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The Effectiveness of Lean Management and Bottom-up Approach on Performance and Competitive Advantage

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The Effectiveness of Lean Management and Bottom-up Approach on Performance and Competitive Advantage

Gaelle Raffi Marguarossian

Abstract

Lean management is a system that strives to achieve improvements in the daily operations of organizations, while lean manufacturing aims at achieving efficiency in every stage of the manufacturing process. Bottom-up approach is a system that focuses on data processing based on information collected from the environment to bring together different subsystems to create a more comprehensive interlinked system that is effective at the top-level. This thesis examines the effect of lean management, lean manufacturing, bottom-up approach on the performance and competitive advantage of the company. Moreover, this study investigates the mediation effects of corporate performance on lean thinking. The results show that bottom-up approach has marginal direct influence on competitive advantage. Moreover, corporate performance was found to fully mediate the relationship between lean management and competitive advantage, and partially mediate the relationship between lean manufacturing and competitive advantage.

Keywords: Lean management, Lean manufacturing, corporate performance, and Bottom-up approach

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Chapter One

Introduction

In this chapter, a definition of lean management is presented. Whereby the concept of the benefits of lean management in the corporate sphere leads to an efficient workflow. As well, a brief definition of the bottom-up approach is presented with the various effects of its implementation.

1.1 Overview

Lean management can be understood as a system that strives to achieve small incremental changes in the daily operations of organizations to generally improve efficiency and final product quality. It is an approach used by organizations, mainly manufacturing industries with regard to the concept of continuous improvement. Companies within the same service or product line require a new package that would help harmonize the problems and do away with the old methods of management. However, this might not be helpful in case the manager and employees of a company do not react positively to change and operate within the new system. It is the responsibility of each and every member of the entity to support the new methods of management so that the desired results can be achieved. Some scholars hold that the ability of an individual or rather a company to accept change faster, buys an added advantage (Mclover, 2001).

A second important factor that enables a firm to become successful and compete fairly with rival companies, is the ability to manage time and make use of every minute within the designated period. Therefore, as a management tool, room for change should always be at the top of the list when it comes to planning and leading. In light of this, for a leader to lay down real plans and the need for change

within a company, he/she would require more valid and reliable tools. One tool is lean management, which keeps the company competitive by reducing the costs and at the same time raising the products quality. From a comparative point of view, it is lean thinking that has proven to be the answer towards improving the performance of many organizations, manufacturing and service companies inclusive. Another tool is the use of bottom-up approach in an industry, which is a system whereby different systems are brought together to create a more comprehensive structure. This is an approach that focuses on data processing based on information collected from the environment in order to develop a hypothesis. The single elements that make up the complex system become interrelated to form larger subsystems. These subsystems are interlinked to come up with an effective top-level system.

This study is concerned with the effectiveness of lean management within the corporate sphere. It shows the possibility of successful implementation within any industry. This thesis is going to incorporate the characteristics of Lean management and manufacturing to come up with a comprehensive result of the effectiveness it has on the competitive advantage of the firm using performance as a mediator. More importantly, this research paper will also consider an insight of background information that surrounds the previous cases of lean management and the future bottom-up approach strategy and how its adoption will effect the company.

This thesis has endeavored to achieve the primary objective; whereby the effectiveness of lean and bottom-up approach and adoption on a company. It is examined through all the levels of an organization and the human resource, including the top managers (Bayou & De Korvin, 2008). This study has ensured that a useful theoretical framework of lean management and the bottom-up approach is provided.

Therefore, interest managers from various products and service lines can implement it to achieve desired improvements in both performance and quality. The integrated system further ensures that wastes are reduced or even eliminated across all levels of production or service delivery.

1.2 Thesis statement

Lean Management and Bottom-up approach significantly impacts the competitive advantage of a company, using corporate performance to examine the effectiveness of the relationship.

1.3 Chapter summary

This chapter explains that lean management is a system focused on identifying non-value adding points and eliminating them as wastes. Lean has several objectives that help in realizing good results for a company that decides to adopt it. They include, using the end customer to define value, examining each step within the process of production, removing all the excess that does not add value, improving the value stream by tightening the schedules, and repeating the cycle until problems are solved. According to lean, relevancy and urgency are highly regarded. A competitive business environment requires that flexibility be given room; elastic companies can implement such managerial systems as the lean integrated system using also the bottom-up approach, by allowing employees to participate in managerial decisions.

