



ΔΙΑΤΜΗΜΑΤΙΚΟ ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ
ΣΠΟΥΔΩΝ ΣΤΗ ΔΙΟΙΚΗΣΗ ΕΠΙΧΕΙΡΗΣΕΩΝ

Διπλωματική Εργασία/ Master Thesis

**IDENTIFICATION OF CRITICAL SUCCESS FACTORS AND EXPECTED
PERFORMANCE MEASURES OF SUSTAINABLE SUPPLY CHAIN
MANAGEMENT**

by

KONSTANTINOS ALAFOGIANNIS

This dissertation is submitted as part of the requirement for the award
of the
MSc In Business Administration

August 2017

Acknowledgements

I would like to express my gratitude to my professor Gkatzamani Katerina, for her guidance during my diploma thesis. Additionally, I would like to thank my family and friends for the support and understanding that have provided during all these months.

Abstract

Supply Chain Management is a relatively new and promising field of science, it has an excessive effect on the productivity of modern enterprises and the wider assurance of quality processes in the highly competitive environment of modern entrepreneurship. Its dissemination is mainly due to its particularly important results, firstly the direction of minimizing the cost of business and in the direction of optimal co-ordination of supplier-related business processes and their distributors. With the complete application of this management, the customer finds the product at the right time, in the right quality and quantity and at the most appropriate price, effectively reducing all those factors that increase the cost of the product.

Supply Chain Management Systems are featured in modern business in various forms, from designing production to transporting the product to the final consumer. This diversity often confuses a multitude of businesses that, while they are interested in implementing such methodologies and innovations, ultimately follow erroneous implementation practices.

The aim of this report is to investigate the field of critical success factors (CSFs) towards to sustainable supply chain management implementations. Thus, it is provided a profound literature review, targeting the CSF for this purpose. Moreover, the data analysis section of this paper, is based on the results given by the questionnaire method. In order to define the critical success factors that Greek companies comply with, a questionnaire has been conducted and answered by many Greek companies that represent different sectors.

Keywords: Performance Measurement; Sustainable Supply Chain Management, Social Performance Measurement. Critical Success Factors

TABLE OF CONTENTS

Introduction.....	6
Chapter 1	7
1.1 Supply Chain – Definition.....	7
1.2 Supply Chain Management.....	7
1.2.1 The Concept of the Supply Chain Management (SCM).....	8
1.3 Sustainable Supply Chain Management	9
<i>Chapter 2</i>	10
Literature Review – Sustainable Supply Chain Performance Measurement (SSCPM) .	10
2.1 Social Sustainable Supply Chain Management Performance	14
<i>Chapter 3</i>	15
3.1 Barriers and Enablers for Sustainable Supply Chain Management.....	15
3.2 Factors and Indicators in the Sustainable supply Chain performance measurement	16
<i>Chapter 4</i>	20
Sustainable supply chain performance management measurement systems.....	20
4.1 Performance Measurement Systems in the SSC	22
4.2 The Balanced Scorecard	Σφάλμα! Δεν έχει οριστεί σελιδοδείκτης.
4.3 EFQM Excellence Model Analysis	Σφάλμα! Δεν έχει οριστεί σελιδοδείκτης. 4
4.4 SCOR Model Analysis	Σφάλμα! Δεν έχει οριστεί σελιδοδείκτης. 6
<i>Chapter 5</i>	27
Critical Success Factors (CFS).....	27
<i>Chapter 6</i>	29
Methodology of the Research.....	29
6.1 Questionnaire Method	30
<i>Chapter 7</i>	33
7.1 Data Analysis – Results	33
Conclusion.....	4746
References	4747

Index of Figures

Figure 1. Sustainable Supply Chain Management	9
Figure 2. Sustainable Supply Chain	10
Figure 3. Sustainable Supply Chain Metrics	18
Figure 4. Framework – Measurements in SSCM	19
Figure 5. The Stages of the Performance System in the Supply Chain.....	21
Figure 6. Research Methods	31
Figure 7. In which geographical region is your company based?	32
Figure 8. When was your business established?	33
Figure 9. How many employees does your business employ?	33
Figure 10. What is the legal form of your company?	34
Figure 11. Is the perception of Sustainable SCM (SSCM) to be considered as a strategic business by your company?	35
Figure 12. Is there any obvious relationship between Economic subjects and Sustainable SCM (SSCM)/Corporate Social Responsibility (CSR) at your company?	36
Figure 13. Is Corporate Responsibility visible in every day corporate operations? 35	
Figure 14. Does your company create higher profits as a tangible payback from the adoption of SSCM?	37
Figure 15. Does your company create higher income as a tangible payback from the adoption of SSCM?	37
Figure 16. Does your company increase employees' motivation as an intangible payback from the adoption of SSCM?	38
Figure 17. Does your company grow employees' constancy as an intangible payback from the adoption of SSCM	38
Figure 18. Do you believe that "planning" is a Critical Success Factor for SSCM?40	
Figure 19. Do you believe that "corporate culture" is a Critical Success Factor for SSCM?	40
Figure 20. Do you believe that "corporate ethics" is a Critical Success Factor for SSCM?	41
Figure 21. Do you believe that "innovation" is a Critical Success Factor for SSCM?.....	42

Figure 22. Do you believe that "research & development" is a Critical Success Factor for SSCM?	42
Figure 23. Do you believe that "organizational strategy" is a Critical Success Factor for SSCM?	43
Figure 24. Do you believe that "human resource operations" is a Critical Success Factor for SSCM?	44
Figure 25. Do you believe that "information technology" is a Critical Success Factor for SSCM?	44
Figure 26. Do you believe that "communication & collaboration" is a Critical Success Factor for SSCM?	45

Index of Tables

Table 1. Indicators for Economic and Environmental SCM	12
Table 2. Framework of Measures for Social SSCPM.....	14

Introduction

All business sectors, whether they are based in Greece or in the rest of world, are characterized by constant and lasting changes, influencing each time the decision making process for optimal production. What every business is interested in, regardless of its size, is the optimization of production operations and, in general, all internal operations. The natural consequence is the development of the scientific field of optimal and flexible operation of enterprises with the help of the supply chain management, (Aly et al, 1997). The development of the supply chain is a relatively new field of development and study, and its applications attract more and more companies.

The main goal of every business, is to make huge profit spending the lowest cost as possible. Additionally, the implementation of the supply chain management is a competitive advantage amongst firms as it is a major factor in the design of its business strategy. The optimal application of the supply chain management is, also, the critical factor in the economic performance of the business. In addition, the operation of the supply chain could be considered successful for an enterprise in the case, it manages to combine and smoothly coordinate all business processes, (Douglas, 2004). At this point, it should be mentioned that the operating procedures include human capital, machinery, and business leadership, internal and external environment of the company.

The performance measures are crucial and helpful tools in the procedure of sustainable supply chain management. It is a matter of big importance, for a company to have a good knowledge of its economic, environmental and social surrounding and impact in order to ensure the viability of its prosperity and its existence. Additionally, every company is striving to operate in a sustainable manner considering the restrictions and the opportunities that are given for each company sector, (Shepherd and Günter, 2006).

Moreover, the target of the performance management in the supply chain sustainability, is to generate the desired results eliminating the conflicts and the costs, (Carter, Rogers, 2008). The results of the supply chain management must include the function of the company, the suppliers, the customers and the service providers.

The aim of this project is to find out the critical success factors for implementing the strategy of SSCM. In order to accomplish this target, it is necessary to define the appropriate indicators which can measure the sustainability of the supply chain of companies in the Greek market. There is an attempt to identify the relationship between

the social and the environmental dimensions of the sustainability that may occur in the Greek companies. This research investigates the existence of main key sustainable factors, based on the information provided by Greek companies that accepted to disclose such piece of information and how their daily operations might have been affected. The questions were formulated by those key success factors that include corporate culture & ethics, innovation, research & development, information technology and human resource operations.

What is more, there are important requirements for the optimal performance measurement in the supply chain management such as the thorough knowledge of the value and the necessity of measurement in the strategic framework and the creation of a calculated strategy of supply chain management risk, (Seuring et al, 2013).

Chapter 1

1.1 Supply Chain - Definition

The definition of the Supply Chain could be described as the network that connects a company with its suppliers to produce and distribute a product or a service. At the final step, the supply chain describes the procedure that the product or the service finally, arrives to the customer. Those networks are made of cooperative components and organizations which they work together in order to control, manage and finally, improve the flow of materials and information from the suppliers to the final users, (Beamon, 1999b). A network may include vendors, intermediaries Warehouses, Third Party Logistics (3PL), distribution centers and of course the customers. At this point, we have to underscore the fact that a Supply Chain could also be described as a Demand Chain, as it depends on the needs and demands of the customers, (Beamon, Ware, 1998).

1.2 Supply Chain Management

Supply Chain Management is a relatively new but promising field of expertise in the science of the logistics. It has a great impact on the efficiency of the current business sectors, providing a larger assurance of quality process among the wider competitive environment in the today's companies. Its large impact is mainly because of its

important methods and results in the aspect of minimizing the costs in the production procedure, scrutinizing the inventory methods, as well as the best coordination of the process between distributors and suppliers, (Ahi, Searcy, 2013). Having the optimal implementation of the SCM, the customers have the chance to buy the products in the best price at the right time, quality and of course, quantity.

Supply Chain Management systems can be applied in many forms, such as product design and product transportation the final costumers. Because of the big variety of those systems, many companies chose the wrong implementation practices producing non expected results. So the implementation and the optimal use of a SCM system which allows the company to enhance the productive procedure, is a crucial strategic decision that goes beyond the traditional methods of manufacturing and distribution resource planning, (Aly, 1997).

1.2.1 The Concept of the Supply Chain Management (SCM)

The need of an effective supply method is not a new issue as all the years that well established companies were seeking for the best value productivity. This matter is related to the purpose of reducing the cost of the products and the services as the markets became more and more competitive and compelling. Supply Chain Management (SCM), embodies all the management and planning procedures that are related to logistic, supply and demand management, (Handfield, & Nichols, 1998). It also evolves the optimal collaboration among the suppliers, channel partners, third party service providers and consumers.

There are many functions and activities that SCM systems integrate and below are being described some of the most important ones.

- a. The most important function is the provision of information, as the entity is able to have instant access to the information from the supplier to the costumer without having any misinterpretations. Modern technology delivers those opportunities and methods so the company can achieve a better and calculated decision as far as the productivity is regarded.
- b. With the help of the informational systems, companies can evaluate and enhance the service level of the consuming according to their capabilities.

- c. The cost of transportation has always been a crucial issue that SCM is trying to address and then give efficient methods and solutions. The planning of the channel transportation is very important as it affects the costs and the profits of every company.
- d. Inventory management requires well planned decisions as it is very important for a company to maintain the right amount of stocks in relation to the consumer demands. The maintenance if the inventory could be very costly for the companies and could affect their productivity, in the case that SCM fail its purpose.
- e. SCM also affects the product management as its purpose is to minimize the cost of productivity using special equipment and services.
- f. Another issue that is affected by SCM is the packaging of the product as its transportation may require special marketing strategy that should be considered.
- g. There is another operational matter such returning product policy that has immediate relation to the SCM.

1.3 Sustainable Supply Chain Management

Supply chain sustainability could be described as the environmental, economic and social management during the process of the productivity of goods and services implementing good practices. The target of supply chain sustainability is to generate economic growth along with protecting social and environmental values.

In addition, the role of Sustainable Supply Chain is to make sure that the companies follow the regulations and the laws related to the international principles during the product or service conduction, (Schaltegger, Burritt, 2014). The pillars that such sustainability is consisted of are economic background, society and of course environment, in other words profit, people and planet.

Figure 1. Sustainable Supply Chain Management



Source : 2008 Supply Chain Monitor

Nowadays, many companies acknowledge the fact that they cope with many disadvantages in their supply chain sustainability procedures due to the fact that of the complexity of the sustainable frame in their supply chain management. Companies which belong to the same sector face common difficulties and challenges in the sustainability, (Schaltegger & Burritt, 2014). Many leading companies though, are trying to identify and surmount those challenges using the tools of the SCM.

Figure 2. Sustainable Supply Chain



Source: Supply chain sustainability: A Practical Guide for Continuous Improvement

Chapter 2

Literature Review – Sustainable Supply Chain Performance Measurement (SSCPM)

Performance measurement has widened its field of research into the SCM sector as long as it is needed for the business management strategy. Hence, the performance measures of a company are including the performance measures of supply chain. However, the procedure of this performance evaluation has never been simple and easy to be achieved, due to the fact that choosing the right and most appropriate performance measures is a tough decision to be made because of the system complication, (Aly, 1997). In contrast, choosing the efficient financial performance measure for a company is not always a matter of high complexity.

The definition of performance measurement given by Beamon et al. (1999b), states that the performance measures are those procedures that quantify the efficiency and the success of strategy. This strategy, though, is more complicated when it has to deal with SSCM because it has to be analyzed in three dimensions such as environmental, economic and social. Therefore, the companies need to examine SSCPM in all dimension, so they can have a clear view of the firms' performances.

In general, there is a big number of studies that explore the field of SSPM. Handfield, R.B. and Nichols, E.L. (1998), have made research in performance measures for SSCM, concluding that there are many difficulties in the development of efficient measures that could be applied for a big range of companies. They also added to this conclusion, that some measurements are not fully compatible with internal organizational management, due to the fact that there are many environmental measures and it is difficult for a company to decide which one would be suitable and how to make the best usage of them. Additionally, there are many third parties which are included in a supply chain, so there is a necessity for different arrangements on what kind of data should be used for the companies that follow different performance management strategies, so the measurement processes should be specified and uniquely applied, (Carter & Rogers, 2008).

