.81	773.62	130.45	793.33	157.39
Cezare salad	754.60	91.67	722.75	140.21	1030.00	121.45
Sauce de Maison	690.90	108.30	700.30	107.28	652.50	80.73
Tomato sauce	741.00	49.07	666.25	62.09	547.63	57.66
Rose sauce	720.25	109.69	681.55	111.70	602.33	88.06

In table 2, we find the descriptive statistic summary of the annual sales in dollars for the products produced. Similarly to table 1, for the annual sales, in dollars, the mean and the standard deviation are much higher for tzatziki and mayonnaise, while tofu, brocheta, six haricots and chickpea salad are similar because they are sold to the same company, for the same price and quantity.

**Table 3: Descriptive statistics of the average price per unit for the different product types**

Product name	2012		2013		2014	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
Tzatziki	4.96	0.09	4.96	0.09	4.96	0.09
Mayonnaise	2.50	0.00	2.50	0.00	3.00	0.00
Hummus	5.00	0.00	5.00	0.00	5.00	0.00
Tofu	5.68	0.00	5.68	0.00	5.68	0.00
Brocheta	5.68	0.00	5.68	0.00	5.68	0.00
Six Haricots	6.44	0.00	6.44	0.00	6.44	0.00
Chickpea Salad	6.44	0.00	6.44	0.00	6.44	0.00
Thai sauce	34.90	0.00	34.90	0.00	35.00	0.00
Cezare salad	29.40	0.00	29.40	0.00	30.00	0.00
Sauce de Maison	28.20	0.00	28.20	0.00	29.00	0.00
Tomato sauce	19.50	0.00	19.50	0.00	19.50	0.00
Rose sauce	25.80	0.00	25.80	0.00	26.00	0.00

In table 3, we find the average and standard deviation of the price per unit for the different products produced by Delice Vert. For most of the products, except for tzatziki, the standard deviation is 0 because Delice Vert sells every product for the same price. In the case of tzatziki, they give a discount to one company, Adonis, because they order so much every month.

**Table 4: Descriptive statistics of the different companies**

Company name	2012		2013		2014	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
Daily Freeze	189.02	263.34	191.86	270.13	207.37	287.51
Adonis	2237.92	197.86	2233.33	213.44	1283.33	693.82
Distribution Bakery	313.33	17.95	324.58	17.01	401.25	37.98
Delice	277.08	19.20	262.92	21.26	227.08	17.50
Canam	160.25	6.22	159.08	7.83	168.17	6.20
Debourd and Renwel	180.38	46.57	176.67	37.66	180.00	50.10
Gourmet Vegetarian	703.33	28.67	718.75	17.21	737.08	16.51
Philippe Good	310.83	22.90	322.08	13.76	337.08	12.66
Mansaby	201.25	18.86	220.50	33.11	212.58	35.21
Others	459.72	466.66	514.17	546.77	623.61	639.53

In table 4, we find the standard deviation and the average quantity each company orders every year. For most of the companies, we find a minor increase every year. Adonis average drastically decreased in the year of 2014 because they stopped ordering at some point during the year. Daily Freeze has a higher standard deviation than average mean because they order different products and the quantities differ greatly, which increases the standard deviation.

**Table 5: Descriptive statistics of the price for the different companies**

Company name	2012 (\$)		2013 (\$)		2014 (\$)	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
Daily Freeze	1114.50	635.81	1110.67	663.46	1261.90	908.91
Adonis	10630.10	939.82	10608.33	1013.83	6095.83	3295.65
Distribution Bakery	1566.67	89.75	1622.92	85.06	2006.25	189.88
Delice	1385.42	95.99	1314.58	106.29	1135.42	87.48
Canam	801.25	31.10	795.42	39.13	840.83	31.01
Debourd and Renwel	901.88	232.86	883.33	188.29	900.00	250.52
Gourmet Vegetarian	1758.33	71.69	1796.88	43.04	2211.25	49.54
Philippe Good	777.08	57.24	805.21	34.41	1011.25	37.98
Mansaby	1181.86	184.15	1300.37	270.27	1256.54	280.49
Others	1375.69	1031.51	1511.81	1234.06	2109.72	1781.31

In table 5, we find the average price and standard deviation that is spend by each company. Similar to table 4, the price average is steady every year except for Adonis, whom has a major decrease in 2014 because they stopped their order in the middle of the year.



**Table 6: Descriptive statistics of the price per unit for the different companies**

Company name	2012		2013		2014	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
Daily Freeze	20.76	11.58	20.76	11.58	21.07	11.64
Adonis	4.75	0.00	4.75	0.00	4.75	0.00
Distribution Bakery	5.00	0.00	5.00	0.00	5.00	0.00
Delice	5.00	0.00	5.00	0.00	5.00	0.00
Canam	5.00	0.00	5.00	0.00	5.00	0.00
Debourd and Renwel	5.00	0.00	5.00	0.00	5.00	0.00
Gourmet Vegetarian	2.50	0.00	2.50	0.00	3.00	0.00
Philipes Good	2.50	0.00	2.50	0.00	3.00	0.00
Mansaby	5.85	0.54	5.85	0.54	5.85	0.54
Others	4.17	1.18	4.17	1.18	4.33	0.94

In table 6, we find the average price per unit orders given by the companies. The reason why companies have a standard deviation of 0 is because they only order 1 type of product for a fixed price. Daily Freeze had a higher average and a higher standard deviation from the rest of the companies because they order different higher priced items, increasing their average.

Based on the descriptive statistics gathered above, we realise that the main product sold are tzatziki and mayonnaise. They are sold in large quantities to different companies. The company that generates the most revenue is Adonis and it only purchases one type of product. Based on these facts, Delice Vert should concentrate on making more tzatziki and mayonnaise and trying to get Adonis contract back because they stopped ordering from them during 2014, which will greatly affect the bottom line of the company.

## 2.5. Hypothesis Testing

Statistic hypothesis is the process of testing a hypothesis that is modeled via the data that was previously gathered. The purpose is to compare the relationship between two or more sets of data.

### 2.5.1. Analysis of Variance (Anova)

An analysis of variance, also called anova, is one of the types of hypothesis testing we will experiment. It measures whether or not the means of several groups are equal by using a t-test. In this experiment, we will use Minitab 17.00 as a statistical package. By using ANOVA type analysis, we test if the average values (for different variables) of different groups (based on product type, company type) are the same or different.

**H<sub>1</sub>: The average monthly order (kg), in 2012, can differ for each product.**

Source	DF	SS	MS	F	P
Factor	6	9496534	1582756	5,24	0,000
Error	293	88478662	301975		
Total	299	97975196			

S = 549,5 R-Sq = 9,69% R-Sq(adj) = 7,84%

Since,  $p < 0.05$ , we conclude that average monthly orders (kg), in 2012, differs between the products. This lets us understand that some products are more in demand than others, depending on the month. There are also differences because for products such as tzatziki and mayonnaise, there is more demand than for the other products.

**H<sub>2</sub>: The average price per month (kg), in 2012, can differ from product types.**

Source	DF	SS	MS	F	P
Factor	6	112056146	18676024	4.06	0.001
Error	209	960383302	4595135		
Total	215	1072439448			

S = 2144 R-Sq = 10.45% R-Sq(adj) = 7.88%

Since,  $p < 0.05$ , we conclude that in 2012, the average price per month (kg) differ from product types. This was safe to assume because the different products have different prices and in some

cases, such as for Adonis, the price of tzatziki is lower for them compared to the other companies.

**H<sub>3</sub>: Average product monthly orders (kg) differ, in 2013.**

Source	DF	SS	MS	F	P
Factor	6	10820750	1803458	7.93	0.000
Error	209	47505223	227298		
Total	215	58325973			

S = 476.8 R-Sq = 18.55% R-Sq(adj) = 16.21%

Since,  $p < 0.05$ , we are able to conclude that the average product monthly order (kg), differs in 2013. Similarly to the year of 2012, because tzatziki and mayonnaise are in higher demand, the average will differ between the products.

**H<sub>4</sub>: The average price per month differs for each product type (kg), in 2013.**

Source	DF	SS	MS	F	P
Factor	6	108559492	18093249	3.91	0.001
Error	209	967267568	4628074		
Total	215	1075827060			

S = 2151 R-Sq = 10.09% R-Sq(adj) = 7.51%

Since,  $p < 0.05$ , we deduct that the average price per month differs for each product types (kg), in 2013. As for the year of 2012, each product has a different price based on the product or the company, except in Adonis case, making the null hypothesis invalid.

**H<sub>5</sub>: The monthly average orders (kg), in 2014, can differ between product types.**

Source	DF	SS	MS	F	P
Factor	6	12051772	2008629	15.60	0.000
Error	209	26914701	128778		
Total	215	38966472			

S = 358.9 R-Sq = 30.93% R-Sq(adj) = 28.95%

Since,  $p < 0.05$ , we conclude that in 2014, the monthly average order (kg) differs for different product types. As the years of 2012 and 2013, orders between products differ as companies that buy the products have different demand. The ones with the higher demand order more.

**H<sub>6</sub>: The average price per month (kg), in 2014, can differ for different product type.**

Source	DF	SS	MS	F	P
Factor	6	83084067	13847345	6.00	0.000
Error	209	482027484	2306352		
Total	215	565111552			

S = 1519 R-Sq = 14.70% R-Sq(adj) = 12.25%

Since,  $p < 0.05$ , we conclude that average price (kg), in 2014, differs between different product types. As for the previous years, different prices are attributed to different products as raw materials differ in prices.

**H<sub>7</sub>: Monthly average orders (per box), in 2012, differs between different product types.**

Source	DF	SS	MS	F	P
Factor	4	1942.1	485.5	40.41	0.000
Error	55	660.8	12.0		
Total	59	2602.9			

S = 3.466 R-Sq = 74.61% R-Sq(adj) = 72.77%

Since,  $p < 0.05$ , we conclude that average monthly orders (per box), in 2012, differs between different product types. As for the other products, companies have different needs and they will order according to their specific demand, deferring the order size.

**H<sub>8</sub>: In 2012, the average price per month (per box) can differ for product type.**

Source	DF	SS	MS	F	P
Factor	4	29816	7454	0.81	0.523
Error	55	505324	9188		
Total	59	535140			

S = 95.85 R-Sq = 5.57% R-Sq(adj) = 0.00%

Since,  $p > 0.05$ , we cannot reject the null hypothesis that average price (per box), in 2012, are the same for the different product types. In this case, the prices are similar because Delice Vert does not produce many products that are considered liquid and the few that they produce they use similar raw materials, making the price similar for each consumer.

**H<sub>9</sub>: Monthly average orders (per box), in 2013, can differ for different product types.**

Source	DF	SS	MS	F	P
Factor	4	1007.9	252.0	14.42	0.000
Error	55	960.8	17.5		
Total	59	1968.7			

S = 4.180 R-Sq = 51.20% R-Sq(adj) = 47.65%

Since,  $p < 0.05$ , we are able to conclude that monthly orders (per box), in 2013, differ for product types. The different products have different demand similarly to the other products in kg.

**H<sub>10</sub>: Price average per month (per box), in 2013, can differ for product types.**

Source	DF	SS	MS	F	P
Factor	4	84253	21063	1.50	0.216
Error	55	774202	14076		
Total	59	858455			

S = 118.6 R-Sq = 9.81% R-Sq(adj) = 3.26%

Since,  $p > 0.05$ , we conclude that average price (per box), in 2013, is similar between product types. As for the year of 2012, because the price did not change, the prices stayed similar between the products.