Furthermore, chapter 2 will include a literature review, which is one that compressively determines the extent to which organizational processes have responded to the incorporation of a new management system. Furthermore, all

relevant information has been gathered, including the challenges that are likely to act as a barrier towards the success of the program. Chapter 3 presents the hypothesis development; chapter 4, the methodology used; chapter 5, the statistical analysis; and chapter 6, the conclusion and discussion.

Chapter Two

Literature review

2.1 Introduction

Before the adoption of lean management within the contemporary business environment, firms used to incur extra costs that would, at times, weigh them down to threatening levels. The urge to get to the top, diverts the attention of both the workers and the management from concentrating on production and producing high-end quality at the highest possible level of employee performance. That means traditional supplier network management proves to be market oriented (Christopher, 2016). On the other hand, companies are profit oriented, looking at the standards of efficient maintenance and other motivational moves towards the bottom-up approach. This chapter shows the link we have between lean management, bottom-up approach and the performance of a company to achieve competitive advantage.

2.2 Lean thinking

The Toyota approach was created to contribute to achieving efficiency in every stage of the manufacturing process. Along these lines, workers are frequently put in groups or rather "work cells", and they are then left in charge of all the work done at that particular stage, it goes without saying that they have to perform to have the entire system standard and the finished product perfectly in shape. At the stage of groups, they are granted the ability to make any minor changes that may serve to the best interest of the workflow by finishing their part within the time that the system allocates for them. This is one advantage of lean manufacturing, it allows for necessary flexibility and enough time to help work cells suggest and initiate their ideas towards producing the best quality. However, these minor changes need to be made within the bracket created by the management with the help of the system's objectives. For this reason, the groups can make requests about changing meetings and time within their workstation (Colchia & Dallari, 2017).

One of the major points of focus of lean management is the idea of zero quality control or quality at each stage and source, this means that there are guidelines towards lean quality assurance between all the levels of production. An example would occur when somebody or an organization new to the system would wonder why the company does not have heaped raw materials, centers designated for distribution, very supplies of the raw materials within the workstations and unavailability of the finished product within the warehouse. Therefore, it is evident that Lean is a framework that deals with stock management and other points of interest such as waste management, anything that does not contribute towards making profits and at the same time hinders human movement. Therefore, lean is concerned with eliminating wastes at all levels of production to maximize profits, this is to say

that anything that does not add value to the item being produced should not be repeated (Bortolotti, 2016).

The elimination cycle starts with the identification of the problem; this is done by dividing the procedure into seven units that were applied by the Toyota manufacturing, it includes movement or transportation, unnecessary movement, non-basic process, inventory, defects and excess generation. These steps effectively identify the problem by determining the exact cause, wipe out the cause, make upgrades and institutionalize.

The first Toyota model of Lean Manufacturing, from which other models were created, contains eight apparatuses and methodologies: Five Ss, Zero Quality Control, Just In Time, SMED, Creation Work Cells, Total Production Management, Kanban and Poka Yoke. The approach of lean thinking and lean inventory network has proceeded onward since Toyota's Lean Manufacturing model and grasped additional tools and strategies (Bortolotti, 2016).

The qualities of lean production network and precepts of a lean store network are taken from the standards of Toyota Production Systems and the procedure of Lean Sigma. Several scholars propose a few of Lean standards given the company's motivation, profit making and flawlessness. Be as it may, the utilization of Lean standards has moved with time and experience of associations in both assembling and administration parts. Recently, supply chains are seen as fundamental in regards to arranging the request figures, upstream coordinated efforts with providers and arranging and planning the assets, this is made to ensure that the product is genuine and that the clients receive the best quality. In addition to the quality, time speed is equally important within the conveyance and integration of systems between the administration and the work cells, there are a few challenges that companies are faced

with when it comes to bringing new clients and maintaining them: Elimination of wastes, smooth flow of operations, efficiency and quality assurance (Martinez-Jurado & Moyano_Fuentes, 2014).

For instance, according to the eradication of wastes, lean philosophy firmly focuses on the recognizable proof and disposal of the divisions of the motivational standards of the company based on the end of waste. The reason behind their motivation and success is the waste elimination that increases profitability and cut operational costs, it begins with the identification of sources of motivation and translating them into a system and procedures of the production. In the process of doing all these, gaps get determined and dealt with, availability of waste is one of them; once identified, it gets efficiently disposed of. This reliable method of waste disposal has likely made lean synonymous to identification and elimination of waste (Bortolotti, 2016).