The authors Beske, Johnson, Schaltegger, (2015), suggest that companies, in order to surpass the difficulties and challenges mentioned above should apply factors and indicators for each supply chain partner. Those factors should measure the environmental, economic and social performance of the partners' performance target point of view. The next step is for every party to compose a supply chain indicator that concludes each parties' internal sub indicators. What described above, is not a simple procedure, as a matter of fact, it is of crucial importance the development and the application of efficient indicators for each dimension of sustainability suited to each supply chain partner, (Fynes, & Voss, & Burca, 2004). It is a common truth that there are no many things yet to be told about suitable management and measurements methods for sustainable performance in supply chain management.

Moreover, Schaltegger, Burritt, (2014), state that little has been written about the measures of sustainable performance in supply chain management. Most researchers focused on environmental and economic aspects of the matter, while social dimension is hard to be analyzed and product safe conclusions as to how it can be measured and improved for the prosperity of the company. In addition, Ahi, Searcy (2013), did a survey on sustainable performance measures in supply chain, marking the fact that there is a big discrepancy on how the performance should be defined in sustainable aspect of SCM. In accordance to the paper of Beamon et al, (1999b), there is an excessive amount of research that address the environmental and economic aspects, but there are only a few that develop up to a point the social issue.

What is more, Searcy (2013), refers to the economic performance metrics as the traditional performance measurements, containing the most known and useful indicators for this dimension, such as, cost, quality, speed and flexibility, adding the terms of innovation and time. The indicators of the environmental dimension are not common for every company as it is described by Beamon et al, (1999b), but they can be categorized in energy use, gas emissions, energy consumption, air emissions, water consumption, recycling, carbon footprint and life cycle assessment.

Table 1. Indicators for Economic and Environmental SCM

Authors	Indicators for Economic SCM Performance	Indicators for Environmental SCM Performance
Beske, Johnson, Schaltegger, (2015),	Quality, Speed, Innovation	Natural Resources, Energy Consumption, Water Quality
Schaltegger & Burritt, (2014)	Cost, Delivery, Quality	Recycling, Environmental Management, Reverse Logistics
Beamon et al, (1999b)	Cost, Gross Domestic Product, Growth, Labor Productivity, Economic Development, Growth Rate	Renewable Energy Sources, Water and Energy Consumption
Ahi & Searcy (2013)	Quality, Innovation, Flexibility, Time	Environmental Management, Air Emissions, Carbon Footprint

Source: Global Logistics: New Directions in Supply Chain Management

The literature review indicates that mostly researches remained concentrated on the study of the economic (traditional) and environmental factors and indicators of the SSCM performance, (Beske, Johnson, Schaltegger, 2015). As it is shown, economic SSCM performance indicators focus on green product materials, environmentally friendly packaging, and waste production per unit, energy that is required per product, waste and energy emissions and waste production per product output, (Shepherd, Günter, 2006).

2.1 Social Sustainable Supply Chain Management Performance

Social performance measurement could be perceived as the measure of social topics that draw the concern of society in general. Although it has been acknowledged its value in SSCM performance, its implementation is very difficult to be achieved. Furthermore, all the social indicators cannot be appropriate in the entire supply chain. It is also mentioned that, the characteristics of social factors tend not to be objective, so they might not be considered reliable to those related the supply chain performance procedure, (Hassini, Surti and Searcy, 2012).

The social factors could also be described as the stages of the procedure that have impact in the human welfare and the community prosperity. Some of those stages of the operation are safety practices, health incidents and economic growth, (Fynes, Voss and Burca, 2004).

As it is presented in the research of Ahi and Searcy (2015c), each dimension (environmental, economic and social) has an instant relation to all partners of the supply chain. In the below Table 2. It is attempted to show the effect of the performance measurements on the related partners.

Table 2. Framework of Measures for Social SSCPM

	Supplier	Employee	Company	Customer	Society
Environmental	Waste Production per Product	Environmental Social Alarms			
Economic	Returning Customers Ratio	Turnover per Year	Returning Customers Ratio	Sales	Macroeconomic Development
Social	Training Time per Employee	Training Time per Employee	Training Time per Employee	After Sales Services	Social Complaints per cent of Employment

Source: Ahi, P., Searcy, C. (2013), A comparative literature analysis of definitions for green and sustainable supply chain management

Chapter 3

3.1 Barriers and Enablers for Sustainable Supply Chain Management

The activities in sustainable supply chain can generate multiple merits such as cost saving because of the minimized cost of packaging, improved working conditions, reduced labor costs, better quality for the products or the services and of course, reduced safety costs. On the other hand, many barriers and obstacles can be addressed, in the process of the SSCM implementation in the companies, (Kanji & Wong, 2002). Those barriers and enablers can be classified in the internal and the external environment of the companies.

The internal barriers could be distinguished to its extremely high costs, inadequate or absent communication within the supply chain. Additionally, many companies could still use old fashioned accounting models and methods in measuring the performance management. It is also important for the managers to be trained and well educated in such a system, so they can comprehend the necessity of how to embody the sustainability in the SCM. Another barrier could be the size of the company (usually small), which in many cases do not claim a corporate structure and management commitment.

Barriers could also be present in the external environment of the companies. Those barriers could possibly be rooted in the lack of supply chain management. There can also be massive competition in the market and therefor, the customers may choose products and services of lower prices. Another crucial barrier is the frame of regulations that the government shapes. In many industries, there is no clear legislative framework, (Balbastre, and Moreno-Luzo, 2003).

The enablers or the drivers of SSCM in the internal environment could include the education and the training of the managers and the employees. The performance management includes reporting, evaluating and analyzing the risk management along with the implemented corporate strategy. Another enabler is the size of the firms, usually big companies can have large sources of funding. What is more, the sources of information and communication could be well advanced that can help the internal supply chain practices.

The external drivers could be the regulatory framework, the commitment of the investors, the choice of the customers, the level of the competition, the collaboration with all the third parties and the existence and the pressure of the Non-Governmental Organizations towards the companies, (Hassini, Surti and Searcy, 2012).

Undeniably, performance measurement of sustainability alongside the supply chain of a company, is vital in order to collect data related to its performance and the effect in its sustainability. Moreover, Douglas (2004), proposes that corporations with a strict reporting and monitoring method in their supply chain, are expected to have performance advantages along with a better commitment from the investors.

3.2 Factors and Indicators in the Sustainable supply Chain performance measurement

Since the last decades, the importance of the performance measurement and management has been notably increased, due to the pursuit of low product cost and huge profits. The tools to measure the performance could be divided between indicators and factors/metrics. Metrics tools measure the quantitative effect in the performance, while the indicators calculates the qualitative performance, (Bai and Sarkis, 2014). In order to enhance the effectiveness of the company's performance process is to use the suitable measurement ways. Measurement is a significant part of any management procedure and forms the foundation for constant development. Evaluating safety performance is equal and successfully doing so will add the accomplishment of your advanced efforts, (Ashby, Leat and Hudson-Smith, 2012). Lagging and leading indicator measures can be helpful in the calculation procedure of the company's performance.

Lagging indicators are the customary safety metrics used to point out improvement along with compliance to the safety guidelines. Those indicators can predict how many people can be harmed and in which extent during the production line in the future and allow to the manager to decide which action must be detained in order to avoid such incidents.

Additionally, a leading indicator can be used to predict a future incident and at the same time can calculate the actions that must be taken to prevent and control the possible

damage. These leading measures, practical estimate and report what the employees are doing in order to avoid harmful events.

However, there is a wide spread theory that insists that the companies cannot rely on absolute and comparative metrics and indicators, for the matters that concern the sustainability, due to the fact that those factors are not directly attached to the sustainability context that the firms provide, (Gunasekaran, Patel and McGaughey, 2004).

For the reason above, the most useful practice for measuring the effects are the lagging indicators which focus on past events in order to predict the future ones. In fact, most Sustainable Supply Chain Management Performance measures, adhere to quantitative and absolute reports. At this point, however, needs to be noted that no type or category of metrics and indicators should be ignored, so the company can use results of better quality, on the basis of taking operational decisions.

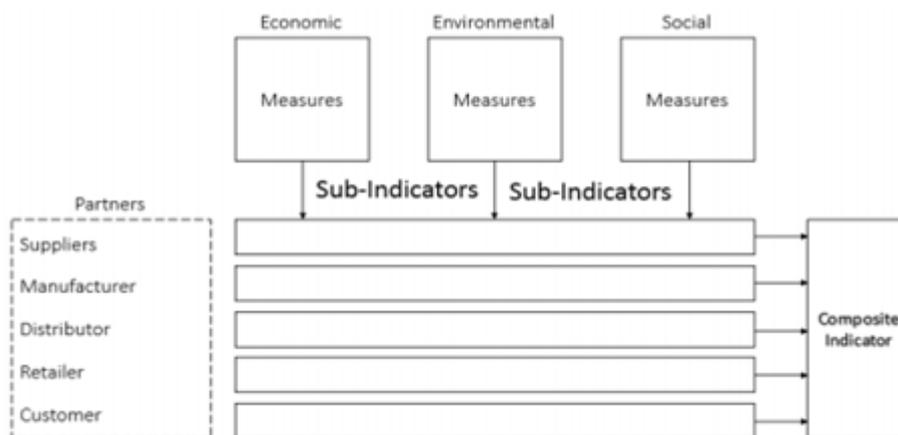
It is widely accepted the fact that the organization face many difficulties considering on the set of metrics and indicators that should be implemented measuring SSCM performance. Moreover, there should be an agreement on the case between the shareholders and all the partner, on which source data specific metrics are going to be applied, (Schaltegger and Burritt, 2014). Another difficulty that should be surmounted is dealing with the existing traditional production measures that have intra-organizational purpose, while the supply chain measures' purpose is more inter-organizational. In addition, economic and social measures impose compliance to certain set of regulations, while environmental measures are difficult to be adapted, in the process of the supply chain. Finally, according to Carter and Rogers (2014), indicators and metrics should be chosen regarding the sustainability supply chain strategy of the companies' that are involved in the same supply chain. It is conceivable that such target is usually difficult to be succeed.

Another sustainable supply chain measure tool is ISO 14031, which is a set of rubrics and guidelines estimating environmental metric results and can be implemented in any kind of company sector. It also gives a rubric of environmental performance evaluation, but it does not provide any consideration on economic and social aspect, stepping aside any performance aspect. It is also suggested, that the companies should choose measurements from Eco Management and Audit Scheme, which is a European environmental audit and performance management system that provides company evaluation according to the environmental plan, (Searcy, 2013).

Moreover, the Global Reporting Initiative (non-profit organization), recommends and suggests sustainability framework for the companies, including in their annual report sustainability in their supply chain. Nevertheless, those guidelines are hard to comply by the firms due to the high complexity in the sustainable supply chain management performance that every company applies, (Hassini, Surti and Searcy, 2012).

Another suggestion concerning the strategies in SSCMP is the efficiency approach, which suggests to diminish waste production along with the decrease of resources consumption in every level of the supply chain. Ratios are useful metric tools that evaluate the product of the carbon footprint, the product of energy consumption, the product of material concentration, etc. In addition, the sufficiency approach describes the absence of the products in order to eliminate the effect on the supply chain. What is more, the consistency approach recommends that unsustainable products should be replaced with sustainable ones, using the proportion of renewable energies that are being used in the process of supply chain, (Schaltegger and Burritt, 2014). All those approaches and strategies should be implemented and combined together. In the below Figure 3. it is presented the effort developing metrics, indicators and sub-indicators in order to serve the purpose of the approaches combination according the three dimensions environmental, economic and social.

Figure 3. Sustainable Supply Chain Metrics

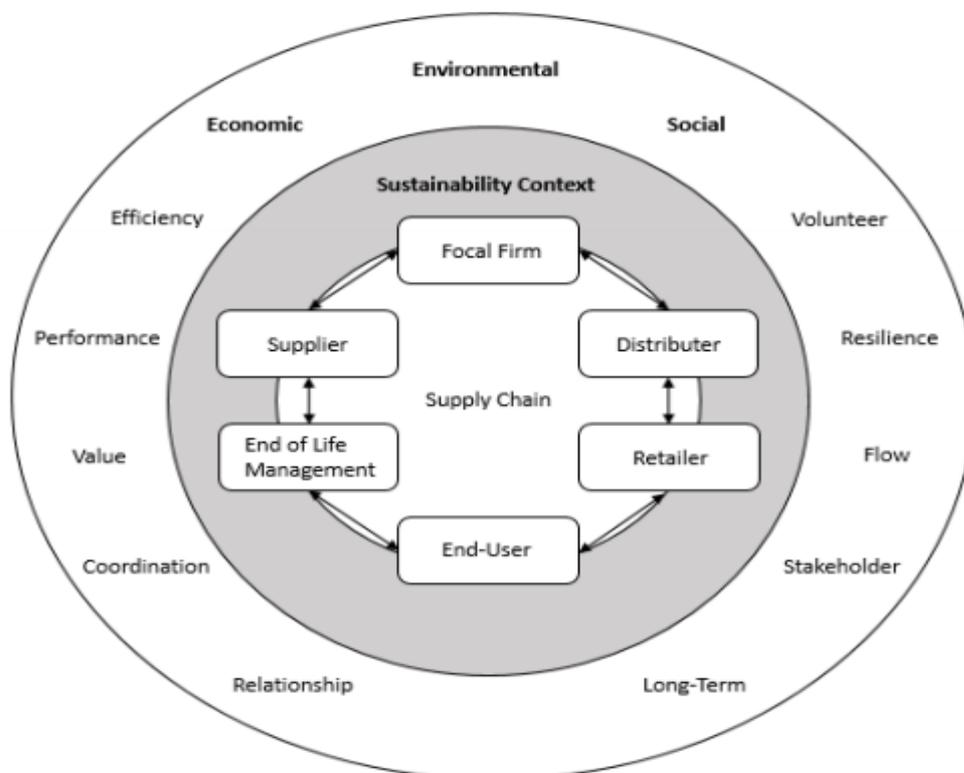


Source: Schaltegger, S., Burritt, R. (2014). Measuring and managing sustainability performance of supply chains: Review and sustainability supply chain management framework. Supply Chain Management.