**H<sub>11</sub>: Product type differ from average monthly orders (per box), in 2014.**

Source	DF	SS	MS	F	P
Factor	4	1260.7	315.2	22.37	0.000
Error	55	774.9	14.1		
Total	59	2035.6			

S = 3.754 R-Sq = 61.93% R-Sq(adj) = 59.16%

Since,  $p < 0.05$ , average monthly order (per box), in 2014, differs between product types. As for the years of 2012 and 2013, different companies order different products in different quantities based on their personal demand.

**H<sub>12</sub>: Average price per month (per box) in 2014 can differ for product type.**

Source	DF	SS	MS	F	P
Factor	4	1793515	448379	35.98	0.000
Error	55	685437	12462		
Total	59	2478952			

S = 111.6 R-Sq = 72.35% R-Sq(adj) = 70.34%

Since,  $p < 0.05$ , the average price (per box), in 2014, differ from product type. Contrary to the years of 2012 and 2013, in this case the prices differ because the cost of the raw materials increased and in order to keep a margin of profit, Delice Vert had no choice to increase the prices of a few products. That created a bigger gap between the prices of different products, making the hypothesis none valid.

**H<sub>13</sub>: In 2012, average monthly orders differ between companies.**

Source	DF	SS	MS	F	P
Factor	9	49427295	5491922	102.64	0.000
Error	266	14233065	53508		
Total	275	63660361			

S = 231.3 R-Sq = 77.64% R-Sq(adj) = 76.89%

Since,  $p < 0.05$ , we conclude that average monthly orders, in 2012, differ between companies. In this case, similarly to the products some companies order more than others based on their size. Delice Vert sells too small and medium size companies, each having different demands. The demand for the small companies is less making the monthly order different for each.

**H<sub>14</sub>: In 2012, average price per month differ between companies.**

Source	DF	SS	MS	F	P
Factor	9	1038931124	115436792	354.92	0.000
Error	266	86517012	325252		
Total	275	1125448136			

S = 570.3 R-Sq = 92.31% R-Sq(adj) = 92.05%

Since,  $p < 0.05$ , we conclude that average price per month differs between companies, in 2012. Some companies order more quantities or even different types of products compared to the others. This has for result a differentiation in prices.

**H<sub>15</sub>: In 2013, average monthly orders differ between companies.**

Source	DF	SS	MS	F	P
Factor	9	49488009	5498668	83.32	0.000
Error	266	17553892	65992		
Total	275	67041902			

S = 256.9 R-Sq = 73.82% R-Sq(adj) = 72.93%

Since,  $p < 0.05$ , in 2013, we conclude that monthly orders differ between companies. As for the year of 2012, demand did not fluctuate as much. Some companies started to order a little more or a little less, keeping a difference between monthly orders for each company.

**H<sub>16</sub>: In 2013, price average per month differs between companies.**

Source	DF	SS	MS	F	P
Factor	9	1028433416	114270380	277.22	0.000
Error	266	109644452	412197		
Total	275	1138077868			

S = 642.0 R-Sq = 90.37% R-Sq(adj) = 90.04%

Since,  $p < 0.05$ , we are able to deduct that price average differs between companies, in 2013. As the quantity purchase is different between the companies, the price will also differ because all different products have different prices.

**H<sub>17</sub>: Average monthly orders differ between companies, in 2014.**

Source	DF	SS	MS	F	P
Factor	9	19081606	2120178	20.43	0.000
Error	266	27605612	103780		
Total	275	46687218			

S = 322.1 R-Sq = 40.87% R-Sq(adj) = 38.87%

Since,  $p < 0.05$ , in 2014, we conclude that monthly orders differ between companies. Companies have different demands from each other. They need to supply their consumers according to their needs. In some cases it is more and in others it is less.

**H<sub>18</sub>: Average price per month differ between companies, in 2014.**

Source	DF	SS	MS	F	P
Factor	9	300439511	33382168	27.68	0.000
Error	266	320769382	1205900		
Total	275	621208894			

S = 1098 R-Sq = 48.36% R-Sq(adj) = 46.62%



Since,  $p < 0.05$ , we conclude that there is a difference between companies regarding prices, in 2014. As for the years of 2012 and 2013, the quantity procured by the different company differs, that has for a direct result in the price differentiation.

As we may see above from the different hypothesis, the price and the quantity differ between the product types and the companies. This is a normal result because most company that purchase from Delice Vert have have different demand and the price of each product differs from each other, but their where a few exceptions when it came time to the prices per box. In that case, because their where not many items sold per box and only one company was purchasing those products, Delice Vert tried to keep the prices relatively similar to each other.

### 2.5.2. Correlation

Another hypothesis testing we are going to use is a correlation testing. With this testing, we are examining the statistical relationship between two or more values that are correlated. We are going to examine the relationship between the quantity purchase for each product between the years of 2012 to 2014 and the amount purchased by each company, in the different years.

**H<sub>1</sub>: For Tzatziki, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013	
2013	0,999		
	0,000		
2014	0,733	0,730	
	0,000	0,000	

For this product, monthly orders between 2012, 2013, and 2014 are significantly correlated. But the correlation coefficient is higher between 2012 and 2013, and decreases for 2014. The reason for the decrease is because one of the companies that was purchasing tzatziki in a large quantity, Adonis, stop their orders mid-year, in 2014. This had for result a decrease in sale in 2014 compare to the years before. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>2</sub>: For Mayonnaise, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.990	
	0.000	
2014	0.967	0.986
	0.000	0.000

Mayonnaise monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient is similar between the years of 2012 to 2014. Mayonnaise is the second most popular item Delice Vert produces. Many companies purchase it. Some companies purchase more during the year and some less, but every year, it balances out, keeping the correlation relatively similar. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>3</sub>: For Hummus, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.994	
	0.000	
2014	0.960	0.957
	0.000	0.000

Hummus monthly orders between 2012 and 2014 are significantly correlated. But the correlation coefficient is higher between 2012 and 2013, and decreases for 2014. We see a slight decrease in sale in 2014, but it is normal. The correlation decreases, but not significantly. If there will be a trend in the future; we should examine it then, accordingly. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>4</sub>: For Tofu, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.937	0.000
2014	0.890	0.873
	0.000	0.000

For this product, monthly orders between 2012, 2013, and 2014 are significantly correlated. There is a high correlation between the years 2012 and 2013, but there is a decrease when we compare the years of 2012 with 2014 and 2013 to 2014. Tofu, Borchetta, Six Haricots and Chickpea Salad are all purchased by one company, Mansaby. Delice Vert has made a deal with them to sell exclusively these products to them at a fixed price and the orders of the products must be the same each month. This is why the correlation for those products is exactly identical. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>5</sub>: For Brocheta, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.937	0.000
2014	0.890	0.873
	0.000	0.000

For this product, monthly orders between 2012, 2013, and 2014 are significantly correlated. There is a high correlation between the years 2012 and 2013, but there is a decrease when we compare the years of 2012 with 2014 and 2013 to 2014. Tofu, Borchetta, Six Haricots and Chickpea Salad are all purchased by one company, Mansaby. Delice Vert has made a deal with them to sell exclusively these products to them at a fixed price and the orders of the products must be the same each month. This is why the correlation for those products is exactly identical. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>6</sub>: For Six Haricots, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.937	0.000
2014	0.890	0.873
	0.000	0.000

For this product, monthly orders between 2012, 2013, and 2014 are significantly correlated. There is a high correlation between the years 2012 and 2013, but there is a decrease when we compare the years of 2012 with 2014 and 2013 to 2014. Tofu, Borchetta, Six Haricots and Chickpea Salad are all purchased by one company, Mansaby. Delice Vert has made a deal with them to sell exclusively these products to them at a fixed price and the orders of the products must be the same each month. This is why the correlation for those products is exactly identical. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>7</sub>: For Chickpea Salad, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.937	0.000
2014	0.890	0.873
	0.000	0.000

For this product, monthly orders between 2012, 2013, and 2014 are significantly correlated. There is a high correlation between the years 2012 and 2013, but there is a decrease when we compare the years of 2012 with 2014 and 2013 to 2014. Tofu, Borchetta, Six Haricots and Chickpea Salad are all purchased by one company, Mansaby. Delice Vert has made a deal with them to sell exclusively these products to them at a fixed price and the orders of the products must be the same each month. This is why the correlation for those products is exactly identical. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>8</sub>: For Thai sauce, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.928	0.000
2014	0.968	0.955
	0.000	0.000

Thai sauce monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation increases slightly year after year. This is good news for Delice Vert because in the year of 2014, they increased their prices for the sale of the sauce and we still find an increase in sales during that year. This lets us assume that they are still able to increase their prices, while still keeping their sales. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>9</sub>: For Cezare salad, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.943	0.000
2014	0.933	0.961
	0.000	0.000

Cezare salad monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient increases each year. This is a great sign for Delice Vert as they have increased their prices for Cezare salad in the year of 2014 and demand still increased. This allows us to assume that an increase in price is possible for this product. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>10</sub>: For Sauce de Maison, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.930	0.000
2014	0.959	0.960
	0.000	0.000

Sauce de Maison monthly orders between 2012, 2013, and 2014 are significantly correlated. Each year, the correlation coefficient increases. This goes with the trend of the other products. Sauce de Maison is purchased by Daily Freeze, similarly to Thai sauce and Cezare salad. Their correlation also increased during the year. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>11</sub>: For Tomato sauce, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.936	0.000
2014	0.907	0.919
	0.000	0.000

Tomato sauce monthly orders between 2012, 2013, and 2014 are significantly correlated. But the correlation coefficient is higher between 2012 and 2013, and decreases for 2014. Demand decreases as the price increased in 2014. This situation may be problematic if it continues in the future. Delice Vert should look at this situation over the next years. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>12</sub>: For Rose sauce, monthly orders of 2012, 2013, and 2014 are correlated.**

	2012	2013
2013	0.930	0.000
2014	0.959	0.960
	0.000	0.000

For this product, monthly orders between 2012, 2013, and 2014 are significantly correlated. But the correlation coefficient is lower between 2012 and 2013, and increases for 2014. This goes with the trend of the other products. Rose sauce is purchased by Daily Freeze, similarly to Thai sauce, Cezare salad and Sauce de Maison. Their correlation also increased during the year. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>13</sub> : There is a relation between the orders of Daily Freeze in years 2012, 2013, 2014.**

	2012	2013
2013	0.997	0.000
2014	0.986	0.986
	0.000	0.000

The company, Daily Freeze, monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient is higher between 2012 and 2013, almost perfect, and decreases slightly for 2014. Daily Freeze orders are stable during the years as the correlation does not change as much. This is good because they are Delice Vert biggest consumer. The low p-value, 0, demonstrates the high significance level and allows us to fully reject are null hypothesis.

**H<sub>14</sub> : There is a relation between the orders of Adonis in years 2012, 2013, 2014.**

	2012	2013
2013	0.928	0.000
2014	-0.825	-0.823
	0.001	0.001

Adonis, monthly orders between 2012, 2013, and 2014 are significantly correlated. There is a high correlation coefficient between the years of 2012 and 2013 but there is a significant inverse correlation (-) when we compare the years with 2014. The correlation has a drastic change because during the mid-year of 2014 Adonis stopped purchasing from Delice Vert. This is not a good situation for Delice Vert as Adonis was their second biggest client. They need to know why they stopped ordering from them and try to get the business back. The low p-values of 0 and 0.001, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>15</sub> : There is a relation between the orders of Distribution Bakery in years 2012, 2013, 2014.**

	2012	2013
2013	0.930	0.000
2014	0.959	0.960
	0.000	0.000

The company, Distribution Bakery, monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient is lower between 2012 and 2013, and increases for 2014. Demand increases every year, but it stays stable. Delice Vert knows what to expect from Distribution Bakery, allowing them to better serve their needs. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.