To get the best out of lean network, waste elimination has proved to be one of the best areas that an organization can consider first before imitating the system. This is because most of the procedures have always been completed with next to zero capital ventures. One prominent zone of waste in procedures is the existence of excess stock in the warehouse. It is not until many organizations adopted lean management with the only aim of controlling their stock, not knowing the vast advantage that Lean management offers. Efforts towards decreasing the stock available in stores using the principles of lean, involves arranging finished products, just in time policy, and the best way of dealing the supplier chain network have led to lower levels of inventory. However, lowering stock level is not the optimal point since the system provides enough room for further improvements. Therefore, lean

supplier network management is more concerned with efficiency, quality assurance, waste elimination and the overall control of inventory (Bortolotti, 2016).

2.3 Bottom-up approach

Through the application of the bottom-up approach, lean system is able to get contributions from the workers that would improve their work rate and morale. Through this, the company is able to evaluate and eliminate wastes in the most effective way. For instance, the bottom-up approach works in such a way that employees are encouraged come up with improvement strategies. This flows from the work cells to the top executive whereby information flows from below. This approach has the capacity to identify the possible areas of wastage that does not add value to the value stream. Consequently, the small working groups have the liberty to give ideas that would help solve the issues that arise. By applying bottom-up approach, the workers are able to spot areas of overproduction whereby they would notice huge transactions in the stream, over-processing where non-value adding activity are identified , waiting where time wasted between activities are identified, ownership issues where too many owners complicating the decision making process are pointed out , unnecessary movement that is solved by identifying too much movement between value adding activities and underutilization of human resources where a wider application of human effort is considered (Middleton & Joyce, 2012).

Accordingly the simplified and continuous processes of lean lead to the realization of certain lean objectives. The processes are meant to lower the operational costs, requires little space and the general reduction of risks involved in day-to-day operations. The bottom-up approach concentrates on employees. Eventually, employee performance improves the working conditions and the value

added to the quality of the final product. The improvement following this approach contributes to the overall success of the full cycle. The effectiveness of lean can therefore be achieved through the bottom-up approach. Work cells are given priority when it comes to improvement and at the same time they have the liberty to suggest ideas that would help bridge gaps created by non-value adding activities (Womack & Jones, 2003).

2.4 Corporate Performance

The success of an entity is usually determined by the ability to meet the needs of all stakeholders involved in timeliness and manner. For instance, the employees' need to be motivated in order to enhance productivity and assure sustainability of success while managers are required to facilitate present and future success of the corporate for overall effectiveness and customers served to satisfaction. A corporate's performance needs to encompass an in-depth comparison on what the company has realized with the set standards. As such, the comparison should pave the way for variance analysis, budgetary breakdown, and benchmark the progress in line with best practices (Abdul-Baki, Uthman, & Sannia, 2014). Measuring of corporate performance, therefore, is necessary for assuring that the involved stakeholders will significantly benefit from the firm. However, these measures must have the capacity in creating insights which usually determine the next course of action. In various instances, financial ratios have been used in measuring firm's performance and have been significantly beneficial in determining unit's performance, type of reward, estimating future performance, evaluating the competitive ability of a firm, and assessing financial performance (Delen, Kuzey, & Uyar, 2013). Moreover, financial ratios have been of great importance in developing financial models that make it

possible to detect and predict probable distress and failures currently and in the future. The ability to assess bankruptcy has also been enhanced by financial ratios, therefore, making it possible to evaluate the healthiness of the corporate (Vasu, & Ravi, 2011). Nevertheless, the use of financial ratios have not been limited to health and bankruptcy of a corporate but also have been used in assessing the strength and weaknesses of the inherent business with other corporates locally and overseas (Abdul-Baki, Uthman, & Sannia, 2014). As such, corporate performance can be determined effectively by making use of financial ratios.

The use of traditional measurements of corporate performance, however, has been indicated to convey significant levels of bias calling for alteration in order to establish measurements that can lead to realistic and reasonable insights. The traditional approach which solely measured individual's performance is broadened in order to include a widened aspect of stakeholders. Delen, Kuzey, and Uyar (2013) claim that the traditional method has no universal way in which calculations concerning performance were to be carried out as well as the degree of financial ratios to be considered. The new approach, however, incorporates corporate's own data in a broader perspective, which convey the tendency to establish counterintuitive relationships in deriving insights that would enhance corporate performance (Bourne, Franco, & Wilkes, 2003). Similarly, although the traditional methods are able to assess bankruptcy, they are unable to specify and to explain categorically which specific features are to be used in assessing a corporate's performance. The new approach is dependent of financial ratios particularly the liquidity, financial condition, profitablility and efficiency which are entirely based on a corporate's actual results making it possible to perceive insights, evaluate strength and weaknesses, predicting bankruptcy, and evaluating health of the corporate (Delen, Kuzey, & Uyar, 2013).