In the economic dimension the efficiency can be estimated with the inventory level, the total logistic costs, the asset returns and the value added productivity. The quality can be measured with the help of customer satisfaction, on-time delivery and product availability. Furthermore, in the environmental dimension, the emissions can be calculated the reduction of carbon emission (in %). Waste and recycling can be measured by the use of packaging recyclable and the reduction of the product damage. As far as the natural resources are concerned, they can be estimated by the declining of water utilisation per warehouse. Finally, in the social dimension, the performance of the employees can be measured by the numbers of jobs that are created, the number of employees that are trained to use system technology and the number of jobs that are reduced.

The metrics of Sustainable Supply Chain Management Performance are the combination of all parties that are involved in the process of the supply chain, containing not only the three dimensions (the Triple Bottom Line), but also other sub-categories of the product procedure. The Figure 4 below demonstrates the framework for measuring the performance in SSCM.

Figure 4. Framework – Measurements in SSCM



Source: Supply chain sustainability: A Practical Guide for Continuous Improvement

Chapter 4

Sustainable supply chain performance management measurement systems

Performance management and measurement systems stand in the basic level of operational strategy in almost every company. The implementation of those measures and systems, provides to the companies the opportunity to assess the success, possible problems and malfunctions, customer needs, product procedure and trace possibilities and chance of improvement.

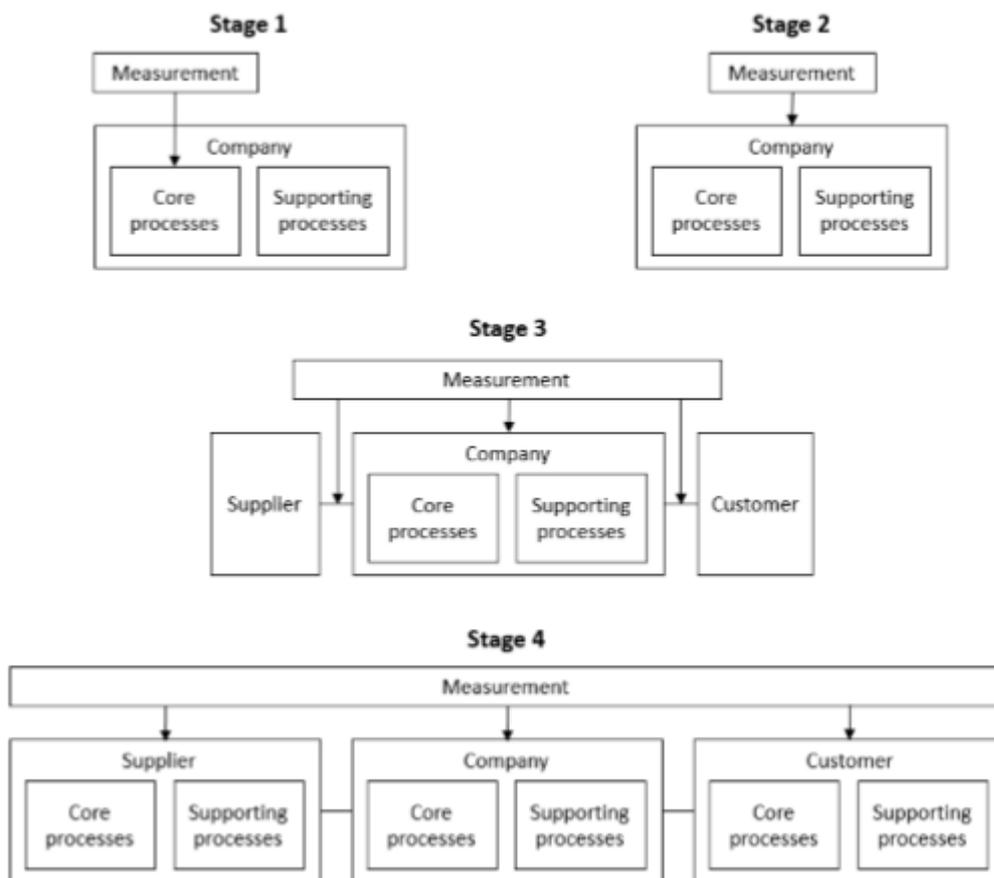
There are two categories of performance management systems, the traditional and the innovative systems. In the first category, the traditional systems are based on monitoring and cost efficiency. On the other hand, the recent systems include innovative methods of valuation based on non-cost measures. Another differentiation is that innovative performance management systems offer long term orientation strategy view, while the traditional ones can only be helpful for short term view, (Fynes, Voss and Burca, 2004). Moreover, the traditional systems focus on profit orientation using individual and functional measures. On the contrary, innovative performance management system demonstrate client orientation values, team measures along with control improvements and generate compatibility of the performances.

The distinctive characteristics of an effective system must include the inclusiveness, which certifies that all performance systems are part of the supply chain in the company. Universality ensures the appraisal under several operating conditions. Another crucial characteristic is the measurability of the data the company decides to use and evaluate. Additionally, the consistency of the systems guarantees that the company's objectives and strategies are reliable and steady. Nonetheless, there are more enhanced characteristics that are also highly acclaimed and provide insurance in the assessment process of the supply chain performance measurement systems and strategies, (Ashby, Leat and Hudson-Smith, 2012). The systems must be comprehensive to the involved partners, as the stakeholders' goals and views need to be served. Another objective is that the selected performances systems need to be casually and currently oriented, so it can predict and evaluate future performances based on up to date data and not on historical events. Casually orientation, also, provides and ensures long term results and targets. Generally, the performance systems must be accepted and comprehended by all the parties involved, so the managers can use in a profitable way the merits of those system. It is also very important for a performance system to contain all the functions of

the process across the entire sustainable supply chain. However, those systems are characterized as systems of high complexity and they are not used and implemented in the proper way, (Cetinkaya et al., 2011).

Many attempts have been made in order to be created an effective performance measurement system compatible with the supply chain management that each company operates with. The Figure 5. below, demonstrates the stages and the levels of the process.

Figure 5. The Stages of the Performance System in the Supply Chain



Source: Cetinkaya et al., 2011

As we can see from the stages above, in the first stage there is only core process, which usually small companies make. Medium sized companies also measure the supporting

process, as it is shown in the second stage. In the third stage, companies take into consideration in the measurement system, the closest parties of their supply chain. The performances of the customers' and the suppliers' are included. In the final stage, the selected system develops dynamic measurements that contain all the supply chain management process, from the first raw material used to the final point of customer performance.

4.1 Performance Measurement Systems in the SSC

There is no extensive research in the field of performance measurement systems in the sustainable supply chain that include all the three dimensions of the Triple Bottom Line, (Searcy, 2013). However, there are many considerable advantages using the framework of the three dimensions in designing a performance measurement system that evaluates the sustainable supply chain.

- There is not only a financial evaluation, but also provides an external aspect of the company's environment.
- Takes into consideration long time periods of performance, as sustainability needs long term evaluation.
- There is control and reduce of the risk management
- Problems and mistakes can be traced in the process of the supply chain
- Endures the training of the parties involved and that promotes the objectives of the shareholders
- There is a well formed channel of information across the company that relates the employees to the procedure of the supply chain and make them part of this procedure as they have an impact on the process.
- There is interaction between the company and the NGOs that allows better communication and operation

- There is assessment and evaluation of the external indicators that originate in different sources of the supply chain
- There is reevaluation of the traditional measurement systems and trace any flaws.
- There is normalization of the performance measures with all parties involved of the supply chain in order to have reliability between the administrations
- There is the permission and the chance for a company to compare its performance to the performance of the leading firm of the sector industry. Nevertheless, such execution must be taken very carefully, as the indicators and the factors the effect one company may be vary from another company even in the same field of industry.

According to the above framework, many performance measurement systems have been created in the purpose to evaluate the sustainable supply chain's performance. Most of them include the sustainability dimensions. AFNOR FD X50-605 is a developed method that asses the logistic targets of the company using strategic data rooted in the competitive and comparative advantages of the entity. Another model is SCM/SME which evaluates the distribution, the productivity, the cash flows, the shares and the returns of the company. EFQM Excellence Model Analysis is suitable in the evaluation of the sustainable supply chain procedure as well as the SCOR Model Analysis and the Balanced Scorecard which are going to be investigated further.

4.2 The Balanced Scorecard

Kaplan and Norton, (1992), created a performance management tool, the balanced scorecard that very soon was applied in the companies as at the same time it was widely accepted in the academic society too. Nowadays, the Balanced Scorecard has been used in many operations not only in the Supply Chain Management, but also in the SSCM. The main characteristic of this tool is that its' target is to provide a more comprehensive aspect to the managers by adding financial metrics with complementary measures that

calculate performance in field like customer satisfaction and product innovation, (Kanji and Wong , 2002).

The Balanced Scorecard method studies performance from four perspectives:

- A. The Financial analysis is consisted of performance measures such as return on investment, operating income and sales growth.
- B. The Customer analysis and perspective, focuses on the customer needs and satisfaction, (e.g. quality, service, price, etc.). The purpose if the customer analysis is to convert the aims and the targets of the company to the needs and objectives of the consumers.
- C. The Internal analysis interprets the consumers' requirements according to the internal procedures in order the satisfaction the customers gain from the product or the service to be upgraded.
- D. The learning and growth analysis evaluates the employee satisfaction and loyalty, as well as the internal process and the information system performance.

Furtherly, the Balanced Scorecard could be applied in the SSCM as long as three criteria are observed. The first condition is to integrate the environmental and the social dimension into the framework of the companies' objectives. In this case, the company manages the Sustainable Supply Chain regarding the strategy that has been applied, focusing on the cost control, empowering the dynamic of the company in a more defensive way.

The second one, suggests the creation of an originated Balanced Scorecard, connected directly on the matters of sustainability, but in this case the tool is not related to all the economic activities of the company, pointing only the environmental and social aspects. In other words, there is no relation to the generation of profits. The final condition states the importance of the environmental and social dimensions within the organizational strategy, but there is a discrepancy if the results of the measure are reliable or not, (Mitra and Bagchi, 2008).

In the purpose of creating a useful Balanced Scorecard, there are some issues and matters that have to be addressed. There must be a framework of the definition of the SSCM strategy and the role within the economic planning. At the same time, the environmental and social aspects must be acknowledged and described. Moreover, there has to be at some point, a consideration of all the sustainability issues along the applied strategy, (Gunasekaran, Patel and McGaughey, 2004). Finally, there has

to be a specific definition of the metrics and the indicators that are used along with the definition of the cause-effect relationship.

4.3 EFQM Excellence Model Analysis

The EFQM Excellence Model contains a flexible non-rigid excellence framework for the companies for their management strategy, established by the European Foundation for Quality Management (EFQM), in order to promote the competitiveness among the organizations. Thus, this Excellence Model can fit to any kind of size, sector and structure of a company, while it promotes the optimal planning for every organization, to locate, understand and solve its weaknesses. At the same time, this model set the frame for a successful and appropriate strategic management.

The EFQM Model offers a framework permitting companies to define their present level of excellence and what kind of efforts must be taken to improve their position. This model also supports the firms to certify that strategic decisions include the requirements of all shareholders and are affiliated with the company's goals. Additionally, the EFQM Model can be a mutual benchmark for the managers. It also integrates a frame of performance metric tools in the purpose of achieving and maintain the company's objectives and goals. Furthermore, EFQM Excellence Model is frequently appraised to integrate innovative concepts. Moreover, the EFQM Excellence Model is applied to get a wide-ranging assessment of the structural performance and to comprehend the associations of cause and effects among what companies achieve and the outcomes they accomplish.

What is more, the EFQM Excellence Model is consisted by three (3) components. The first component includes critical management principles that lead manager to successful planning. Those principles are the agility within management, the creation of a sustainable environment, the development of the company's capability, the creation of a target and inspiration, the creativity and innovation, the value of the customers; satisfaction, the discovery of the abilities of the employees and the achievement of greater performance and results.

The second component is divided into Drivers and Results. The Drivers are: the employees, the leadership, the management strategy, the products and services, the resources and finally the procedures. In addition, the Results can also be the people,

the customers, the society and the performance outcomes. The third component assess the performance results as part of the management strategy. It sets the framework of the designed methods in order to deliver the targeted results not only for the current time, but for the future too. It sets the foundation of the approaches in a systematic method in order to certify the execution. Finally, there is the assessment and the improvement of the components in the grounds of analyzing the performance results and the continuing training and researching.

Furtherly, the EFQM Excellence Model is used by many organizations and companies across the world, targeting the enhanced performance results, both in private and public sectors. The intense competition among the companies pushes this model to create innovative solutions in order to maintain the prosperity and secure the portion of the market of every company.