**H<sub>16</sub> : There is a relation between the orders of Delice in years 2012, 2013, 2014.**

	2012	2013	
2013	0.935		
	0.000		
2014	0.824	0.919	
	0.001	0.000	

The company, Delice, monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient decreases slightly yearly. Even with a decrease in correlation, it is still significant, meaning that there is a relationship between the number of orders and the year. This is a sign of stability. The low p-values of 0 and 0.001, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>17</sub> : There is a relation between the orders of Canam in years 2012, 2013, 2014.**

	2012	2013	
2013	0.957		
	0.000		
2014	0.893	0.867	
	0.0	0.000	

The company, Canam, monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient is higher between 2012 and 2013, and decreases for 2014. The correlation has decreased every year. This is not an alarming situation as the correlation is high, but if the trend continues and we see a decrease again, Delice Vert may need to look at the situation and try to fix the problem. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>18</sub> : There is a relation between the orders of Debourd and Renwel in years 2012, 2013, 2014.**

	2012	2013
2013	0.996	0.000
2014	0.988	0.987
	0.000	0.000

The company, Debourd and Renwel, monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient is higher between 2012 and 2013, almost perfect, and decreases slightly for 2014. Even with a slight decrease, the situation between Delice Vert and Debourd and Renwel is near perfect as the correlation is near 1. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>19</sub> : There is a relation between the orders of Gourmet Vegetarian in years 2012, 2013, 2014.**

	2012	2013
2013	0.954	0.000
2014	0.944	0.954
	0.000	0.000

The company, Gourmet Vegetarian, monthly orders between 2012, 2013, and 2014 are significantly correlated and is similar for each year. The situation is steady with Gourmet Vegetarian. Monthly orders may vary slightly during the years, but will still stay similar. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>20</sub> : There is a relation between the orders of Philipes Good in years 2012, 2013, 2014.**

	2012	2013	
2013	0.960		
	0.000		
2014	0.727	0.752	
	0.007	0.005	

The company, Philipes Good, monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient is higher between 2012 and 2013, and decreases significantly in 2014. There is a decrease in correlation because over the years, Philipes Good has increased their demand each year. This is good as they are bringing in more revenue for Delice Vert, but the company has to anticipate constant increase in demand. The low p-values of 0, 0.005 and 0.007 demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>21</sub> : There is a relation between the orders of Mansaby in years 2012, 2013, 2014.**

	2012	2013	
2013	0.982		
	0.000		
2014	0.958	0.969	
	0.000	0.000	

The company, Mansaby, monthly orders between 2012, 2013, and 2014 are significantly correlated. The correlation coefficient is higher between 2012 and 2013, and decreases for 2014. Even with a slight decrease, the situation between Delice Vert and Mansaby is near perfect as the correlation is near 1. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

**H<sub>22</sub> : There is a relation between the orders of Others in years 2012, 2013, 2014.**

	2012	2013
2013	0.997	0.000
2014	0.997	0.997
	0.000	0.000

The other company's monthly orders, between 2012, 2013, and 2014 are significantly correlated, almost perfect, and are similar for each year. Even do in this section, there are many companies involved, the correlation is steady and near perfect. The reason for this is that Delice Vert only produces a certain number of products for the small companies. These companies do not purchase in big quantities, but they purchase on a regular basis and that is why correlation is near perfect every year. The low p-value, 0, demonstrates the high significance level and allows us to fully reject our null hypothesis.

We may conclude that in most cases, there is a strong correlation with the products and the companies during the different years. This is a normal case for a small company as demand will not increase or decrease dramatically in a short period of time. The only time it will decrease dramatically and we will find a big decrease in correlation is when the company stops purchasing a product from Delice Vert, which was the case for Adonis, whom stopped their monthly order of Tzatziki during the year of 2014. This is a situation of major concern, which Delice Vert should look at and try to find a solution in order to fix the problem.

## **2.6. Always Better Control (ABC) Analysis**

In this section, we are going to use ABC model, to evaluate which products are more important for Delice Vert. With an ABC model, we are able to separate all the products, which Delice Vert produces, into three categories: product A, most important product for the company, product B, second most important and product C, the less important. The products that will be categorised into the A group will constitute of 70 to 80% of the total production of the company. The other 10 to 15% will be considered B products and the rest of the 5% will be C products.

**Table 7: ABC analysis product class of 2012**

<b>Product</b>	<b>Annual sales (\$)</b>	<b>Percentage of quantity produced</b>	<b>Cumulative percentage</b>	<b>Class of products</b>
Tzatziki	220796.25	0.51	0.51	A
Mayonnaise	84962.50	0.20	0.71	A
Hummus	28950.00	0.07	0.78	B
Tofu	14114.80	0.03	0.81	B
Brocheta	14114.80	0.03	0.84	B
Six Haricots	14114.80	0.03	0.87	B
Chickpea Salad	14114.80	0.03	0.9	B
Cezare salad	9055.20	0.02	0.92	C
Thai sauce	8899.50	0.02	0.94	C
Tomato sauce	8892.00	0.02	0.96	C
Rose sauce	8643.00	0.02	0.98	C
Sauce de Maison	8290.80	0.02	1	C
sum	435224.35	1.00		

As we could see, in 2012, half of Delice Vert production consists of Tzatziki and the second most important item produced is Mayonnaise. These are their two main products. The rest of the products are not sold as much as these two, with the exception of Hummus, the rest of the sells, are low.

**Table 8: ABC analysis product class 2013**

<b>Product</b>	<b>Annual sales (\$)</b>	<b>Percentage of quantity produced</b>	<b>Cumulative percentage</b>	<b>Class of products</b>
Tzatziki	221495	0.51	0.51	A
Mayonnaise	91237.5	0.21	0.72	A
Hummus	27125	0.06	0.78	B
Tofu	15904	0.03	0.81	B
Brocheta	15904	0.03	0.84	B
Six Haricots	15904	0.03	0.87	B
Chickpea Salad	15904	0.03	0.9	B
Thai sauce	9283.4	0.02	0.92	C
Cezare salad	8673	0.02	0.94	C
Sauce de Maison	8403.6	0.02	0.96	C
Rose sauce	8178.6	0.02	0.98	C
Tomato sauce	7995	0.02	1	C
sum	437828.5	1.00		

In 2013, similarly to 2012, Tzatziki and Mayonnaise are the most produced items by Delice Vert, Tzatziki, which is about 50% of the total production. The rest of the products are not produced in a large quantity.

**Table 9: ABC analysis product class 2014**

<b>Product</b>	<b>Annual sales (\$)</b>	<b>Percentage of quantity produced</b>	<b>Cumulative percentage</b>	<b>Class of products</b>
Tzatziki	182590	0.42	0.42	A
Mayonnaise	118260	0.27	0.69	A
Hummus	27775	0.06	0.75	B
Tofu	15563.2	0.04	0.79	B
Brocheta	15563.2	0.04	0.83	B
Six Haricots	15563.2	0.04	0.87	B
Chickpea Salad	15563.2	0.04	0.91	B
Cezare salad	12360	0.03	0.94	C
Thai sauce	9520	0.02	0.96	C
Sauce de Maison	7830	0.02	0.98	C
Rose sauce	7228	0.01	0.99	C
Tomato sauce	6571.5	0.01	1	C
sum	434387.3	1.00		

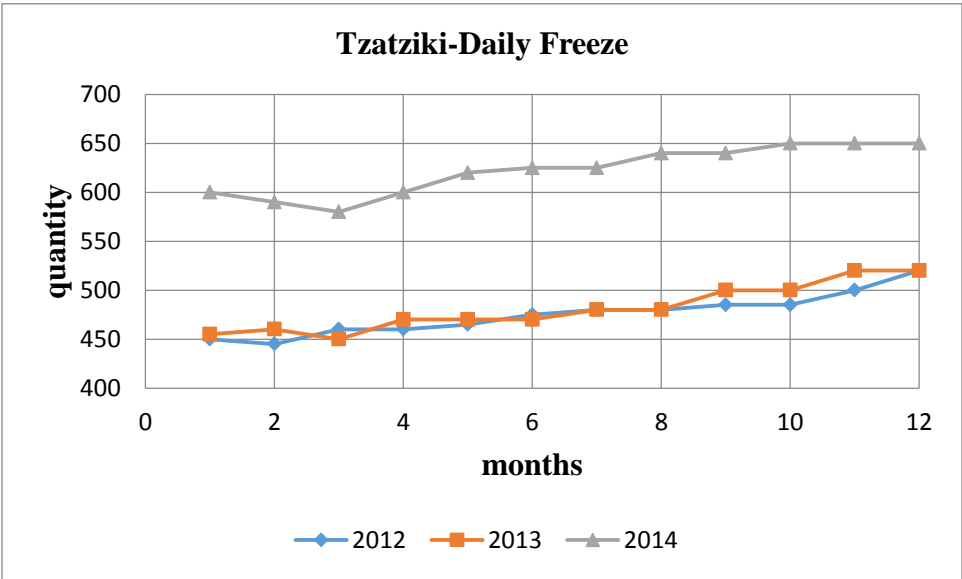
In 2014, similar to the previous years, Tzatziki and Mayonnaise are the two most popular items produced by Delice Vert. The difference between 2014 and the previous years is that the production of Tzatziki has decreased a little, while there is an increase in the production of Mayonnaise. The reason for this is because one of the companies stopped ordering Tzatziki during the year, decreasing production, while most companies increase their demand for Mayonnaise. The rest of the products stay still, similar to the previous years.

As we could see from the ABC models, Tzatziki and Mayonnaise are the two most important products for Delice Vert. They are the ones that generate most of the revenue. The rest of the products, account for 30%, as a hole. Delice Vert should concentrate on their strengths and try to sell more Tzatziki and Mayonnaise, as they are the ones that will generate the largest revenue.

**2.7. Inventory figures**

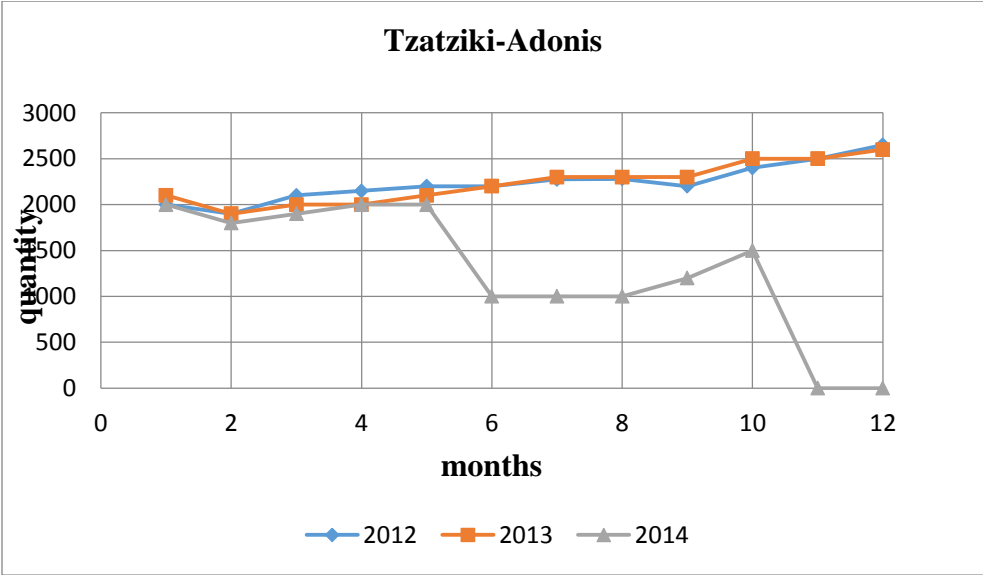
In this section, we will closely examine the demand for the A class products, because they account for more than 70% of the total production of Delice Vert. We will look at all the companies that purchase Tzatziki and Mayonnaise. We will examine their purchase patterns during the years of 2012 to 2014.