These aspects of financial ratios are all directed towards enhancing the health of the corporate in future by focusing on the development process, unlike the traditional measurements which were limited to the emphasis on cost (Bourne, Franco, & Wilkes, 2003). As such, centering the financial ratios towards corporates development, the actual results, and wider evaluates of performance makes it possible to mark comparisons against the set standards and consequently guarantee a healthy business which is able to benefit all stakeholders.

Chapter Three

Hypothesis Development

This chapter looks forward to evaluating the effectiveness of lean management and bottom-up type of management in an organization. Five hypotheses that are geared to help in understanding the influence on performance and competitive advantage of both the lean and bottom-up type of management have been formulated. Moreover, the hypothesis chapter will also evaluate how performance mediates the positive influence of lean management and the competitive advantage of the bottom-up type of management. It seeks to understand how the lean type of management is intertwined with the bottom up type of management. The factors of lean management could be affected by the factors of bottom-up.

3.1: H1: Lean management has a positive effect on competitive advantage

The lean management system has a rivalry advantage to an organization in several ways which include improving customer service (Prajogo, Oke, & Olhager 2016). The customers experience an exceptional satisfaction because their products or services are delivered in timely and definite location. When lean administration is executed in an association, the entity ends up noticeably aggressive due to enhancing client administrations. The organization stays aggressive both in regards to product and costs. The company proliferates expanding its territories. Moreover, the brand recognition improves tremendously thereby attracting customers who in return consume the products or services of an organization. Research has shown high brand recognition and acquirement of new clients have a linear positive relationship

(Prajogo, Oke, & Olhager 2016). In this way, the lean administration framework enhances the upper hand of an organization through enhanced client benefits as one of the upper hands of the lean arrangement of administration.

Competitive Advantage is also improved through improved efficiency and reduced costs. The lean system leads to emerging of skills that bring changes at the work place. Similarly to the way space is created when waste is removed from the warehouse to create a space for another line of produces, time is also saved which can help employees to serve customers more efficiently (Suri, 2016). The time created helps the workers to be able to produce services or products quickly and in short moment. This also helps the employee in absorbing new tasks as well as being able to respond quickly to the customer's demands. Therefore, the improved efficiency and reduced costs are one of the competitive advantages that are created when the lean type of management is deployed in an organization.

Applying lean management into an organization helps the firm to be more competitive in the industry because the approach helps the entity identify opportunities that primary would not have existed if another type of management would be in use rather than lean type management. The participation of employees in running an organization is one of the opportunities that is created when lean management is adopted (Suri, 2016). The lean operation also helps in developing adaptable processes which are inclined to change into customer's needs. The customer may be in need of his or her products being delivered in timely and definite location, but the company may not be in a position to meet the demands of the client (Prajogo, Oke, & Olhager 2016). Fortunately, once lean management is incorporated into the organization system, the customer's needs are met promptly. Therefore, lean

type of management helps in identifying such opportunities in an organization that is impossible to be created when other types of management are in place.

The positive aspect brought to the customer as a result of lean management cannot be underestimated. According to research, lean type of management helps in the delivery of services at a constant speed because of the inventory process in manageable (Suri, 2016). Lean operation minimizes the time that is taken when the customer waits for the products or services. The method of lean management acts as mistake-proofing subsequently reduces the occurrence of flows. The customer satisfaction increases as well as the profit as a result of reduced waste, saved costs of production and increased quality in production. The increase in quality production which leads to increased profits helps the organization to remain competitive throughout the industry. Therefore, lean type of management is very crucial because it helps create customer satisfaction.