4.4 SCOR Model Analysis

The SCOR Model Analysis, (Supply Chain Operation Reference Model), has been designed by the Supply Chain Council Inc. which is a non-profit organization, providing consulting programs and solutions to the companies. The distinct characteristic of this model is the simplicity that can offer on the grounds of the terminology. SCOR Model can offer a structure for supply chain development, from the improvement of the operational policy to the execution of innovative management strategies. It also defines the procedures of the company that are related to the satisfaction of the customers' demand. The structure of this model includes the source, plan, deliver and return, while at the same time it investigates the present position of the company's targets and objectives along with the benchmarks of the sector of the business. The SCOR Model Analysis is based on the performance measurements, the process modeling, the best practices and skills.

As it is mentioned above, the SCOR Model includes several management procedures, such as source which is linked to the actual demand of products and services. The plan contains all the processes that cover the customer demand and supply. The deliver and return pillars contain the distribution management of the finished products and the customer support in the post deliver procedure.

What is more, the SCOR Model is consisted of several key factors and indicators that can calculate the performance of the supply chain management. Those indicators are classified in three levels. The first level contains the factors that are used in the measurement of the performance of the supply chain of the company. The second level is consisted be the indicators that measure the SCOR procedure across the supply chain. The last level may not be in correlation with all the indicators of the previous levels, but deliver undependable metrics as far as the supply chain performance is concerned. The characteristics above give an actual aspect of the supply chain performance and its strategies.

Chapter 5

Critical Success Factors (CFS)

Critical Success Factors are mostly applied in the field of management researches concerning not only in operational and organizational management, but in supply chain management too. The identification of the CSFs can be utilized in the future development and research in the performance of the organizations, depending on the systems and practices the companies use, (Zou, Kumaraswamy, Chung, and Wong, 2014). It is widely accepted the fact that, the CSFs must have a common definition among the partners involved across the supply chain, in order to achieve performance development. There are several definitions of the CFS, the most acknowledged is that the results of the CSFs demonstrate an effective performance strategy for the companies involved. CSFs are usually applied in the Supply Chain Management (SCM) as much as in Sustainable Supply Chain Management (SSCM). Some well-known CSFs are:

- ✓ Planning
- ✓ Culture
- ✓ Innovation
- ✓ Research
- ✓ Development
- ✓ Organizational strategy

- ✓ Employee training and authorization
- ✓ Human resources management
- ✓ Information technology
- ✓ Service and product quality
- ✓ Improvement
- ✓ Communication
- ✓ Collaboration
- ✓ Management strategy
- ✓ Ethics
- ✓ Value

All the CSFs mentioned above, are applied in several sectors in various industries and can be a helpful tool for the organizational managers to empower the companies' strategic and competitive advantage. CSFs are in every level of the company structure so it is comparative the exploration and the investigation of every existing factor. On the other hand, the existence of an excessive number of such factors may lead in misjudged results and erroneous decisions, (Svensson, 2007).

In addition, the CSFs must be related to the SSCM and the Triple Line Bottom dimensions in order to be useful in the long term prosperity and viability of the company. Nevertheless, all the CSFs are not connected to each dimension (economic, environment and social), so a critical success factor, in the purpose of being included in the SSCM, must affect all the three dimensions in accordance to their features, (Mitra, and Bagchi, 2008). Hence, specification of sustainable critical success factors in the supply chain management allows firms to implement the sustainability.

Moreover, there should be consideration on the critical factors of sustainability on the base of the management system of a company. As a matter of fact, specific factors can lead to the set targets of the organization. Therefore, the American Institute of Chemical Engineers has created factors of sustainability that are connected to the strategic management, (Seuring, 2013). The commitment to the sustainability is one of them while environmental activity and social attachment include the emissions, the use of sustainable resources, stakeholders' responsibility and community ethics. Additionally, there is the factor that describes the safety along the production process. Another one is the degree of innovation as far as the sustainability is regarded. The last factor defines the actual value of the supply chain management that reaches the standards of customers' and suppliers', (Schaltegger and Burritt, 2014).

Meanwhile, it is stated that that such a constructive inventiveness could associate with organizations together continuously to advance the performance in health, protection and environment and improve the communication with investors about the environmental procedures and products. Generally, the sector of industries initiative is supportive to create credibility in company responsibility for industrial corporations, (Hassini, Surti and Searcy, 2012). Furthermore, there is a new platform in the European Union, Reach (EC2007), which is responsible on manufacturing to guarantee the analysis of the risk management of all chemicals. Particularly, it generally emphasizes on the environmental and the human health matters of sustainability.

As far as the CSFs are concerned, there are certain activities in which the management of every company should pay thoroughly and persistent attention. For the present and the future success of a company, the executive managers track the valuable information from the reports of the current operating activities that their results describe in order to figure out the desirable solutions, (Richey, Roath, Whipple and Fawcett, 2010). As it is mentioned above, the CSFs are designed to provide and enhance the strategic planning along with the environmental analysis report.

Furthermore, the use of the CFSs is very popular for classifying the critical subjects during the implementation of the strategic planning, while at the same time, the CSFs are useful in making an improved resource allocation, in accordance with the company's activities and visuals. Nevertheless, there is a big discrepancy regarding the level of implementation of the CSFs, due to the fact that they may not reproduce the real situation and therefore, may be biased, (Zou, Kumaraswamy, Chung, and Wong, 2014). Even though, the CSFs describe in a big portion the actual issues and position, the level of the engagement of the managers is what makes the CSFs more reliable.

At first, the purpose of the CSFs was to be a productive tool in the field of planning the management information system of a firm. The progress that has been made, though, helped in the evolutionary application of the CSFs in the fields of human resource management, internet marketing, environmental management, outsource operation management, public governance and in the education systems, (Gunasekaran Patel and McGaughey, 2004). Those sectors are extremely important, so CSFs are crucial areas of activities in the SCM, which must obtain continuous and cautious thoughtfulness by managers, as they will define the district line between success and failure.

Chapter 6

Methodology of the Research

In the previous sections, it has been discussed the framework of the SSCM. Furtherly, there will be investigation over the issues on how SSCM must be applied in an effective way, how the connection between the SCM and the sustainability has to be estimated and therefore, the critical factors for applying the SSCM should be addressed. The above questions have partly been approached with the help of the related Literature Review.

6.1 Questionnaire Method

As it is reported, there are three types of research in the methodology, the quantitative, the qualitative and the mixed methods. Many authors have stated the opinion that both qualitative and quantitative methods should not be considered as processes that deliver entirely different results, but those results must be correlated with each other in order to promote a reliable conclusion.

In this research, the instrument of gathering a wide variety of data collection is the questionnaire. This method is the most appropriate for this survey for the simple reason that is very practical. Indeed, large amounts of information can be congregated from a great number of people in a short period of time. Additionally, it is a relatively cost-efficient tool. Using questionnaire to outsource data information can be executed by the researcher/author with minimum affect to its reliability and validity, (Hughes J. and Ackroyd, 1981). The answers of the questionnaire can be easily and quickly grouped and use them through a software package (in this case it is used the Excel). In addition, the structure of the questions can be focused on the specific subject that has been studied. The answers and the results can be objectively interpreted. Furthermore, once the data have been quantified they could be compared and contrasted to other research results. What is more, the quantitative methods are used in the purpose of explaining, describing and articulating the quality results of a research. Quantitative methods' target is to explain and clarify the models and the patterns.

Based the analysis of the research approaches it is realized that there is no wrong neither correct research approach. Due to the nature of the subject, and especially because of the academic base, I adopted the quantitative methodology.

For the purposes of the survey, primary data was collected through a questionnaire. The questionnaire is a tool for obtaining primary data through oral, written or electronic sources to the sample (Grove, Gray & Burns, 2015). The main advantage of the questionnaire tool is the low cost coupled with the speed of gathering the answers.

In the present study, a questionnaire of closed responses was selected using the five-level Likert bipolar scale provided by Remenyi (2013). The advantage of the Likert scale is that it is bipolar (the answers include both agreement and disagreement) while supporting closed questions, making it possible for the response process to be more efficiently and standardized. Regarding the four questions concerning the identity of the sample, the use of multiple choice questions was adopted for the same purposes as the Likert scale.

Queries 1 through 3 are based on a corresponding qualitative research study in the form of a case study, by Yingli & Heshan (2014). Questions 4 to 16 are then based on the bibliographic review and more specifically by Zou, Kumaraswamy, Chung & Wong, (2014). Finally, questions 17 to 20 concern the demographic part of the questionnaire.

In order to have a quick and easy approach to the sample, modern technology was used. Specifically, the questionnaire was prepared in electronic form and continued on-line through the application of Google forms so that the sample can be answered easily and directly from anywhere via an internet access device and the responses are recorded directly on an electronic database. It is immediately pumped in an excel file. Respondents were informed by telephone and sent them the necessary interface via e-mail to access the questionnaire. The form of the questionnaire can be find in the Appendix 1 in the page 49.

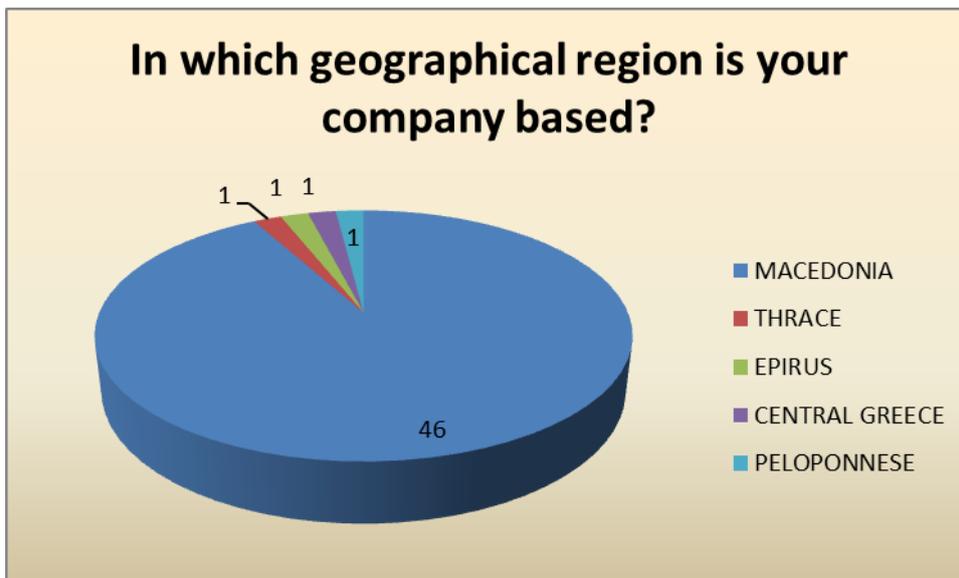
The questionnaire was uploaded on the internet, so the companies could directly respond to the questions. The companies that took part, were Greek companies from different sectors and sizes. In fact, the questionnaire was sent in 65 companies, but only 50 actually responded. So, the response rate was approximately 70%. The answers were delivered either by employees who work in the financial departments of their companies or by the owners of the companies.

Chapter 7

7.1 Data Analysis – Results

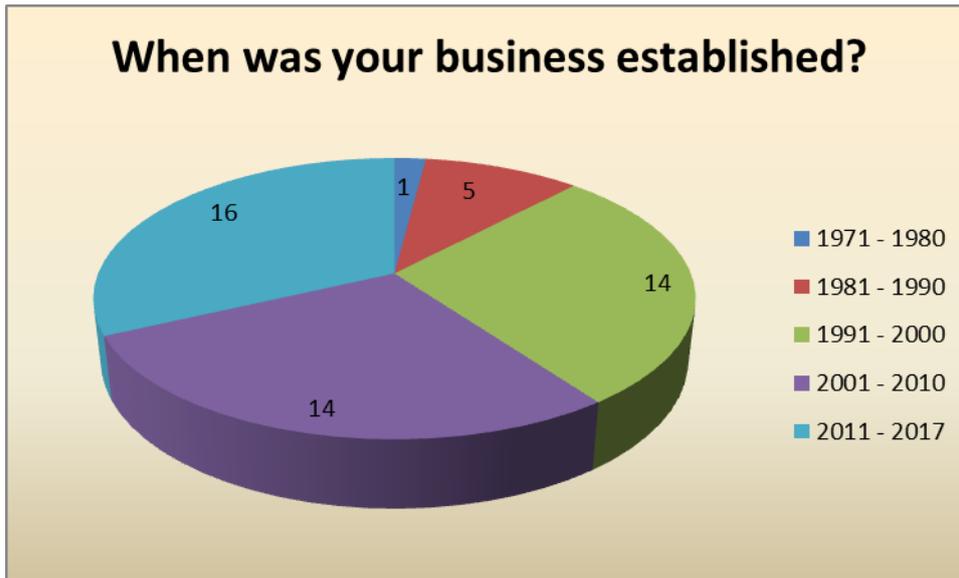
In this chapter, the findings of the survey will be shown in the charts below. Both, results and literature review are used in order to meet the expectations of this project. For the purpose of this survey, this section will attempt to provide analysis and discussion in order to describe the sustainability concept into SCM and estimate the level of the relation between sustainability factors and SCM that are based on the Greek companies that took part in the survey.

Figure 7. In which geographical region is your company based?



Starting with the demographic identity of the survey, out of a total of 50 respondents of the sample, 46, or 92%, work in companies based in the Macedonian district. The other respondents are working in companies based in Thrace, Epirus, Peloponnese and Sterea Hellas. This result was largely expected given that the survey was conducted using a digital questionnaire via the internet but the site of the subject is Thessaloniki.

Figure 8. When was your business established?