**Figure 1: Quantity of Tzatziki sold to Daily Freeze during the years of 2012 to 2014**



In the years of 2012 and 2013, Daily Freeze order is similar, but in 2014, we find a large increase. The reason for such increase was an increase in demand for Daily Freeze products, which has for result in an increase for Delice Vert, their suppliers.

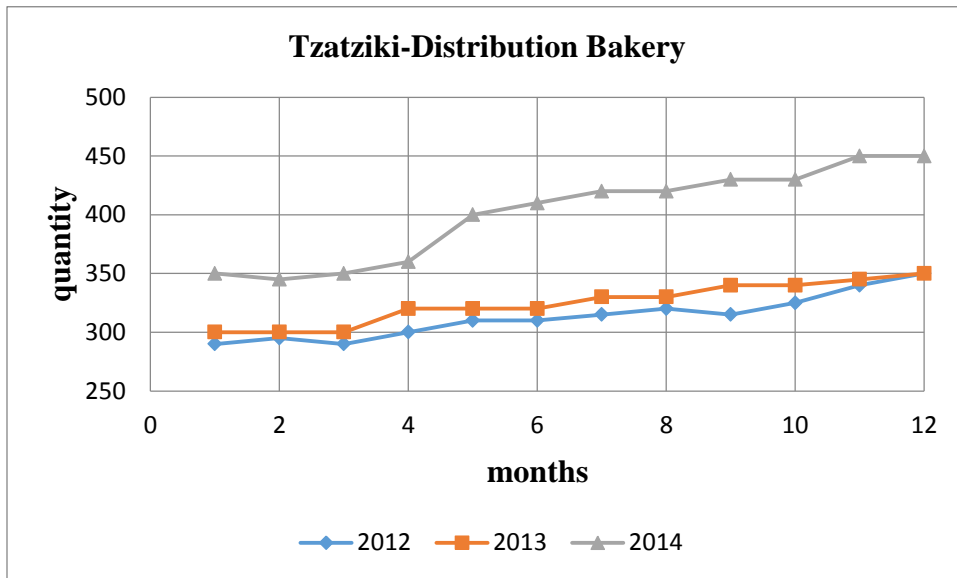
**Figure 2: Quantity of Tzatziki sold to Adonis during the years of 2012 to 2014**



In the years of 2012 and 2013, sale was stable, but during mid-2014, the sales started to drastically decrease and reach 0 by the 11 month. The reason for the decrease was that Adonis found a new supplier to purchase Tzatziki. From the mid of 2014 to the 11 month they started to purchase from both suppliers and by the 11 month they switched companies. This is a major lost for Delice Vert as they use to purchase so much Tzatziki from them.

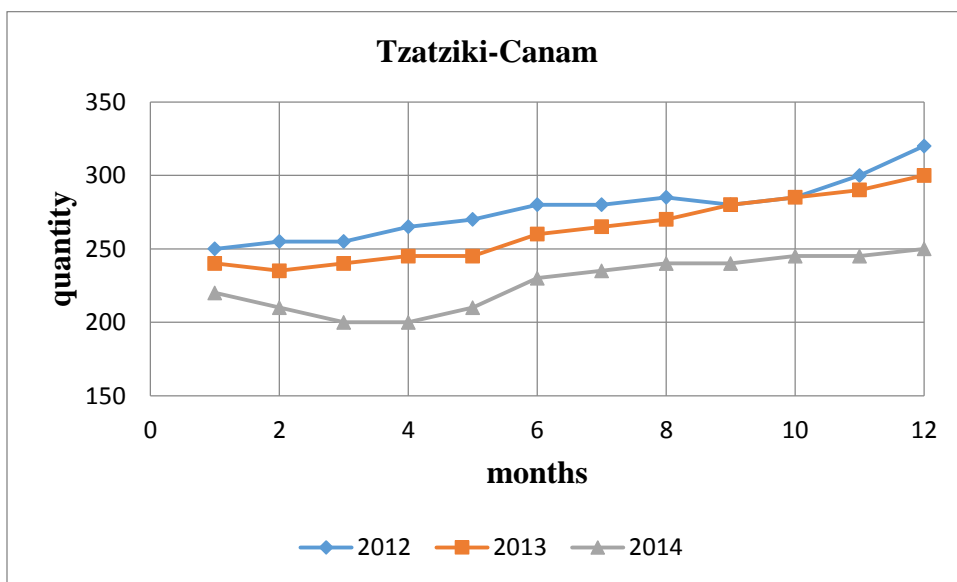


**Figure 3: Quantity of Tzatziki sold to Distribution Bakery during the years of 2012 to 2014**



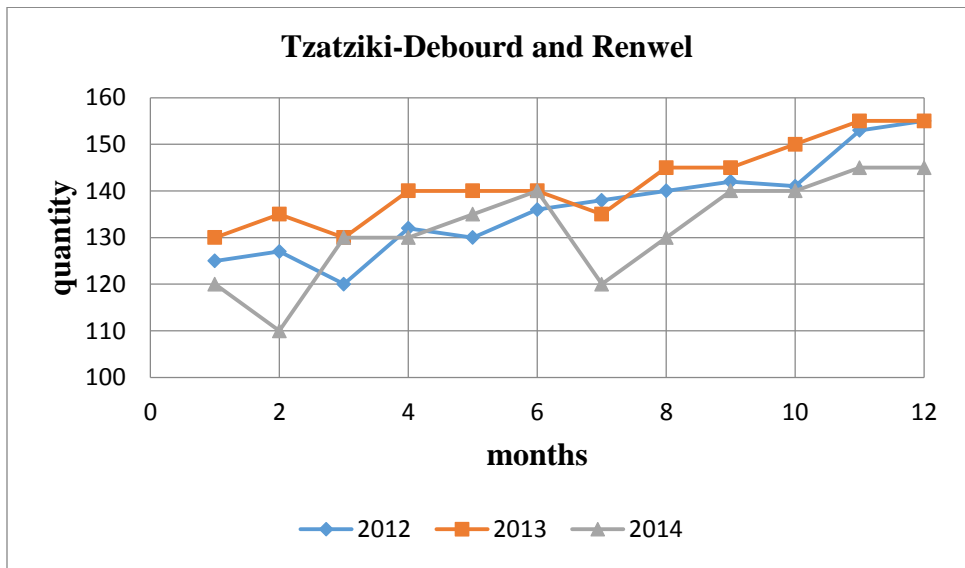
In the years of 2012 and 2013, the demand is similar, but there is a major increase in 2014. This is because the relationship between Delice Vert and Distribution Bakery is better than before. Now the managers from both companies are friends, Distribution Bakery tries to order more from Delice Vert, which reflects the increase in 2014.

**Figure 4: Quantity of Tzatziki sold to Canam during the years of 2012 to 2014**



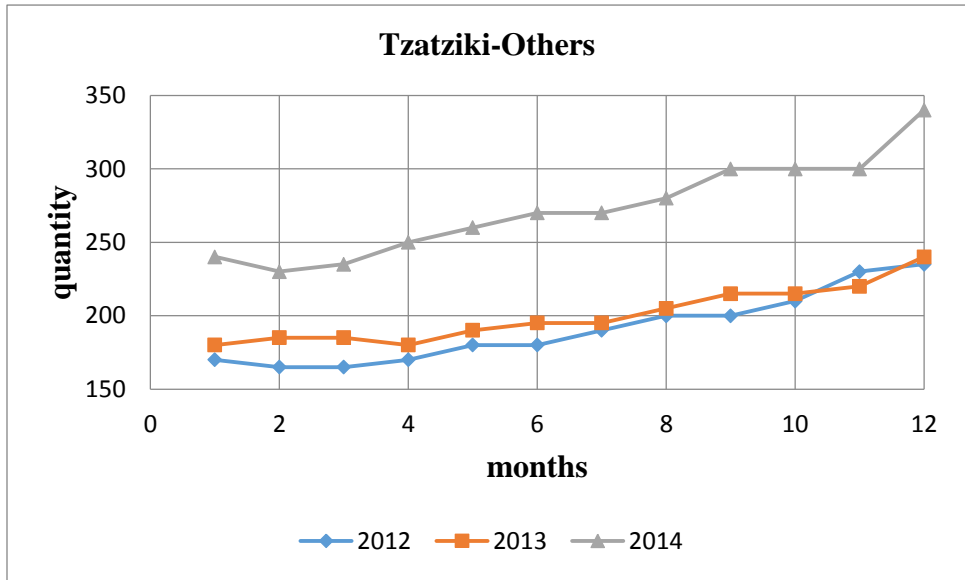
Canam has decreased their demand every year. The reason for the decrease is that Canam is not doing so well. Over the years, they started to loose consumers, which decreased their demand, which has for effect a decrease in demand of Tzatziki.

**Figure 5: Quantity of Tzatziki sold to Deboud and Renwel during the years of 2012 to 2014**



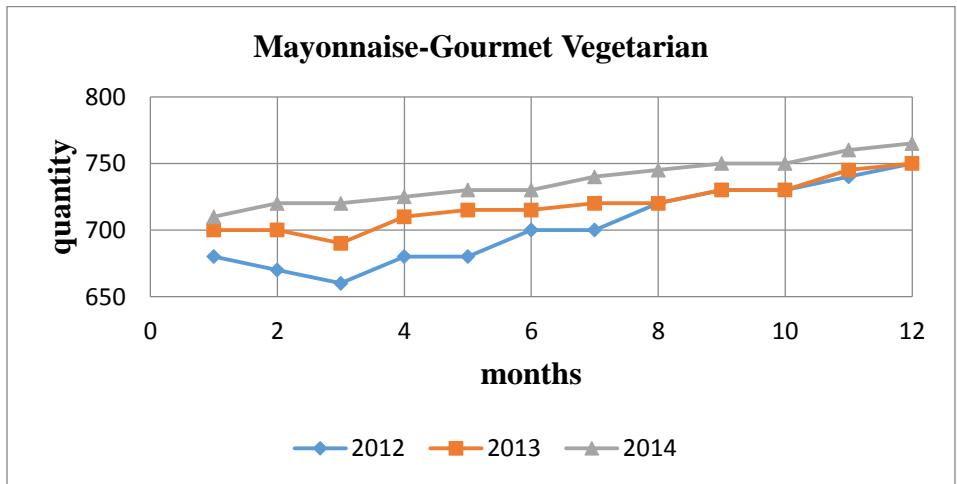
Deboud and Renwel demand is steady during the years. There is small difference in demand over the years, but we could see that demand increases over the months and it is at its pike during the last few months. The reason for such pike is because at the end of the year, there are many holidays and people purchase more items, increasing demand.

**Figure 6: Quantity of Tzatziki sold to all the other small companies during the years of 2012 to 2014**



In the years of 2012 and 2013, the demand was similar and in 2014 it increased. The reason for the increase was because Delice Vert acquired new customers during that year. They had more of a demand for Tzatziki.