3.2 H2: Lean manufacturing has a positive competitive advantage

The ability to become lean and actually having it work depends on the specific way of understanding, and of looking at philosophy and the correct approach for management systems. The Toyota Company all of it right by adhering to the 4P model. The 4P model was looked into by Liker, the author of "The Toyota Way." He examined several principles within the TPS summing to 14 of them. He later categorized them into four principles: Philosophy, process, people and partners and problem solving (Salah & Carretero, 2010). Consequently, the so called 4P came into existence. On the other hand, Womack and Jones provided five principles of lean approach that they believed were the gateway to achieving successful implementation

and realization of the major objectives. Therefore, every organization would require the five principles. One way of ensuring that it actually happens is to incorporate the principles in every level of the organization and having to establish a complete transformation of the existing business system (Kollberg & Brehmer, 2006). This is like a real change requirement and the only way to see it happen is by learning how to start it. To begin with, any company that wishes to achieve successful implementation would precisely define the customers' value. After this is done, it is the responsibility of the management to see that the defined value is spread across the organization through all the departments of all the branches. Considering the fact that the defined value fails to spread throughout the organization, then we are likely in realize failure since it would result to a huge waste of the organization by producing the wrong product or service (Dal & Greatbanks, 2000).

The second principle is identifying fully the value stream and eliminating waste. Here, we are concerned with three major activities; information control, physical transformation and product definition. The layout of the production plant matters a lot. This is because it would result in a better organization of work and reliable visibility for managers and supervisors. By doing so, they will be able to pin point mistakes within the levels of production and consequently fix them. Therefore, it becomes necessary that changes in technology, organization of work flow and introduction of work boards would require effective reorganization. In order to realize the full functionality of the procedures and the flow of steps, one has to employ innovative thinking. Over time, managers have held on to the belief that flow can only result from gradual incremental improvements (Karim & Arif-Uz-Zaman, 2013).

However, lean manufacturing gives a different direction of transformation, whereby managers are required to think critically and implement radical improvements that would help come up with a whole new business management system. The next step requires that the left to pull the product he/she wants at the required time. The cumulative benefit of this step would ensure that the high cost of inventory control is reduced. The final process, pursuing perfection, involves the best performance of all the steps such that one performing step would result in considerable benefits to the next making them strong enough to establish the general outcome (Fearne & Fowler, 2006).

According to Ahlstrom and Karlson, Lean production is said to have about eight principles: continuous improvement, waste elimination, pull scheduling, mulfunctional teams, delayering, zero defects, team leaders and vertical information systems. The lean management system has waste elimination as the primary goal at every level of production. Basically, lean is meant to reduce all types of waste within the company. This coupled with gradual improvement performance that the company concentrates on quality and therefore putting waste elimination at the top of the list. There are established methods that the company uses to identify mistakes (Krajewski & Malhotra, 2013). These include training of employees to master the use of varying methods of hypothetical testing that shows how to pin point problems and come up with corresponding solutions to them. These employees are made to look for mistakes by considering variations and waste and eventually coming up with ways of eliminating them. Lean has several beliefs, many of which revolve around continuous improvement of performance and quality. Therefore, lean can be improved over time regardless of how good it is. Employees and managers are encouraged to think in

ways that would enhance the existing lean management by their continued identification and fixation of the problems.

There are various economic activities that are subject to change over time; construction and housing, food supply system, transportation, personal services and manufacturing. All these can have the tendency of changing over time. In addition, availability of new technologies and investments would result to an increased long term growth rate associated with that particular industry. However, lean approach has a different efficient change such that it has the power to bring about new major changes in a few years (Marvel & Stanridge, 2009). This system works in a more comprehensive setting than one or two areas within a firm or an industry. The only problem that can be realized is the inability of managers to generate knowledge and energy to make decisions, accurately define value, correctly identify the value stream and the ability to allow value to flow perfectly especially to the benefits of the consumer. Lean principles help achieve the major objectives of firms; improvement of performance, quality and elimination of wastes throughout the system of production.

3.3 H3: Bottom-up approach has a positive on competitive advantage

The bottom-up approach is a method whereby organization management efforts and energy flow from the subordinate segments to more significant or essential segments of an organization (Suri, 2016). It is very imperative when the energy within an organization flows from lower departments in hierarchy design. This method of management is influential and can have a great impact on the performance of the company. It is clear that the customer and the employee are on

the top of the chart in this bottom-up approach, implying that the company is customer-centric, and the employees are valued as the most important factors/input in the organization (Prajogo, Oke, & Olhager 2016). One reason why employees can affect the competitive advantage of an organization using the above-mentioned method is that it enables them to work according to their ideas.