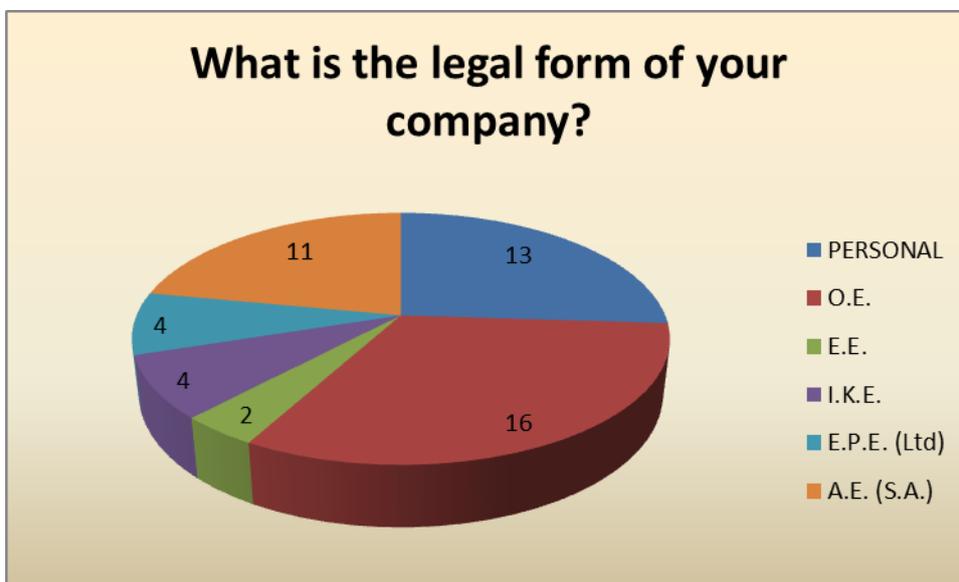
To continue with the demographic identity of the sample, a questioned person is working in a business that was founded in the 1970s, five in the 1980s, the businesses in which 14 respondents were established in the 1990s, 14 in the decade '00 and finally 16 people of the sample work in an enterprise that was established in the last decade (10). From the above it is evident that 60% of the enterprises were founded in the 21st century, while the overwhelming majority (44 companies) were established after 1990. Thus, it becomes clear that the companies in which the correspondents are working are mostly new companies with relatively few years of operation.

Figure 9. How many employees does your business employ?



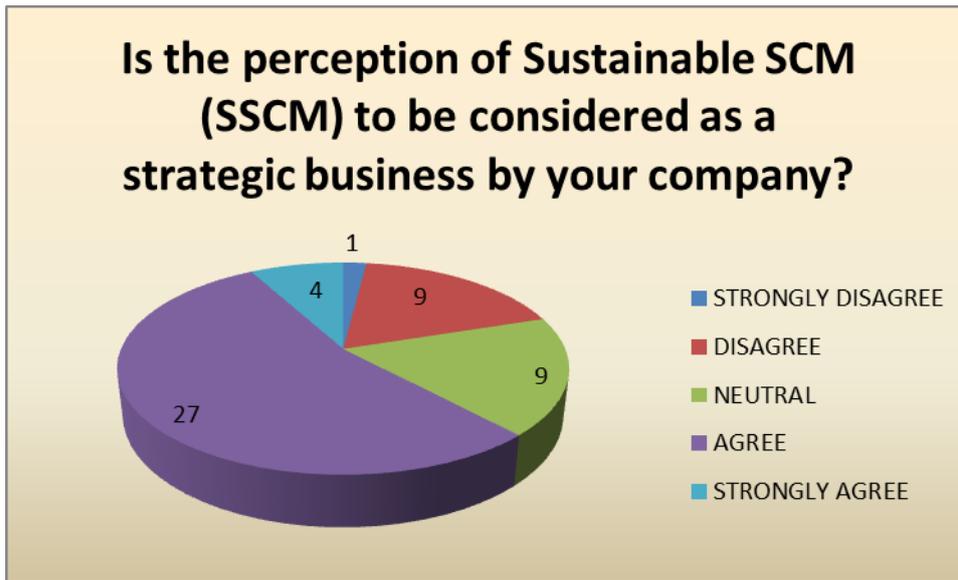
Regarding to the number of staff employed by the firms surveyed, the overwhelming majority of correspondents are employed in firms with fewer than 500 staff. More specifically, the 48 correspondents represents the 96% of the sample that work in companies with up to 499 staff, while only of the companies are employing between 500 and 999 employees. From the above result, it seems that the companies for which the sample works are of small to medium size.

Figure 10. What is the legal form of your company?



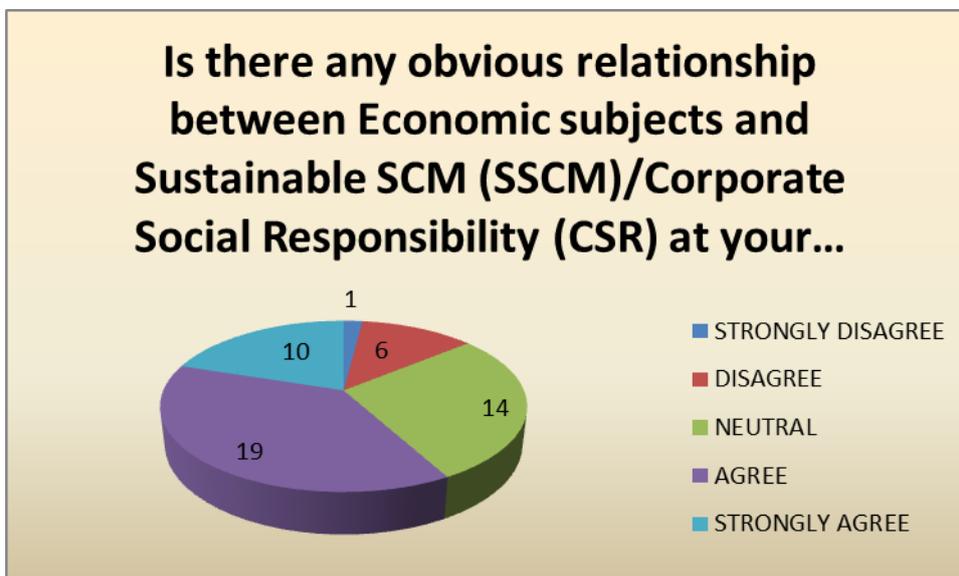
Next, by completing with the identity of the sample and the legal form of the enterprises in which the sample participants work, 13 are employed in an individual enterprise, 16 in a joint venture, 2 in a limited partnership, 4 in a private capital company and Limited Liability Company and 11 in Societe Anonyme. In this case there is a more efficient allocation of businesses. More specifically, 26% of the correspondents are employed in a private enterprise, 36% in a personal company (OE, EU), while the remaining 42% are in capital companies (IKE, PE, SA).

Figure 11. Is the perception of Sustainable SCM (SSCM) to be considered as a strategic business by your company?



Regarding whether sustainable SCM is a strategic action for the business in which they work, only 31 participants that are the 62% of the sample quite agree. On the other hand, only 10 respondents representing 20% of the sample claim that they disagree more or less with that position. Finally, 9 respondents neither agree nor disagree on whether Sustainable SCM is a strategic action for the business they are employing. The above results are undoubtedly a positive element as it reveals that the prospect of a sustainable SCM does not only exists but is one of a strategic and conscious choice of the companies.

Figure 12. Is there any obvious relationship between Economic subjects and Sustainable SCM (SSCM)/Corporate Social Responsibility (CSR) at your company?



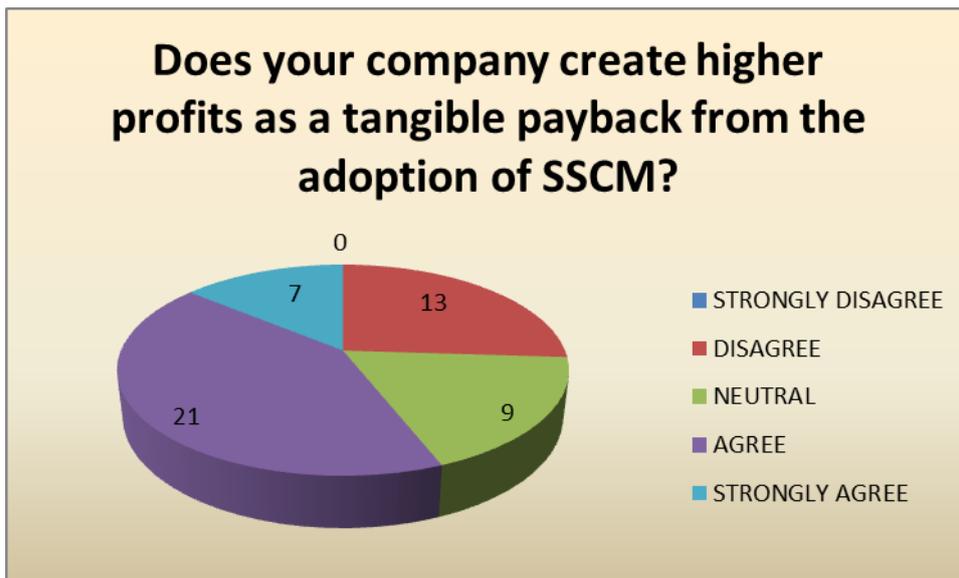
The existence of a relationship between business economics and sustainable SCM is supported by the majority of the sample. In particular, 10 participants fully agree and 19 agree that there is a relationship between sustainable SCM and the financial figures of the business they work with, with a total amount of 58%. On the other hand, only 7 disagree with the existence of such a relationship, while 14 correspondents, i.e. 28% of the sample, neither agree nor disagree with the existence of this relationship. It is perceived that the foregoing results reveal sustainable SCM's impact on companies' finances, which undoubtedly encourages and motivates them to further implementation.

Figure 13. Is Corporate Responsibility visible in every day corporate operations?



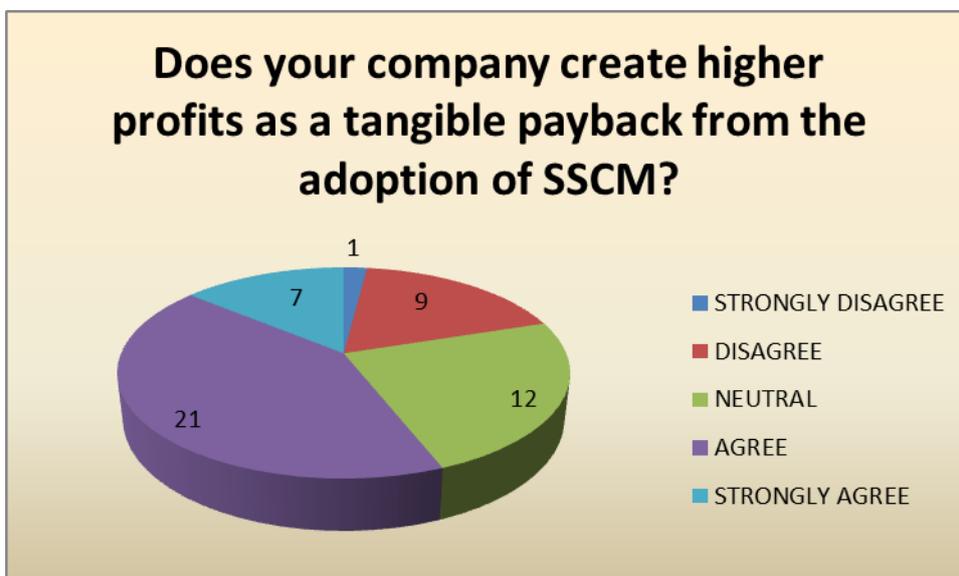
Focusing on corporate responsibility, the overwhelming majority of the participants argue that corporate responsibility is evident in the day-to-day operations of the company they are working in. In particular, 23 and 14 respondents fully agree and agree that corporate responsibility is of a great importance in the conduct of business. Only 7 correspondents (14%) do not agree or disagree, while 6 disagree as they do not see that corporate responsibility holds all the actions of the company they work for. The above result is an encouraging factor with regard to the enterprises in which the sample works in terms of adapting them to the new business environment.

Figure 14. Does your company create higher profits as a tangible payback from the adoption of SSCM?



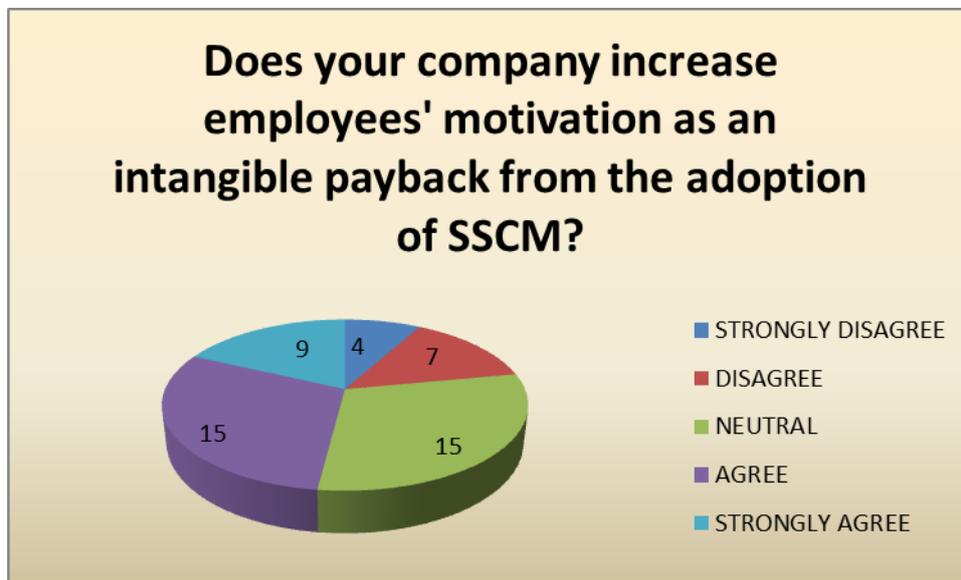
Given the impact of sustainable SCM on company financials from a previous question, it examines whether its application strengthens corporate profitability. 56% of respondents confirm (7 totally agree and 21 agree) that sustainable SCM has a positive effect on profits. From then on, 9 respondents (18% of the sample) did not agree or disagree, while only 13 (26%) felt that sustainable SCM had no positive impact on the profits of the company they are working in. The above result supports the results so far, which reveal the gradual shift of businesses to sustainable SCM.