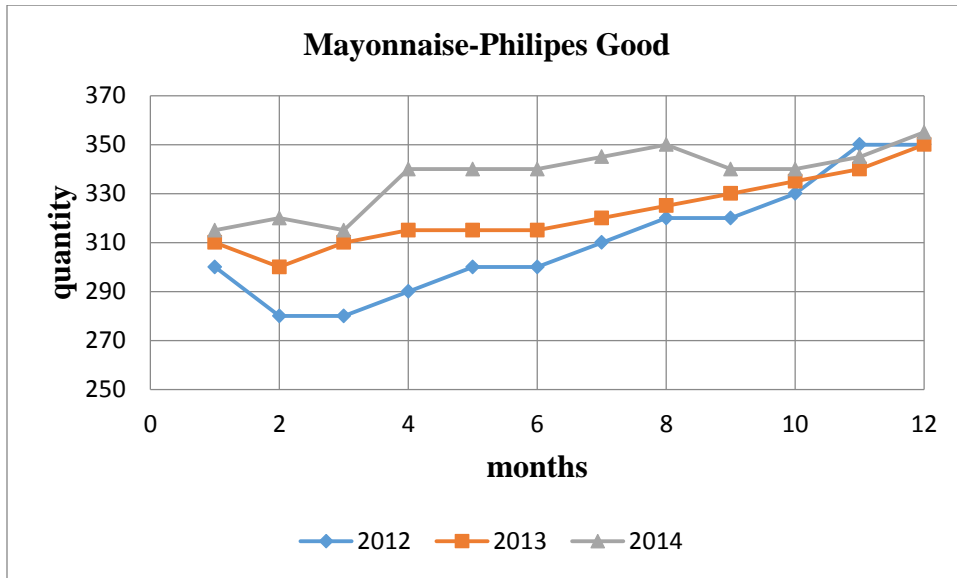
**Figure 7: Quantity of Mayonnaise sold to Gourmet Vegetarian during the years of 2012 to 2014**



During the years we find a slight increase each year. We could also see that demand increases every month. It is at its lowest for the first three months and it reaches its pick during the last

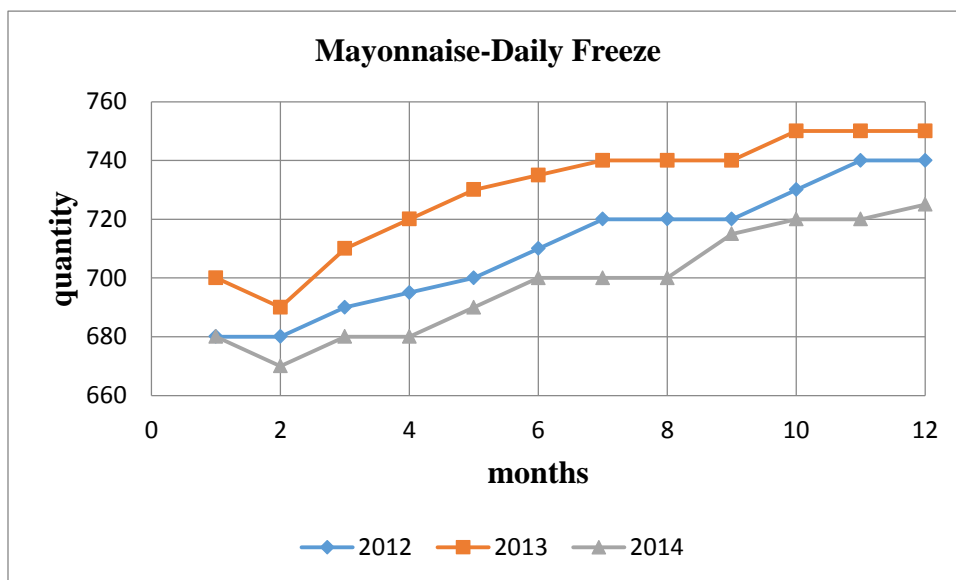
two. The reason is that at the end of the month, there are more holidays and people spend more money. When the new year begins, they do not have much money anymore to spend because they spend it before.

**Figure 8: Quantity of Mayonnaise sold to Philipes Good during the years of 2012 to 2014**



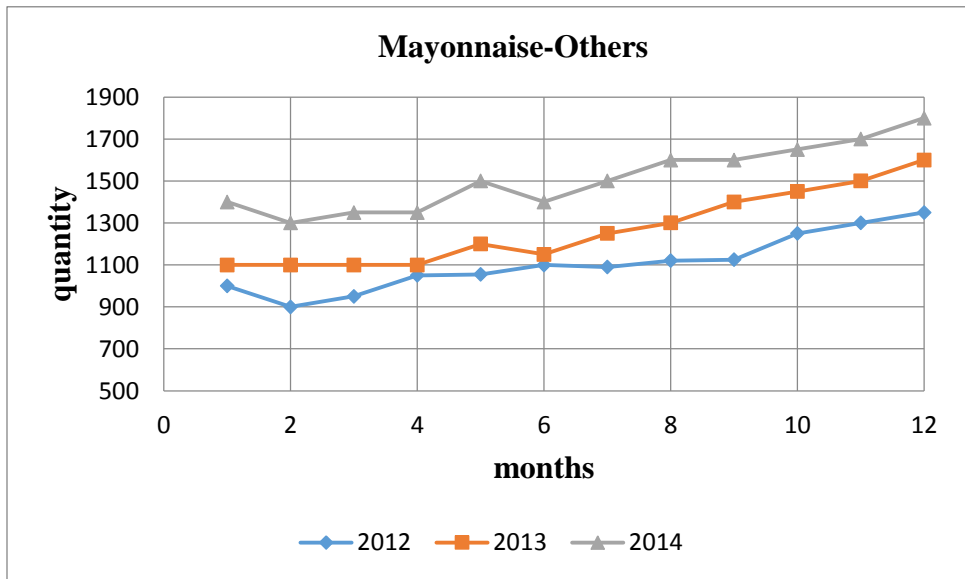
Philipes Good has a stable demand every year. They are a small company and their clientele has been stable for the past years. They do not need to supply more, keeping a steady demand.

**Figure 9: Quantity of Mayonnaise sold to Daily Freeze during the years of 2012 to 2014**



There was an increase in demand from the years of 2012 to 2013, but after there was a decrease in 2014. The reason for the decrease is that they started to purchase more products, from Delice Vert during the years and they had less need for Mayonnaise

**Figure 10: Quantity of Mayonnaise sold to the other small companies during the years of 2012 to 2014**



Demand has increased every year. The reason is that Delice Vert has gained smaller clientele during the years and the total of the orders increased during the time.

In general, we could see that demand increase during the years for both Tzatziki and Mayonnaise, the two main products produced by Delice Vert. This shows that our data includes a positive trend pattern. We realise that demand is at its lowest at the beginning of the month and increases during the following months, reaching its peak during the end of the month. This, on the other hand, shows that our data also includes seasonality.

## 2.8. Forecast Winters method

In this section, we will try to forecast the monthly demand for the year of 2015. We will use the data collected from the years of 2012 to 2014 to forecast as best as possible the demand that Delice Vert will incur during the year of 2015. As the previous data has indicated to us, we find

seasonality and trend in our data, because of that, we will use Minitab and apply the Winters Forecasting method. In order to calculate the forecast of winters method, we use the formula below, but by using Minitab, the program calculates for us directly.

$$L_t = \alpha \frac{Y_t}{S_{t-s}} + (1 - \alpha)(L_{t-1} + T_{t-1}) \tag{1}$$

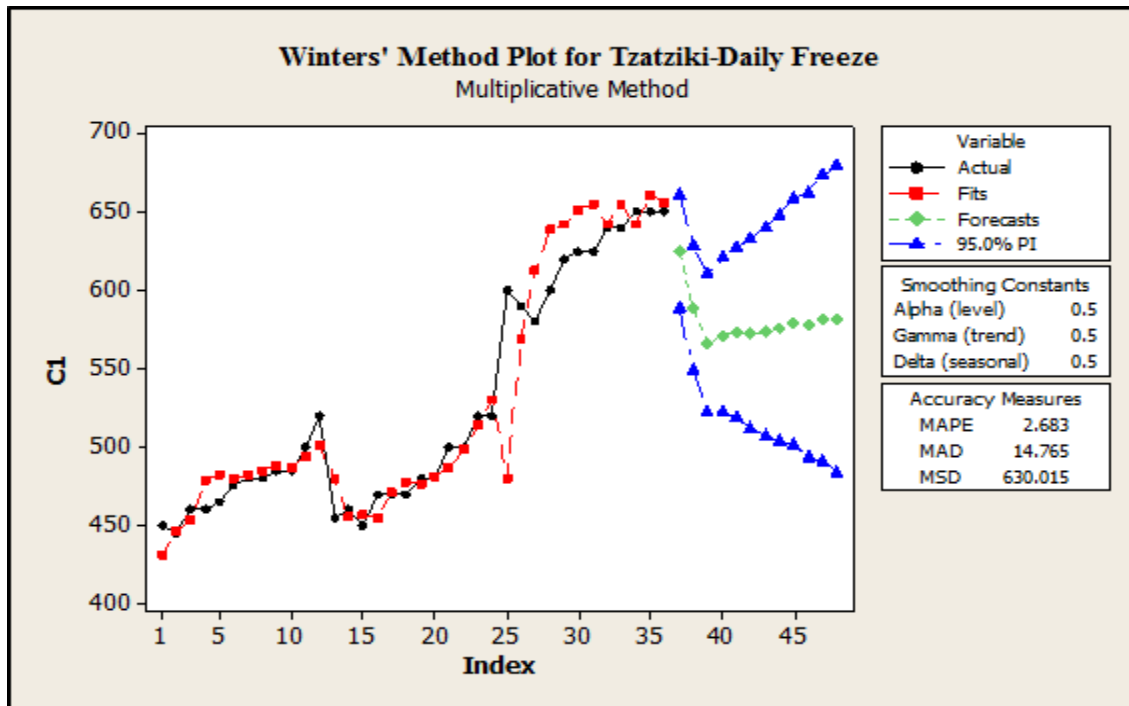
$$T_t = \beta(L_t - L_{t-1}) + (1 - \beta)T_{t-1} \tag{2}$$

$$S_t = \gamma \frac{Y_t}{L_t} + (1 - \gamma)S_{t-s} \tag{3}$$

$$\widehat{Y}_{t+p} = (L_t + pT_t)S_{t-s+p} \tag{4}$$

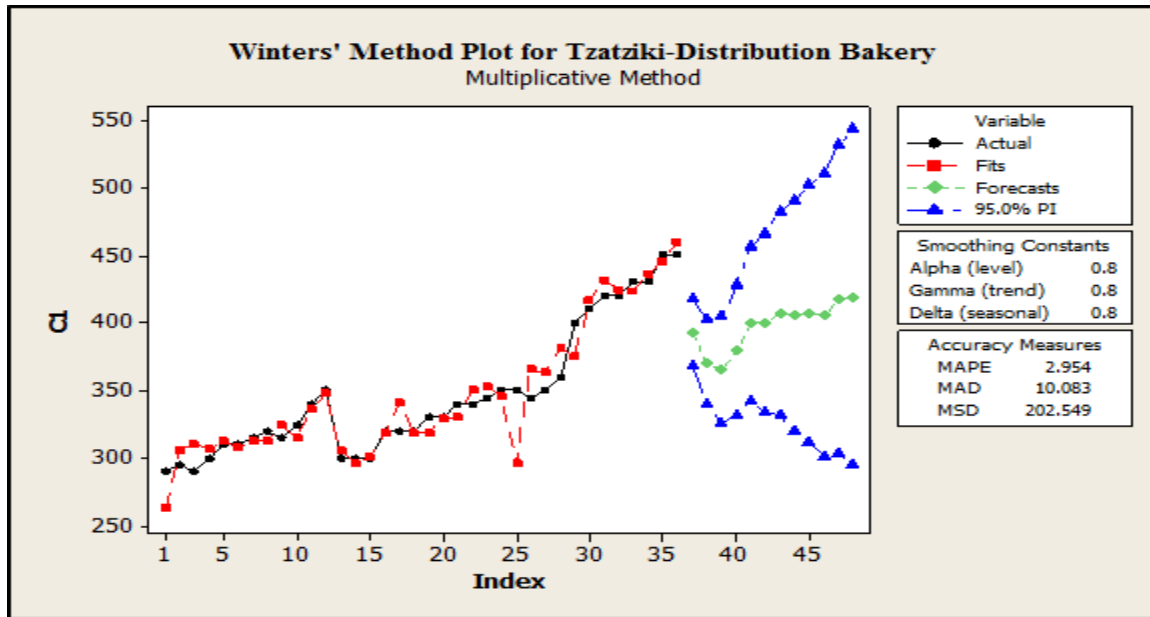
Before we start to calculate the forecast for p periods in the future, equation 4, we need to estimate the current level of the equation, equation 1 and then we estimate the trend and seasonality, equations 2 and 3. In equations 1 to 3 ( $\alpha$ ,  $\beta$  and  $\gamma$ ) are smoothing constants, located between 0 and 1. In equation 1,  $Y_t$  represents the actual value of the series in period t and finally in equation 4, p represents the periods to be forecast in the future and s, the length of seasonality.