The representatives are inspired to work hard realizing that the undertakings they are performing exude from their ideas. They, therefore, have a clear understanding of what is expected of them in the workplace. According to related research, it is hard to implement ideas that originated from someone else or the top management because sometimes the employees may be the ones who know what is supposed to be done to advance or make a company successful (Albrecht et al., 2015). One of the reasons for this is that they deal with clients on a daily basis as opposed to members of the top management. Consequently, enabling the employees to implement their ideas, can facilitate the performance of an organization.

Another reason is that employees are regarded as the partners who are critical when it comes to decision making (Rothaermel, 2015). They are appreciated because they contribute to the success of the organization, once they feel valued, they commit themselves fully, knowing that their results will be appreciated in the end. A recent study concedes that if a company wants to move forward, then it should let the employees be the decision makers and be allowed to identify flaws in the system (Rothaermel, 2015). Moreover, the bottom-up approach is also a good method to get the most out of the skills and talents of employees. There are situations whereby employees do not want to share all their knowledge or skills because they know that this will be used to improve service or products, without receiving proper credit for their input. This is where bottom-up approach becomes crucial because this method

gives the employees a sense of ownership which will consequently motivate them to put in the necessary skills and it allows the entire workforce to brainstorm and come up with the ideas necessary to help the company move forward. The top management may set the goals that are supposed to be achieved and their respective time-frame but the mechanisms used to achieve these goals come from the employees (Prajogo, Oke, & Olhager 2016). The top management again meets to decide which goals or strategies to be employed after the employees have studied them. Therefore, the employees are the engine of the organization because the critical ideas originated from them after they have brainstormed the different concepts (Prajogo, Oke, & Olhager 2016). Again the employees are also the one going to make sure that those ideas have come to fruition.

According to the study, most companies are turning towards the bottom-up approach and using some of the related management methods once the top-down fails (Albrecht et al., 2015). One of the reasons the majority of the organizations are employing bottom-up method of management is due to the fact that the team becomes more proactive. The employees can predict problems that may arise within the organization and pre-emptively formulate related solutions. Moreover, the milestone planning is also incorporated and the team members are allowed to design the to-do list, assisting in the achievement of the milestone plans (Albrecht et al., 2015). The team members are again allowed to devise their ways of executing their to-do lists. The bottom-up approach allows members of the team to think creatively.

In a bottom-up method of management, the project success is doubled because the employees are incentivized to execute their tasks. The team members are aware of what they are supposed to do and how they will go about doing their activities. One advantage of knowing what to do and the appropriate method to use is

that there are no surprises. The team members are also able to see the end before they begin working on their project. The bottom-up approach is also a good method of filling the information gap between the employees and the managers. Therefore, the bottom-up approach effects positively the organization through the involvement of the employees into the decision-making chamber.

3.4 H4: Bottom-up approach adoption has a positive competitive advantage

One competitive advantage offered by the bottom-up approach is that the company gets the upper hand in the industry. This is because the clients are attracted by the products and services of the firm using this approach rather than that of other firms simply because the customers are getting the products and services in timely and definite location. According to the recent study, the positioning of the company is the most critical thing because it helps the organization sustain and acquire more clients (Srivastava, Anand, & Jain, 2014). The bottom-up approach is the method that helps the company position itself. Therefore, the positioning, quick delivery of products in a timely manner and definite location are the elements intertwined in bottom-up that subsequently give an organization a competitive advantage.

Another way the bottom-up approach contributes to giving a company a competitive advantage is through differentiation. According to research, the differentiation of the company is realized when bottom-up approach is used within an organization (Rothaermel, 2015). The company can differentiate itself in the market through an offering of services and products that leads to the satisfaction of the client. When the bottom up method is in operation, the products and services are improved since it will require the commitment and creativity of all team members involved

(Rothaermel, 2015). Moreover, the innovation of products is enhanced in a bottom-up method of management. Therefore, the rivalry advantage of the company is improved when bottom-up approach is employed, which subsequently leads to differentiation of the organization (Rothaermel, 2015). Although the differentiation of an organization can also be realized when the top-down method of management is in operation, the differentiation factor is realized more when the bottom-up type of management is used.

According to research, a company may gain a competitive advantage over other firms in the market when the firm has people who can innovate and create goods and services that provide a better customer experience than the services or products of other companies (Park, Kim, & Krishna, 2014). The bottom-up approach offers an opportunity to the members of an organization to be creative and innovative. Moreover, the members of an organization are also able to establish relationships that may lead to improved services and products (Park, Kim, & Krishna, 2014). Other firms may be tempted to copy the goods of the organization or porch the top-notch employees, but once the method of bottom-up management is in place, it ensures that even new employees can become creative and innovative.