Figure 15. Does your company create higher income as a tangible payback from the adoption of SSCM?



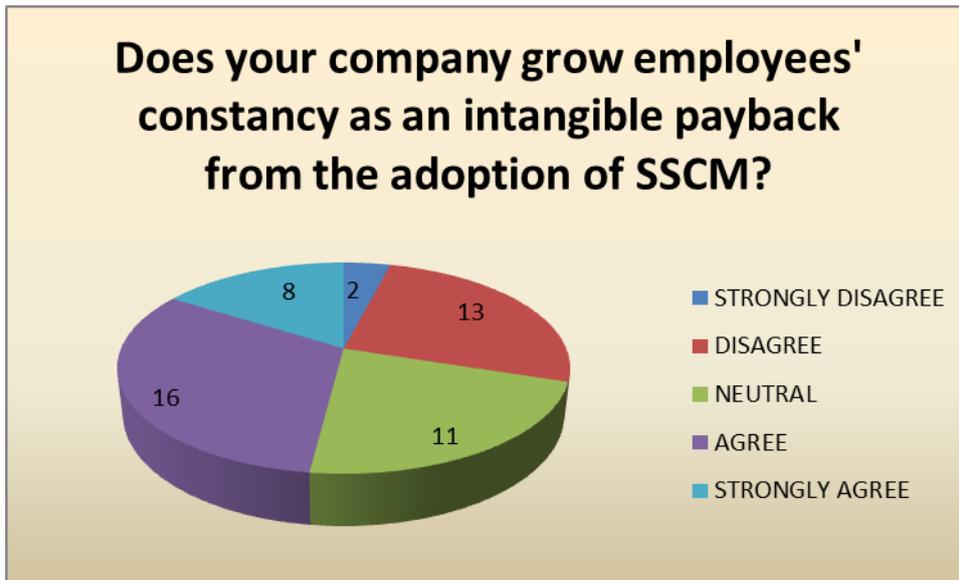
By specifying the impact of sustainable SCM on the ability of a business to generate revenues, they have emerged interesting and similar to the above results. More specifically, 7 correspondents fully agree that sustainable SCM has led to an increase in the turnover of the business they work in, while 21 people, or 42%, simply agree. From there, then 12 respondents remained neutral, not expressing any opinion. Finally, 9 employees disagree and 1 disagrees with sustainable SCM's positive impact on corporate revenue. The above results, reveal the gradual progress of the companies towards the sustainable SCM due to tangible financial returns.

Figure 16. Does your company increase employees' motivation as an intangible payback from the adoption of SSCM?



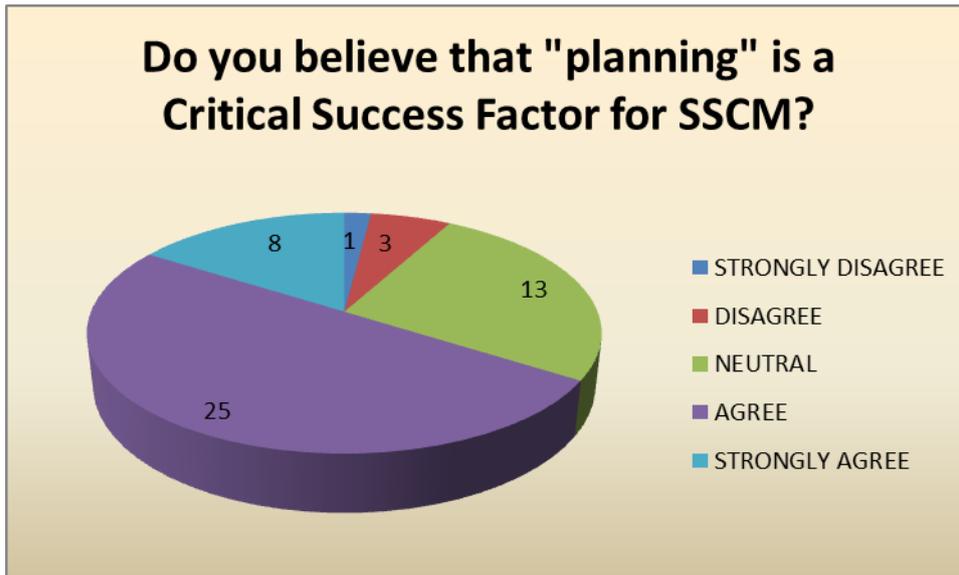
Regarding the effect in sustainable SCM's impact on motivation of the staff, the results are less clear. In particular, 15 participants representing 30% of the sample neither agree nor disagree with sustainable SCM's influence on motivating the employees. From there, 15 and 9 respondents fully agree and agree with the positive association of sustainable SCM and motivation of staff. In contrast, 11 respondents in total (7 and 4) either disagree or disagree strongly that Sustainable SCM acts as a motivating factor for staff. In conclusion, there is a broader positive attitude to sustainable SCM's impact on employee motivation, an attitude that is not as clear as in previous questions.

Figure 17. Does your company grow employees' constancy as an intangible payback from the adoption of SSCM?



Remaining in the relationship between Sustainable SCM and Human Resource Management, its ability to lead to increased employee loyalty is assessed. Almost half of the employees agree with this case. In particular, 8 agree totally and 16 agree to increase staff compliance in the company that works due to sustainable SCM. On the other hand, 2 employees disagree strongly and 13 disagree on the assumption that staff remain loyal to their employer due to sustainable SCM, while 11 employees, or 22% of the sample, neither agree nor disagree. It is obvious that employees are more loyal to their businesses if they apply sustainable SCM. At the same time, comparing the result with that of the previous question, sustainable SCM cannot have a clear effect on staff performance, but it undoubtedly increases fidelity and hence remains in the company.

Figure 18. Do you believe that "planning" is a Critical Success Factor for SSCM?



In order to try to identify the crucial factors for a sustainable SCM, the overwhelming majority agrees that design is an important component. More specifically, 33 employees, corresponding to 66% of the sample, either agree (25) or fully agree (8) with the prominent role of the design process. Then 13 correspondents neither agree nor disagree on the above, and only 4 either disagree (3) or completely disagree (1) about the importance of planning in sustainable SCM. From this result, it is clear the employees' understanding of the important role of design in sustainable SCM.

Figure 19. Do you believe that "corporate culture" is a Critical Success Factor for SSCM?



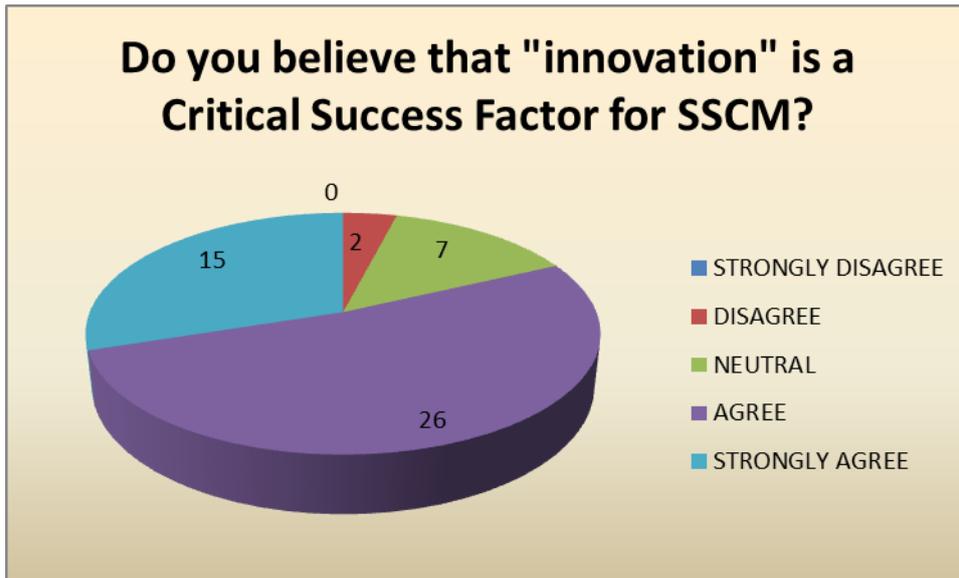
As it seems from the above results, there is a strong is correspondents' view of the role of corporate culture in sustainable SCM. More specifically, 11 participants strongly agree that corporate culture is a vital factor in having a sustainable SCM, and 25 simply agree. On the other hand, only 1 respondent disagrees completely and 4 disagree, with 9 employees staying neutral. With 72% of the sample agreeing to a certain extent that corporate culture is a vital factor in a sustainable SCM, it is clear about its role.

Figure 20. Do you believe that "corporate ethics" is a Critical Success Factor for SSCM?



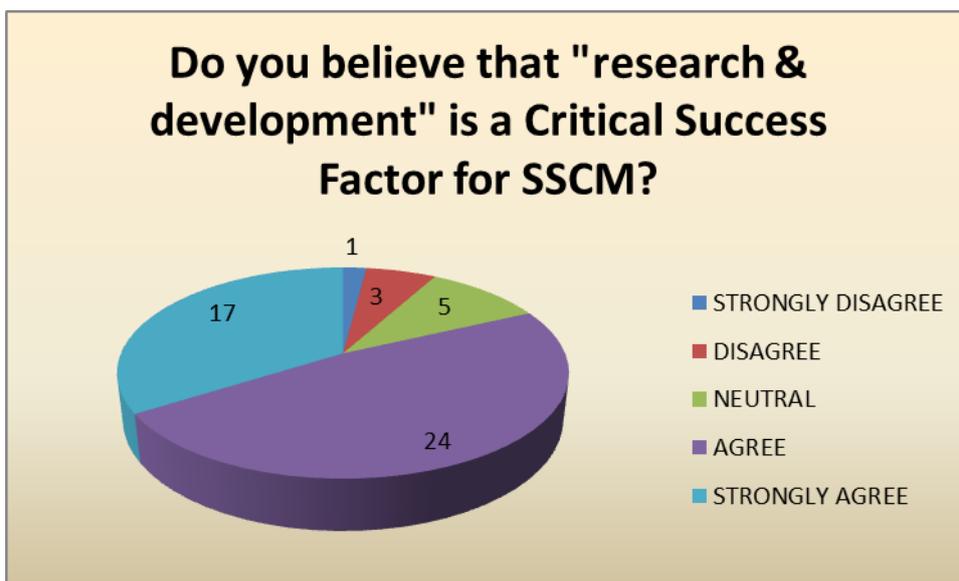
As far as corporate ethics is concerned, relating to sustainable SCM, the results are the same as before. In particular, 13 participants fully agree with the vital role of corporate ethics in sustainable SCM, while 25 agree, with a positive attitude accounting for a total of 76% of the sample. From then on, 9 correspondents neither agree nor disagree, with only 3 (1 and 2) totally disagreeing or disagreeing with the role of corporate ethics in sustainable SCM. The above results clearly underscore the fact that the point of view that corporate ethics is a vital factor in a Sustainable SCM.

Figure 21. Do you believe that "innovation" is a Critical Success Factor for SSCM?



Focusing on whether innovation is a vital factor for a sustainable SCM, 26 and 15 correspondents agree and agree with the important role of innovation. Neutral attitude had 7 correspondents, while only 2 disagreed with the important role of innovation in sustainable SCM. It is understood that with 82% of the sample agreeing to a certain extent, it is clear the importance of the existence of innovation for sustainable SCM.

Figure 22. Do you believe that "research & development" is a Critical Success Factor for SSCM?



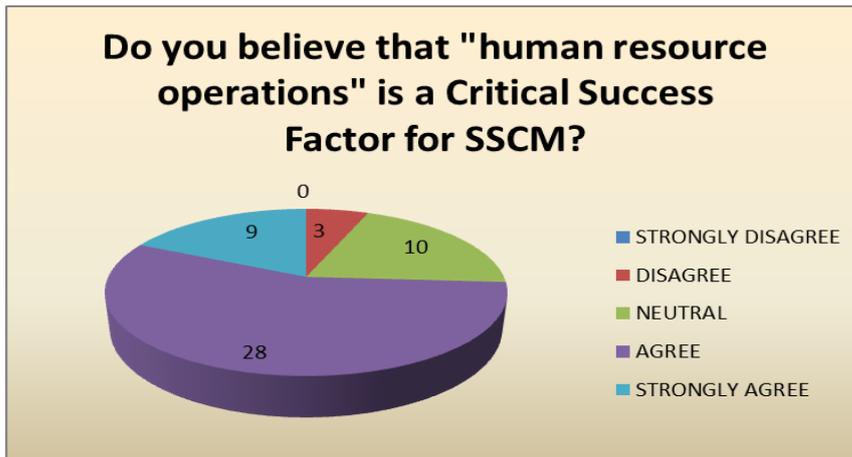
Bypassing the broader concept of innovation and specializing in the operation of research and development, 17 participants agree fully and 24 agree that R & D is an important factor in the success of a sustainable SCM, following a similar match with the previous question. From that point, only 5 respondents do not agree or disagree with the role of research and development, while 3 disagree and one disagrees completely. Following the trend of the previous question, it is clear that research and development as well as innovation are a vital element for a sustainable SCM.