**Figure 11: Winters' Method plot for quantity sold of Tzatziki to Daily Freeze**



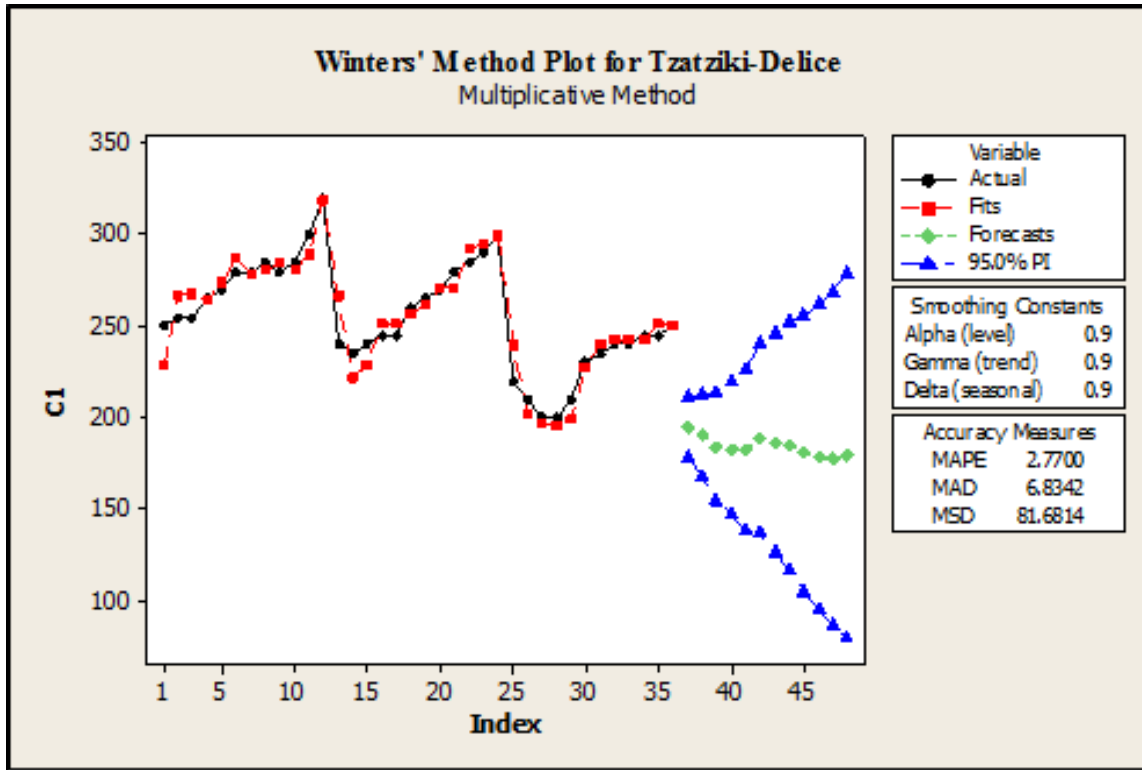
We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.5 we have the lowest MAPE, 2.7, giving us a more accurate result.

**Figure 12: Winters' Method plot for quantity sold of Tzatziki to Distribution Bakery**



We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.8 we have the lowest MAPE, 2.95, giving us a more accurate result.

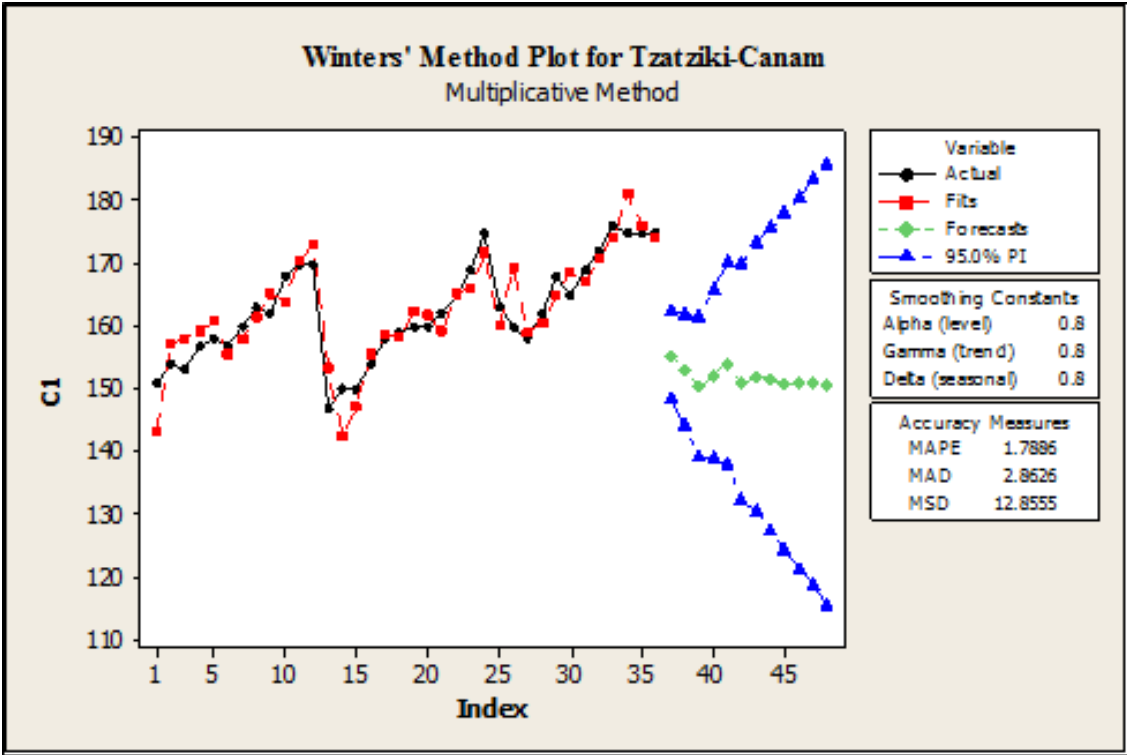
Figure 13: Winters' Method plot for quantity sold of Tzatziki to Delice



We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.9 we have the lowest MAPE, 2.77, giving us a more accurate result.

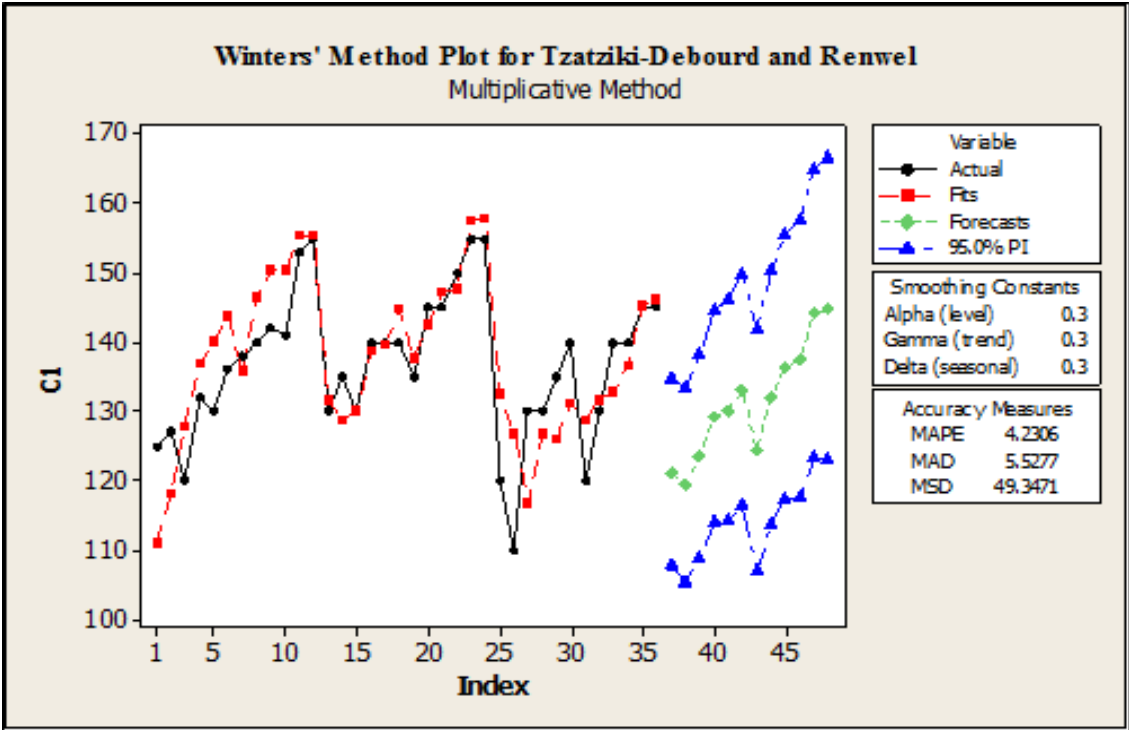


Figure 14: Winters' Method plot for quantity sold of Tzatziki to Canam



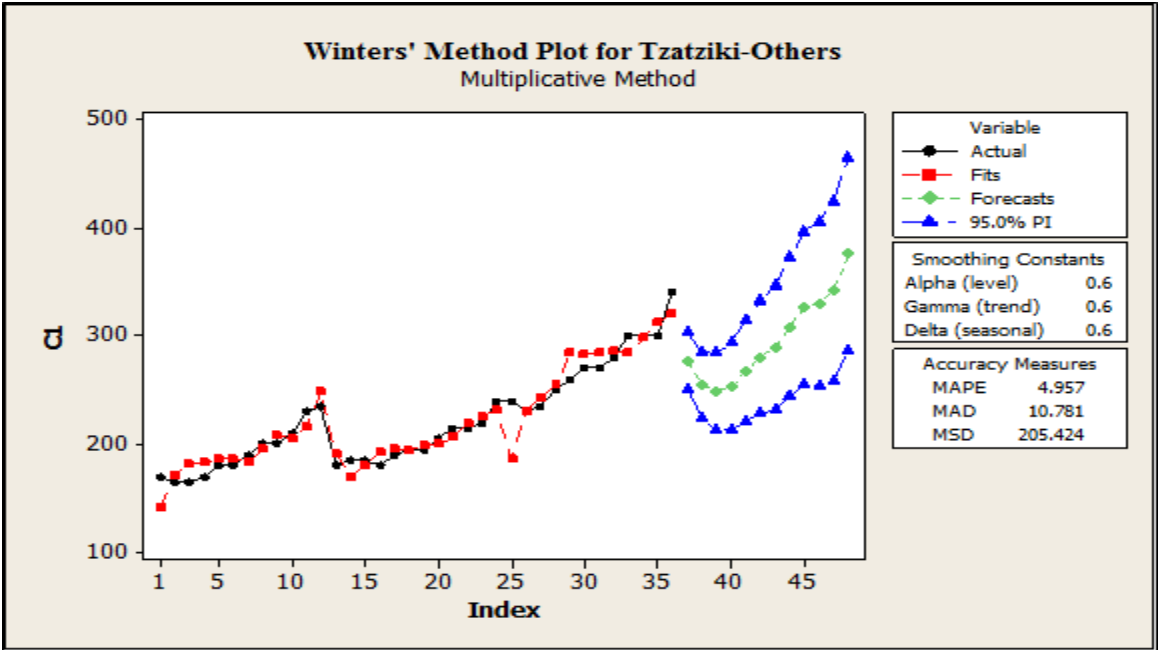
We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.8 we have the lowest MAPE, 1.78, giving us a more accurate result.