Figure 23. Do you believe that "organizational strategy" is a Critical Success Factor for SSCM?



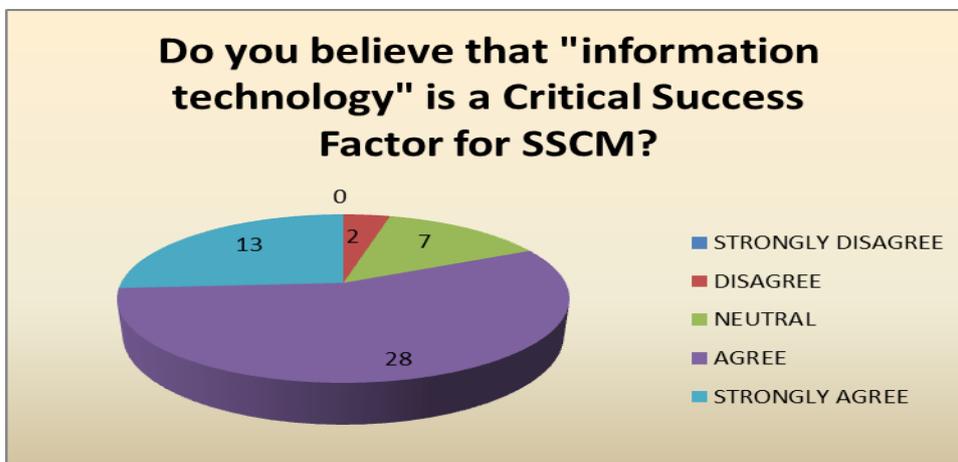
Regarding the organizational strategy, the 13 respondents totally agree and 26 agree on its characterization as a success factor for a sustainable SCM, while 9 were not expressed either positively or negatively. On the contrary, only 2 disagree on the role of organizational strategy. From the above result, it is clear that the sample considers organizational strategy to be particularly important for a sustainable SCM, but not to the degree of innovation and research and development.

Figure 24. Do you believe that "human resource operations" is a Critical Success Factor for SSCM?



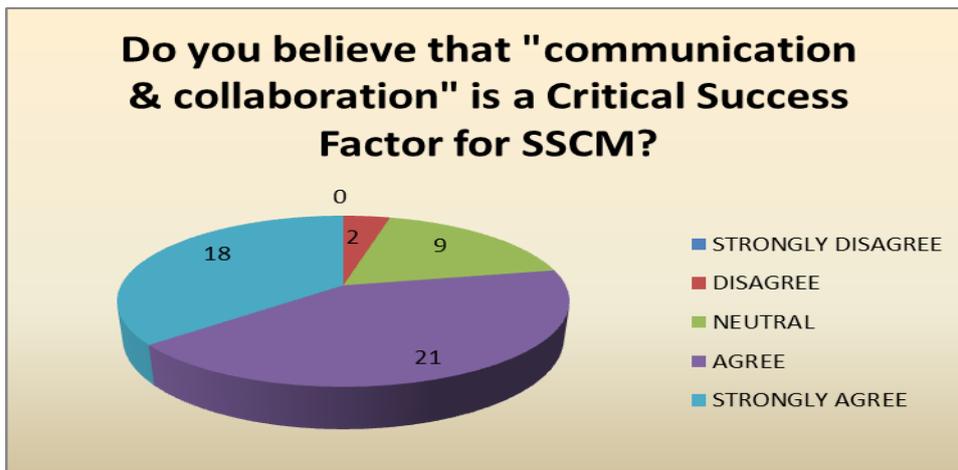
Focusing on human resources management, 28 and 9 participants agree totally or simply agree that human resources management is a success factor for a sustainable SCM. From there, then 10 respondents, ie 20% of the sample, maintained a neutral stop, while only 3 people disagreed. It is clear that with 74% of positive attitude, the sample of research considers the functioning of human resources management to be important for the success of a sustainable SCM, but not to the extent of other factors.

Figure 25. Do you believe that "information technology" is a Critical Success Factor for SSCM?



Regarding the role of information technology, 28 participants agree and 13 agree totally that the adoption of such information is a success factor for a sustainable SCM. Participants who did not express a view stood at 7, while only two disagreed. Having expressed 82% of the sample positive, it is obvious that information technologies play a prominent role in a sustainable SCM environment.

Figure 26. Do you believe that "communication & collaboration" is a Critical Success Factor for SSCM?



Finally, focusing on communication and collaboration between employees, 18 participants totally agree while 21 agree on their important role in the success of a sustainable SCM. Only 2 disagree that communication and collaboration are not a vital factor for a sustainable SCM, while 9 have neither agreed nor disagreed.

Conclusion

The perspective of SCM in the sustainable concept can be relatively easily understood, but implementing those factors in a company's process can be considered as a challenging task. The strategic of SSCM that should be followed must be carefully chosen in order to include the sustainable implementations in the SCM, (Douglas, 2004). Hence, attention should be paid to the economic, social and environmental dimensions of the supply chain procedures.

For most businesses to which respondents work, Sustainable SCM is a strategic choice. Indeed, there is a strong relationship between economic and Sustainable SCM, its existence leads to an increase in both turnover and profitability. Regarding the human resources, sustainable SCM function to some extent as an incentive for staff, but mainly increases loyalty towards the company.

As for the critical success factors of a sustainable SCM, the highest positive responses gathers research and development, then this innovation and information technology. The first three places show a correlation between new technologies and sustainable SCM. In the fourth and fifth place are the communication and cooperation between the employees and the strategic organization. Followed in order of corporate ethics, human resources management, the existence of corporate culture and finally the design garnered more negative versus but comparatively lower than other factors positive responses. According to the paper of Ismyrlis, Moschidis, & Tsiotras, (2015), the key success factors among the Greek companies rely on the importance of the quality the assurance managers have towards to the CSFs. They also state that the main factors are the management commitment, education and communication, while on the other hand, availability of data and use of statistics are characterized as the least important.

It was mentioned in this paper the fact that most surveys are exploring the relationship between sustainability and SCM on the grounds of the triple dimensions, considering the profit that might be generated. Nevertheless, there is little technological knowledge and limited experience in the implementation of the SSCM in the companies. Furthermore, this research attempted to broaden the knowledge of how sustainability and its factors are used by the Greek companies. Eventually, this paper has sum up the critical key success factors for applying the strategic SSCM.

What is more, this project has scientifically contributed and discussed the data and the results. Nonetheless, there is some limitation in the study that must be considered. The findings of the research may not be representative for all the Greek companies and therefor might be lack of information. There was a limited access to the financial data of those companies, so the economic dimension of the sustainability within the companies could not be extensively researched. Thus, this study mainly focuses on the main critical factors of SSCM that the companies could convey. The key success factors that have been included are only rely on the present situation of the companies and it might not be suitable for others which could operate in different sectors and backgrounds. Consequently, further studies can be conducted in order to examine within study research strategy, to associate the exact implementations in SSCM across dissimilar industries, to investigate the alterations based on the sustainable actions in SCM at the similar range, or to create the average factors about how to successfully accomplish a planned SSCM.

References

1. Ahi, P., Searcy, C. (2013), *A comparative literature analysis of definitions for green and sustainable supply chain management*. Journal of Cleaner Production 52: 329-341.
2. Ahi, P., Searcy, C. (2015c), *Measuring social issues in sustainable supply chains*. Measuring Business Excellence 19(1): 33-45.
3. Aly, M.A. (1997), *“Is self-assessment (as a powerful tool for total quality management implementation) suitable in the Middle East context? The experience of a petrochemical global company”*, Journal of Total Quality Management, Vol. 8 No. 2/3, pp. 54-9.
4. Ashby, A., Leat, M., Hudson-Smith, M. (2012), *Making connections: a review of supply chain management and sustainability literature*. Supply Chain Management: An International Journal 17(5): 497-516.
5. Bai, C., Sarkis, J. (2014), *Determining and applying sustainable supplier key performance indicators*.
6. Balbastre, F. and Moreno-Luzo'n, M. (2003), *“Self-assessment application and learning in organizations: a special reference to the ontological dimension”*, Journal of Total Quality Management, Vol. 14 No. 3, pp. 367-88.

7. Beamon, B. M. (1999b). *Measuring supply chain performance*. International Journal of Operations & Production Management 19(3): 275-292.
8. Beamon, B. M., Ware T.M., (1998), “*A process quality model for the analysis, improvement and control of supply chain systems*”, Logistics Information Management, V.11, No. 2, pp. 105-113.
9. Berry, D, Towill, D R. & Wadsley, N. (1994), “*Supply chain management in the electronics products industry*”, International Journal of Physical Distribution & Materials Management Vol. 24, No.10, pp.20-3215
10. Beske, P., Johnson, M. P., Schaltegger, S. (2015). *20 years of performance measurement in sustainable supply chain management—what has been achieved? Supply Chain Management: International Journal* 20(6): 664-680.
11. Carter, C. R., Rogers, D. S. (2008), *A framework of sustainable supply chain management: moving toward new theory*. International Journal of Physical Distribution & Logistics Management 38(5): 360-387.
12. Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. London: Sage Publications.
13. Douglas, M.L., (2004), “*Supply Chain Management: Processes, Partnership, Performance*”, Sarasota, FL: Supply Chain Management Institute.
14. Fynes, B. & Voss, C. & Burca, S. (2004), “*The impact of supply chain relationship quality on quality performance*”, International journal of production economics, Vol. 96, No. 3, pp. 339-354
15. Grove, S., Gray, J. & Burns, N. (2015), *Understanding Nursing Research: Building an Evidence – Based Practice*. Missouri: Elsevier Saunders
16. Gunasekaran, A. Patel, C. McGaughey, R.E. (2004), “*A framework for supply chain performance measurement*”, International journal of production economics Vol. 87, pp. 333-347
17. Handfield, R.B. & Nichols, E.L. (1998), “*Introduction to supply chain management*” (Prentice Hall)
18. Hassini, E., Surti, C., Searcy, C. (2012). *A literature review and a case study of sustainable supply chains with a focus on metrics*. International Journal of Production Economics 140(1): 69-82.
19. Hughes J. A and. Ackroyd S., (1981), *Data Collection in Context*, Longman

20. Hull, D.L. & Cox, J.F. (1994), "*The field service function in the electronics industry: providing a link between customers and production/marketing*", International journal of Production Economics, Vol.37, No.1, pp.115-26
21. Kanji, G.K & Wong, S.A (2002), "*Developing a business excellence model for supply chain management*", Marsh L., "Supply Chain Management Excellence, Kingsham Press, Chichester, pp. 120-121
22. Kaplan, R., & Norton, D. (1996). *Using the balanced scorecard as a strategic management system*. Harvard Business Review, pp. 75-85.
23. Lambert, D.M, Cooper, M.C. Pagh, J.P. (1998), "*Supply chain management: implementation issues and research opportunities*", The international journal of Logistics Management, Vol. 9, No.2
24. Mitra, S., and Bagchi, P.K. (2008). *Key success factors, performance metrics, and globalization issues in the third-party logistics (3PL) industry: A survey of North American service providers* Paper presented at the Supply Chain Forum: An International Journal.
25. Remenyi, D. (2013), *Field Methods for Academic research – Interviews, Focus Groups and Questionnaires in Business and Management Studies*. Reading: Academic Conferences and Publishing International
26. Richey, R. G., Roath, A. S., Whipple, J. M., Fawcett, S. E., (2010), "*Exploring a Governance Theory of Supply Chain Management: Barriers and Facilitators to Integration*" Journal of Business Logistics, Vol. 31, No. 1, pp. 237-256.
27. Routroy, S., Pradhan, S. K., (2013) "*Evaluating the Critical Success Factors of Supplier Development: A Case Study*", Benchmarking: An International Journal, Vol. 20, No. 3, pp. 322-341
28. Schaltegger, S., Burritt, R. (2014). *Measuring and managing sustainability performance of supply chains: Review and sustainability supply chain management framework*. Supply Chain Management: An International Journal 19(3): 232-241.
29. Searcy, C. (2013). *Corporate sustainability performance measurement systems: A review and research agenda*. Journal of Business Ethics 107(3): 239–253.
30. Seuring, S. (2013), *A review of modeling approaches for sustainable supply chain management*. Decision support systems 54(4): 1513-1520.
31. Shepherd, C., Günter, H. (2006), *Measuring supply chain: current research and future directions*. Journal of Productivity and Performance Management 55(3/4): 242-58.

32. Svensson, G. (2007). *“Aspects of sustainable supply chain management (SSCM): conceptual framework and empirical example “*. Supply Chain Management: An International Journal, Vol. 12, No. 4, pp. 262-266.
33. Vasileios Ismyrlis, Odysseas Moschidis, George Tsiotras, (2015) *“Critical success factors examined in ISO 9001:2008-certified Greek companies using multidimensional statistics”*, International Journal of Quality & Reliability Management, Vol. 32 Issue: 2, pp.114-131
34. Wu, M. Y., Weng, Y. C., (2010), *“A Study of Supplier Selection Factors for High-tech Industries in the Supply Chain”*, Total Quality Management, Vol. 21, No. 4, pp. 391-413.
35. Zou, W., Kumaraswamy, M., Chung, J., and Wong, J. (2014). *“Identifying the critical success factors for relationship management in PPP projects”*. International Journal of Project Management. Vol. 32, No. 2, pp. 265-274.