**Figure 15: Winters' Method plot for quantity sold of Tzatziki to Debouard and Renwel**



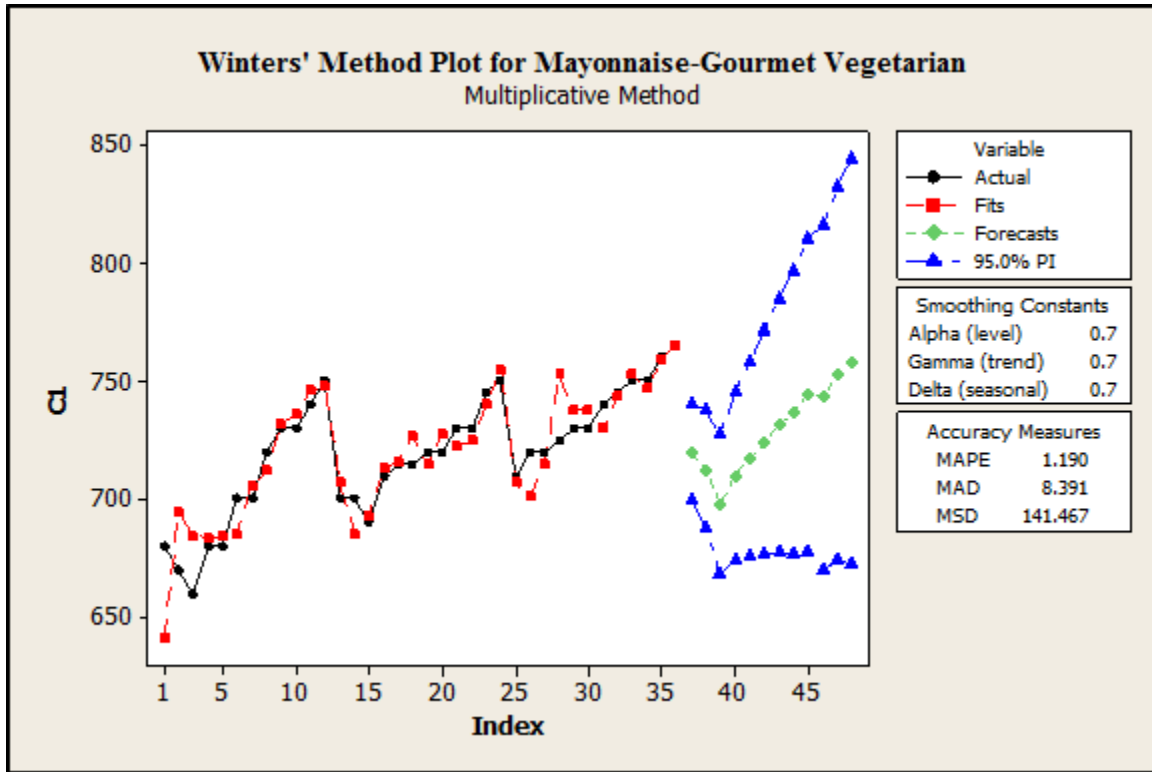
We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.3 we have the lowest MAPE, 4.23, giving us a more accurate result.

Figure 16: Winters' Method plot for quantity sold of Tzatziki to other small companies



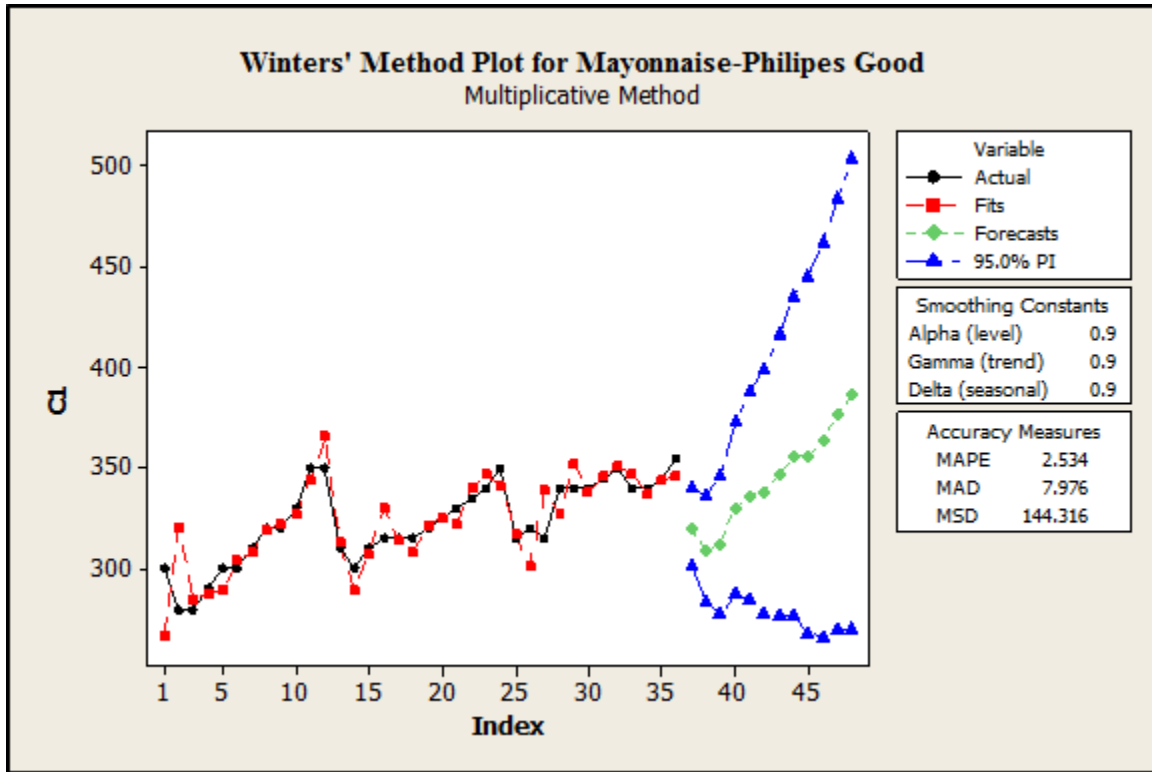
We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.6 we have the lowest MAPE, 4.96, giving us a more accurate result.

**Figure 17: Winters' Method plot for quantity sold of Mayonnaise to Gourmet Vegetarian**



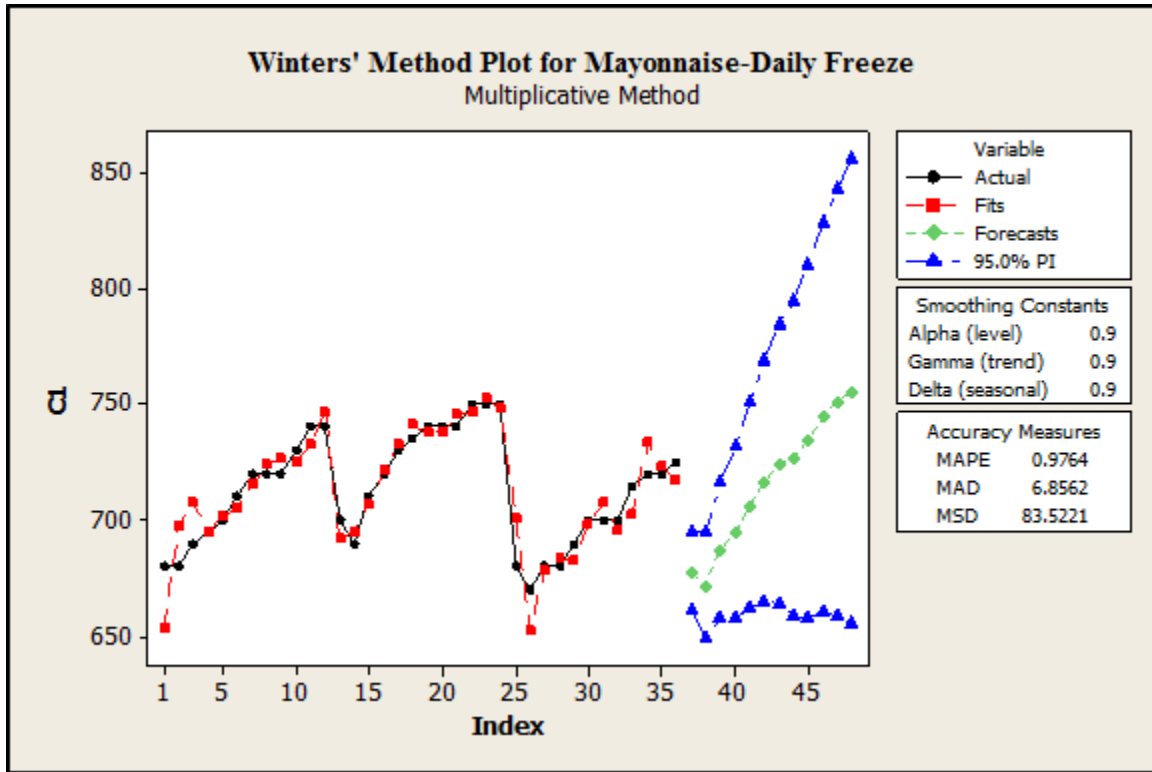
We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.7 we have the lowest MAPE, 1.19, giving us a more accurate result.

**Figure 18: Winters' Method plot for quantity sold of Mayonnaise to Philipes Good**



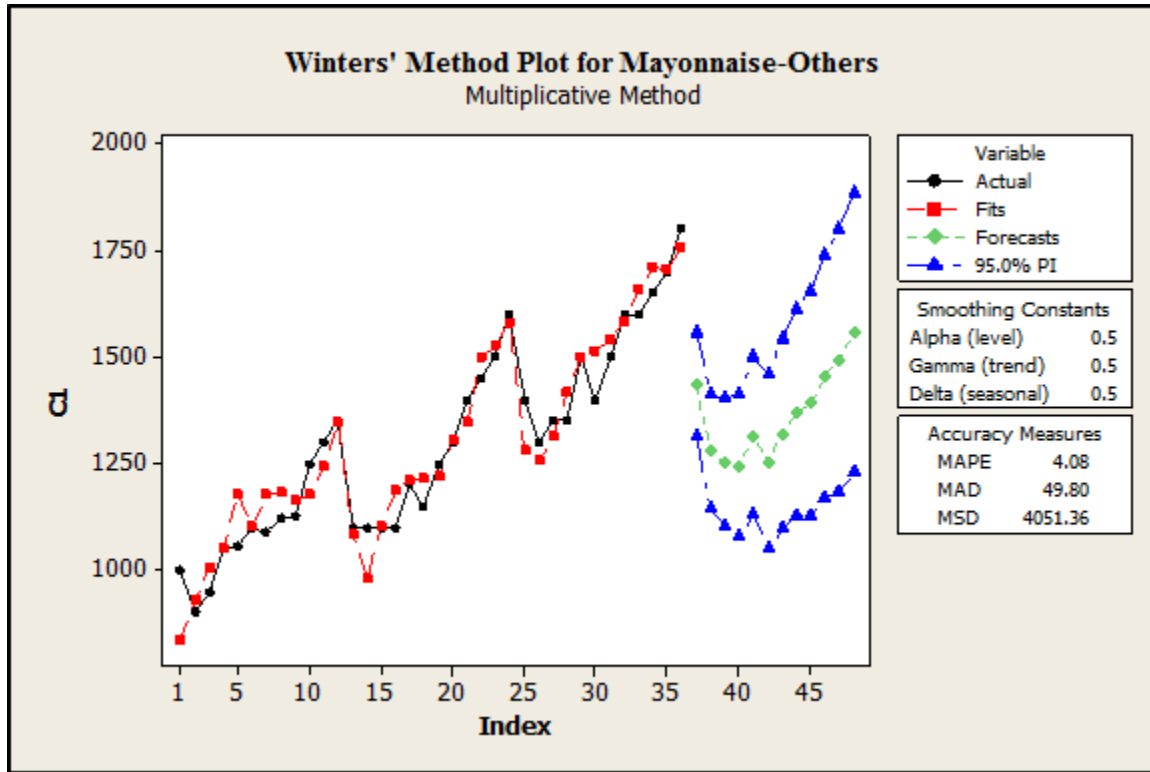
We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.9 we have the lowest MAPE, 2.53, giving us a more accurate result.

**Figure 19: Winters' Method plot for quantity sold of Mayonnaise to Daily Freeze**



We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.9 we have the lowest MAPE, 0.98, giving us a more accurate result.

**Figure 20: Winters' Method plot for quantity sold of Mayonnaise to other small companies**



We have used the data collected in the years of 2012 to 2014 in order to find the most accurate monthly demand for 2015. We found that with smoothing constants of 0.5 we have the lowest MAPE, 4.08, giving us a more accurate result.

We have used the Winters Method in order to better predict future monthly demand for Delice Vert A class products. For every product, we have a MAPE value of five or lower, in order to have a more representative result. The Winters Method was not applied for the sale of Tzatziki, for Adonis, because during the mid-year of 2014, sells stopped completely, making us unable to compute any future sales demand.

In order to test the performance of Winters Method in forecasting, we collected monthly sales data during 2015, as actual data. We used the forecast values generated by Winters Method. In the table below, we summarize average MAPE values for our A class products for each company.

**Table 10: Average MAPE for A class products**

Company	A class Product	Average MAPE
Daily Freeze	Tzatziki	1.57
Distribution Bakery	Tzatziki	7.83
Delice	Tzatziki	5.11
Canam	Tzatziki	2.50
Debourd and Renwel	Tzatziki	6.74
Others	Tzatziki	5.81
Gourmet Vegetarian	Mayonnaise	2.12
Philipes Good	Mayonnaise	1.44
Others	Mayonnaise	7.42

As we see in the table above, the MAPE for all A class product is lower than 8%, and the total average MAPE is 4.5%. This lets us assume that our forecasting method is accurate and should be used for further years. In our table, we did not include Daily Freeze demand for Mayonnaise because during the year of 2015, they stopped ordering Mayonnaise from Delice Vert. This situation, which is a random or unidentifiable effect, makes us unable to apply this method to generate forecast. We also find a discrepancy between few of the different companies MAPE values. Some of the companies have values between 1 and 2%, while the others have a value between 5 to 8%. This is a big gap between the companies. One of the reasons that could explain this situation is the fact that most of these companies are also considered small companies and they also do not need keep clear records of their inventories and sales, which has for result an increase in the MAPE value.

## **2.9. Findings and Discussion**

In this section, our main findings will be discussed and interpreted based on studies that was done previously and different types of literature. We are going to compare the literature that was gathered previously with the data we have collected and analyzed in order to better discuss the meaning of our findings and how should Delice Vert respond to such findings.



From the data collected for this study, the data leads us to suggest that since the inception of Delice Vert, sales and demand have been steady over the years. There are many reasons why we are able to conclude such statement, which will be discussed further in this chapter.

In order to come to this conclusion, hypothesis need to be used as a base and based on those hypotheses, we would be able to identify which type of data will be needed. According to the 6<sup>th</sup> edition of the education research book, published by Gall, in 1996, in order to do an objective report, quantitative data must be used in the research, which is the type of data which was gathered for this research. In order to have quantitative data, hypothesis must be adapted accordingly.

There are many ways to gather quantitative data, which is a social representation of the company. You could gather the data by conducting interviews, questionnaire or direct observation. Each one of them has advantages and disadvantages, and one must be chosen which best fit the study. A questionnaire is the most inexpensive way to gather data and is easily accessible to a large sample. This method was not used mainly because we only have two people working in the company, we do not have a large sample and also because if the participants do not understand the questions properly, they will not be able to give an accurate answer, falsifying the data. A direct observation could also be done where we observe activities in their natural settings. This method would have allowed us to have the most accurate results, but it was not done because it is time consuming and it would have been impossible to do because the company is based in Canada and the main researcher is based in Turkey. For these reasons, interviews were conducted. An interview over skype was conducted with the employees of Delice Vert. the reason why the interview was done over skype was that the interviewer was not located in Canada, when the interview must have taken place. Some question where already predetermined, while some where asked spontaneously, depending on the answers that where given by the employees. This allowed us to gather accurate data while better understanding the company dynamics. This interview method is the best method suited for this study according to McLeod, as mentioned in his article, The Interview Method, if a structure interview was conducted, a global understanding of the company will be impossible as the interviewer would not be able to deviate from the questions, which where scripted beforehand. In the unstructured interview, data

will be better represented as it will be adapted to the responded, but it will be a challenge to classify and interpret them later in the study.

There was no mistake during the data collection phase because the interviewer had prior experience collecting and conducting interviews. He also read Guzman's, Data recording and processing book in order to avoid interview mistakes and have accurate and unbiased data, giving validity to the study.

This study had some advantages, similar to what we found in Yauch and Steudel book, Complementary Use of Qualitative and Quantitative Cultural Assessment Methods, because it was an quantitative study, data was gathered quickly and we were able to put them into different groups, allowing us to see the similarities and discrepancies, which in turn helped us formulating different hypothesis. Biases may occur according to Dudwick, which is explained in his article, Analyzing Social Capital in Context: A Guide to Using Qualitative Methods and Data. According to him, in order to avoid such biases, we need to collect a large pool of data, allowing us to eliminate outliers, but this was not the case for this study. The reason why a large pool of data was not collected was because there was not a large pool in this study to start with and because of that we could assume that the data is bias, but the chances of that happening are low because the researcher tried to eliminate all factors that could lead to any biasness. After creating the hypothesis, gathering the data, overcoming limitation, time came to analyze the data. Descriptive statics was done for the average price and quantities of each product and companies. This test was done to see the main differences between each group, during the years of 2012 to 2014. An Anova and correlation hypothesis was also conducted to have a deeper understanding between the products and the companies, during the years of 2012 to 2014. An ABC model was conducted to find the most important items sold by Delice Vert. Tzatziki and Mayonnaise where the two main products sold by Delice Vert and because of such, a further examination of those two products where done. The amount of Tzatziki and Mayonnaise sold to each individual company was examined during the years of 2012 to 2014 and Winters Forecasting Method was applied in order to predict the amount that Delice Vert will sell during the year of 2015.

After doing a descriptive statistic, different hypothesis testing and Winters Forecasting Method, for most of the products and companies, we were able to conclude that Delice Vert has a steady demand. Even the forecast predicts a steady demand during the year of 2015. The only

discrepancy that is observable is when a company stops purchasing from Delice Vert. the one company that had a big impact on Delice Vert was Adonis because they order a large quantity of Tzatziki every month and during the middle of 2014, they stopped ordering from Delice Vert. This had a major impact on sales for the company, but the damage was not catastrophic because they started ordering again they started to order again during the year of 2015.

Steady demand is good because managers know what to expect and the task that they need to accomplish, that is why lead time is always between 2 to 3 days, but this situation is good only for the short term. If the company does not start to grow, the probability of failure increases. According to Leenders article Purchasing and supply management, effective management must be present in order to grow and be more profitable. In Phillips and Kirchhoff's study conducted in 1989, Formation, growth and survival; small firm dynamics in the U.S. economy, they report that if a company does not grow, they have a 66.3% more chance of failure than the companies that do. As we see from the data collected this is not the case of Delice Vert. Measures must take place in order to prevent failure.

One of the advantages of being in the food manufacturing sector is the fact that the processed food are less susceptible to early spoilage, they have longer shelf lives. This allows the company that produces such product to sell it to consumers that do not operate in a near proximity. As Laudan mentions in his article, In Praise of Fast Food, the different nutritional factors that process food brings to the consumer and the ability to produce large quantities of food for a cheaper prices gives food manufacturing around the world an advantage. Delice Vert, being located in Canada, near the American market has an advantage that is not taken by the managers as they only serve consumers that are located in a near proximity. If Delice Vert finds big companies in America that would be interested into purchasing their A class products, they could not only increase their revenue, but also be able to decrease their raw material cost as they will purchase in large quantities. The reason why this avenue was never explored is because the owners are not comfortable with change as Wiklund and Shepherd mention in their journal aspiring for, and achieving growth: The moderating role of resources and opportunities. The managers see they are doing well and they do not want to add on more work. They also do not want to risk losing what they already have for a strategy that is not sure to work. That is why they are not trying to grow, which could slowly lead them to their failure.

The other avenue Delice Vert should consider taking is to get a loan, which should be used to grow the company. Howorth, Peel and Wilson mention in an examination of the factors associated with bank switching in the U.K, which is the reason why companies do not take advantages of financial services provided by the government is because of their lack of information. After talking with the managers of Delice Vert, we could quickly understand that they do not possess much knowledge of the different programs that the government has in place to help them expand. They choose a bank based on proximity and not their specific needs. By simply having a good relationship with you bank allows you to have better interests rate and have the opportunity to get other advantages presented to you according to Berger and Udells article, relationship lending and lines of credit in small firm finance. Another aspect that needs to be addressed is the balance sheet. In order to get a financial investment from the bank you have to provide them with a proper balance sheet. At the start of this research, the financial data of Delice Vert had no order; it took time to sort all the data into proper groups and tables. If this situation is not addressed, according to Ang's small business uniqueness and the theory of financial management article, any financial service will be inaccessible because the situation will be hard to analyses and it will not fulfill the criteria's that are in place.

If Delice Vert hopes to survive and grow at the same time, they are unable to continue in this situation. Change must take place. These are a few changes that could be established in the near future, which do not require much time. These changes could also be examined in future studies. See how it will affect the company in the positive and negative ways.

## **2.10. Limitations to the study**

The major limitation of this study was not having the researcher in the same country as the managers of Delice Vert, while having a 7h time difference was hard for both parties to communicate. It took lots of time and effort to find time that was acceptable for both parties in order to communicate. When the manager did not know about certain information's, he had to go and find it, wish usually takes time. This situation is not problematic on its own, but being in a different country, with a 7h time difference, made the process even longer and the research could not start without those key information's. The other limitation of the study was that data was not

properly recorded. Getting the exact amounts of sells for each company was not properly written and because of such, some assumptions about the data must have been made.

## **2.11. Conclusion and Suggestions**

In conclusion, this thesis investigated how the utilization of data could help understand the supply chain system of the company. Data collection is an integral part of any business. With the advancement of technology and the increase in competition, worldwide, businesses need to adapt and react quickly to every changes and treats. The main reasons why larger enterprises succeed and keep on growing is because they allocate resource and time to data analysis, which help them better understand their consumers and market. By better understand their surroundings, they are able to deploy more efficient strategies and changes according to their present and future needs. Most of the small business do not use their data because it is costly and time consuming. While most of the business will not even keep their data ordinated, the ones that do, may not possess the knowledge to utilize the data properly. Small businesses tend to do the minimum in order to avoid legal repercussions. If small business owner could understand the advantages of data utilization, their chances of failure will diminish and they may aspire to be a large enterprise, in the future.

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