Appendix 1

The following questionnaire relates to scientific research in my dissertation in the postgraduate program of the University of MACEDONIA. Your participation in this research is voluntary and will contribute to the completion of my studies. Thank you in advance for your help and precious time.

		STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
1	Is the perception of Sustainable SCM (SSCM) to be considered as a strategic business by your company?					
2	Is there any obvious relationship between Economic subjects and Sustainable SCM (SSCM)/Corporate Social Responsibility (CSR) at your company?					
3	Is Corporate Responsibility visible in every day corporate operations?					
4	Does your company create higher profits as a tangible payback from the adoption of SSCM?					
5	Does your company create higher income as a tangible payback from the adoption of SSCM?					
6	Does your company increase employees' motivation as an intangible payback from the adoption of SSCM?					
7	Does your company grow employees' constancy as an intangible payback from the adoption of SSCM?					
8	Do you believe that "planning" is a Critical Success Factor for SSCM?					
9	Do you believe that "corporate culture" is a Critical Success Factor for SSCM?					
10	Do you believe that "corporate ethics" is a Critical Success Factor for SSCM?					
11	Do you believe that "innovation" is a Critical Success Factor for SSCM?					
12	Do you believe that "research & development" is a Critical Success Factor for SSCM?					
13	Do you believe that "organizational strategy" is a Critical Success Factor for SSCM?					
14	Do you believe that "human resource operations" is a Critical Success Factor for SSCM?					
15	Do you believe that "information technology" is a Critical Success Factor for SSCM?					
16	Do you believe that "communication & collaboration" is a Critical Success Factor for SSCM?					

17	In which geographical region is your company based?	THRACE	MACEDONIA	EPIRUS	THESSALY	CENTRAL GREECE	ISLANDS	PELOPONNESE	AEGEAN ISLANDS	CRETE
----	---	--------	-----------	--------	----------	----------------	---------	-------------	----------------	-------

18	When was your business established?	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011-2017
----	-------------------------------------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

19	How many employees does your business employ?	0-499	500-999	1.000-1.499	1.500-1.999	2.000-2.499	2.500-2.999	3.000-3.499	3.500-3.999	4.000-1.000
----	---	-------	---------	-------------	-------------	-------------	-------------	-------------	-------------	-------------

20	What is the legal form of your company?	PERSONAL	O.E.	E.E.	E.P.E. (Ltd)	I.K.E.	A.E. (S.A.)
----	---	----------	------	------	--------------	--------	-------------

Appendix 2

Είναι η ροπτική οσιμης χειρίσης διαστική αλυσίδας ατηνική ργεια για χειρήση ν οποία άζεστε;	2. Είναι εμφανής η σχέση μεταξύ οικονομικών θεμάτων και της βιώσιμης διαχείρισης εφοδιαστικής αλυσίδας / εταιρικής κοινωνικής αυθύνης στην επιχείρηση στην οποία εργάζεστε;	3. Είναι η εταιρική ευθύνη κάθημερινά εμφανής στις λειτουργίες της επιχείρησης στην οποία εργάζεστε;	4. Δημιουργή η επιχείρηση στην οποία εργάζεστε υψηλότερα έσοδα ως υλική ανταμοιβή από την υιοθέτηση της βιώσιμης εφοδιαστικής αλυσίδας;	5. Δημιουργή η επιχείρηση στην οποία εργάζεστε υψηλότερα κέρδη ως υλική ανταμοιβή από την υιοθέτηση της βιώσιμης εφοδιαστικής αλυσίδας;	6. Αυξάνεται η παρακίνηση εργαζομένων , στην επιχείρηση στην οποία εργάζεστε, ως άυλη ανταμοιβή από την υιοθέτηση της βιώσιμης εφοδιαστικής αλυσίδας;	7. Αυξάνεται η πιστότητα εργαζομένων , στην επιχείρηση στην οποία εργάζεστε, ως άυλη ανταμοιβή από την υιοθέτηση της βιώσιμης εφοδιαστικής αλυσίδας;	8. Πιστεύετε ότι ο "εταρική κουλτούρα" αποτελεί παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	9. Πιστεύετε ότι η "εταιρική κουλτούρα" αποτελεί παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	10. Πιστεύετε ότι η "εταιρική αποτελεί παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	11. Πιστεύετε ότι η "καινοτομία" αποτελεί παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	12. Πιστεύετε ότι οι "έρευνα & ανάπτυξη" αποτελούν παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	13. Πιστεύετε ότι η "στρατηγική οργάνωση" αποτελεί παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	14. Πιστεύετε ότι οι "διαδικασίες διαχείρισης ανθρωπίνων πόρων" αποτελούν παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	15. Πιστεύετε ότι η "τεχνολογία & πληροφορίας" αποτελεί παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	16. Πιστεύετε ότι η "επικοινωνία & συνεργασία" αποτελεί παράγοντα ζωτικής σημασίας για την επιτυχία μίας βιώσιμης εφοδιαστικής αλυσίδας ;	17. Σε ποιο γεωγραφικό διαμέρισμα εδρεύει η επιχείρηση στην οποία εργάζεστε;	18. Πότε ιδρύθηκε η επιχείρηση στην οποία εργάζεστε;	19. Πόσο προσωπικό απασχολεί η επιχείρηση στην οποία εργάζεστε;	20. Τι νομική μορφή έχει η επιχείρηση στην οποία εργάζεστε;	
3	3	2	2	2	3	3	3	5	5	4	5	5	5	5	5	5	Πελοπόννησος	2001 - 2010	0 - 499	Ιδιωτική Κεφαλαιουχική Εταιρεία
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	Θράκη	2011 - 2017	0 - 499	Ανώνυμη Εταιρεία
4	3	4	3	4	3	3	4	4	5	5	5	4	4	4	4	5	Μακεδονία	2001 - 2010	0 - 499	Ανώνυμη Εταιρεία
2	2	3	2	2	2	2	2	2	2	3	2	2	2	2	2	3	Ήπειρος	1991 - 2000	0 - 499	Ατομική
5	5	4	4	5	5	4	5	5	5	5	4	5	5	5	5	5	Μακεδονία	2011 - 2017	0 - 499	Ανώνυμη Εταιρεία
3	4	3	2	4	3	3	3	3	3	3	3	4	4	4	4	4	Στερεά 4 Ελλάδα	1991 - 2000	0 - 499	Ανώνυμη Εταιρεία

4	3	4	4	4	4	5	5	5	5	4	4	4	4	5	4 Μακεδονία	2011 - 2017	0 - 499	Ομόρρυθμη Εταιρεία
2	2	3	3	3	3	2	4	4	3	3	3	3	3	3	3 Μακεδονία	1991 - 2000	0 - 499	Ετερόρρυθμη Εταιρεία
4	5	5	4	3	4	5	3	4	4	4	5	4	4	4	5 Μακεδονία	2001 - 2010	0 - 499	Ιδιωτική Κεφαλαιουχική Εταιρεία
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5 Μακεδονία	1991 - 2000	500 - 999	Ανώνυμη Εταιρεία
4	3	3	2	1	1	2	1	2	1	2	1	2	2	2	2 Μακεδονία	1991 - 2000	0 - 499	Ατομική
2	2	2	3	3	3	3	3	2	3	4	3	3	3	4	3 Μακεδονία	1991 - 2000	0 - 499	Ομόρρυθμη Εταιρεία
4	3	4	5	5	5	5	5	5	5	5	4	4	4	4	4 Μακεδονία	2001 - 2010	0 - 499	Ιδιωτική Κεφαλαιουχική Εταιρεία
4	4	4	5	4	4	5	4	4	4	5	5	5	5	5	5 Μακεδονία	2011 - 2017	0 - 499	Ανώνυμη Εταιρεία
5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	5 Μακεδονία	2011 - 2017	0 - 499	Ανώνυμη Εταιρεία
3	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4 Μακεδονία	2011 - 2017	0 - 499	Ιδιωτική Κεφαλαιουχική Εταιρεία
2	3	3	2	3	2	3	3	3	3	3	4	4	4	4	4 Μακεδονία	2011 - 2017	0 - 499	Ατομική
2	2	2	2	2	3	3	3	3	3	2	2	3	3	3	3 Μακεδονία	2001 - 2010	0 - 499	Εταιρεία Περιορισμένης Ευθύνης
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5 Μακεδονία	1991 - 2000	500 - 999	Ανώνυμη Εταιρεία

4	5	4	5	5	5	4	4	5	5	5	5	5	4	5	5 Μακεδονία	2011 - 2017	0 - 499	Ανώνυμη Εταιρεία	
3	3	4	4	4	3	3	3	4	3	4	4	4	4	4	4 Μακεδονία	2001 - 2010	0 - 499	Ανώνυμη Εταιρεία	
4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4 Μακεδονία	2001 - 2010	0 - 499	Εταιρεία Περιορισμένης Ευθύνης	
4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5 Μακεδονία	2001 - 2010	0 - 499	Εταιρεία Περιορισμένης Ευθύνης
3	3	4	3	3	3	2	3	4	4	4	3	4	4	4	3 Μακεδονία	2011 - 2017	0 - 499	Ετερόρρυθμη Εταιρεία	
2	3	2	3	2	3	2	3	2	3	3	2	3	2	3	2 Μακεδονία	1991 - 2000	0 - 499	Εταιρεία Περιορισμένης Ευθύνης	
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4 Μακεδονία	2011 - 2017	0 - 499	Ομόρρυθμη Εταιρεία	
3	3	2	3	3	4	4	4	4	4	4	4	4	4	4	4 Μακεδονία	2001 - 2010	0 - 499	Ατομική	
4	5	5	4	4	4	4	4	4	4	5	5	4	4	3	4 Μακεδονία	2011 - 2017	0 - 499	Ανώνυμη Εταιρεία	
3	4	4	4	4	3	4	4	3	4	5	5	5	4	5	4 Μακεδονία	1971 - 1980	0 - 499	Ομόρρυθμη Εταιρεία	
4	4	3	4	4	5	5	4	4	4	5	4	4	5	4	5 Μακεδονία	2011 - 2017	0 - 499	Ατομική	
2	2	4	2	2	2	2	3	3	3	3	4	3	3	4	3 Μακεδονία	2011 - 2017	0 - 499	Ομόρρυθμη Εταιρεία	
3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4 Μακεδονία	1991 - 2000	0 - 499	Ατομική	

4	4	5	4	5	5	4	4	4	4	5	5	5	5	4	5 Μακεδονία	1991 - 2000	0 - 499	Ομόρρυθμη Εταιρεία
4	5	4	4	4	5	4	4	3	4	4	4	5	3	3	3 Μακεδονία	1991 - 2000	0 - 499	Ομόρρυθμη Εταιρεία
4	4	4	5	4	3	2	4	4	5	5	5	4	4	5	4 Μακεδονία	2011 - 2017	0 - 499	Ομόρρυθμη Εταιρεία
4	4	4	4	3	3	3	3	4	4	4	4	3	3	4	4 Μακεδονία	1981 - 1990	0 - 499	Ομόρρυθμη Εταιρεία
4	4	5	4	4	4	4	4	4	5	5	4	4	4	4	4 Μακεδονία	1981 - 1990	0 - 499	Ομόρρυθμη Εταιρεία
4	5	4	4	4	4	4	5	4	4	4	5	4	4	4	5 Μακεδονία	1991 - 2000	0 - 499	Ομόρρυθμη Εταιρεία
2	3	4	2	2	2	2	2	3	2	4	3	3	3	3	3 Μακεδονία	2011 - 2017	0 - 499	Ατομική
1	1	2	2	2	2	1	2	1	3	3	3	3	3	3	3 Μακεδονία	1981 - 1990	0 - 499	Ατομική
4	5	5	4	4	4	4	5	5	5	5	5	5	5	5	5 Μακεδονία	1991 - 2000	0 - 499	Ατομική
4	4	5	4	4	3	3	4	4	4	4	5	4	4	4	5 Μακεδονία	2001 - 2010	0 - 499	Ατομική
4	4	5	3	3	4	3	4	5	4	4	4	4	4	4	4 Μακεδονία	2001 - 2010	0 - 499	Ομόρρυθμη Εταιρεία

4	3	5	3	3	3	2	4	4	4	4	5	4	4	4	5 Μακεδονία	1981 - 1990	0 - 499	Ομόρρυθμη Εταιρεία
4	4	5	4	2	2	1	4	3	4	4	5	4	3	4	4 Μακεδονία	1991 - 2000	0 - 499	Ομόρρυθμη Εταιρεία
4	4	4	2	3	1	2	4	3	4	4	5	5	4	4	5 Μακεδονία	2001 - 2010	0 - 499	Ομόρρυθμη Εταιρεία
2	2	5	2	2	1	2	4	5	4	4	4	4	4	4	5 Μακεδονία	2011 - 2017	0 - 499	Ατομική
4	3	4	2	3	1	2	4	4	4	4	4	4	4	5	4 Μακεδονία	2001 - 2010	0 - 499	Ατομική
4	4	5	4	4	3	3	4	4	5	5	4	5	4	4	4 Μακεδονία	2001 - 2010	0 - 499	Ατομική
3	4	4	2	3	2	2	3	4	4	4	4	3	3	4	4 Μακεδονία	1981 - 1990	0 - 499	Ομόρρυθμη Εταιρεία

-