A study asserts that having a good culture and structure in an organization brings competitive advantage to the firm (Rothaermel, 2015). The bottom-up approach creates a conducive environment that promotes positive culture and structure that are necessary for competition. An excellent example of how bottom-up approach is inclined to create a good culture is through the sharing of common goals and ideas. An organization may have employees who have good skills and talent, but if they do not share the mission and goals of the organization, the competitive advantage may not be realized quickly. One of the reasons why the lack of sharing

may not create a competitive advantage is that each employee does his tasks according to his motivation (Rothaermel, 2015). It is hard for employees to motivate themselves, but once they can share ideas and mission, they become motivated.

Processes, practices, and products, as well as intellectual property, are some of the methods associated with the bottom-up approach allowing a competitive advantage to an organization. Superior methods of production often associated with bottom-up approach are tools that create competitive advantage (Suri, 2016). Other firms in the market may be able to replicate the products, but they cannot imitate methods and practices that are used to produce them. One good example to protect the design of the products which is susceptible to replication by other firms is intellectual property. Some laws are drafted to curtail the activities of "monkey see, and monkey do." The law may allow the firms to copy the design of specific products but can also set limits on such practices (Suri, 2016). Therefore, the competitive advantage is created through processes, the design of the product and practices. These parameters that culminate to competitive advantage are enhanced when the bottom up approach management is in operation.

3.5 H5: Performance has a positive effect on competitive advantage

Normally, organizations are regarded as cohesive organisms that find better ways of doing things and the financial performance is amongst the best ways any firm can use to optimize its activity in an environment (Elshaer & Augustyn, 2016). Some of the sources of competitive advantage are financial performance being that success primarily depends on the level of funding. The way in which a firm performs financially has a great impact on its competitive advantage. Enhancing financial

performance contributes towards the general business improvement thus leading to competitive advantage. Financial performance sends positive signals to the shareholders and the employees of an organization. The impact of a shareholder may make an organization do well because of the way the outsiders look at it. The Financial performance reflects the overall performance of an organization and sends a signal that the business is doing well (Elshaer & Augustyn, 2016). It is a sign of effective formulation of strategies which leads to overall performance.

A firm that is doing well financially, is likely to implement a value-creating strategy which has never been created by any other potential competitor and is probably hard to duplicate. Giachetti (2016) observes that a firm may decide on the type of competitive advantage it seeks to attain since that can help to establish a profitable sustainable advantage. Financial performance may help a firm to sell its products at a price lower than its competitors because it has strong financial muscle hence attracting more customers in an industry. Financial performance implies economical utilization of resources to make a profit which when compared to other competitors, may mean that the organization works much better than other competitors in resource utilization Giachetti (2016).

A firm with sound financial performance can always make extra money that they can use to engage in value creating processes that cannot be duplicated by its competitors hence leading to a sustainable competitive advantage. An organization with sustainable competitive advantage is likely to improve its competitive position within an industry thus helping it to survive against its competition over a long period. Such competitive advantage that is derived from sound financial performance may be as a result of available funds to invest in knowledge or unique technology that can

trigger a significant buying criterion. It is worth noting that sustainable competitive advantage creates products or services that cannot be easily imitated.

Financial performance further offers business support service since money is the lifeblood of a business and therefore finance is needed to gain assets, run market surveys or develop products which may provide the necessary competitive advantage. A firm that experiences good financial performance is able to run expensive marketing and advertising because they have the money to carry out such activities. In addition, finance may make a business to be efficient and reactive thus seizing every opportunity that knocks hence boosting the revenues or profits of an organization making it the best performing or profit making company in an industry Giachetti (2016). It is also worth noting that a firm whose financial performance is considered great is likely to attract the best employees which in turn leads to increase in productivity and efficiency compared to the other competitors.

Moreover, Tracey et al (1999) identify price/cost quality, delivery, and flexibility as crucial competitive capabilities. Several studies measure organizational performance by using financial market tools like return on investment, market share, profit on margin sales, and the growth of market. As a result, quality impacts both the organizational performance and its competitive advantage as well. Newbert (2008) state that top – management can benefit from the findings that a competitive advantage stems from the combination of valuable and rare resources. So, if the exploitation of such resources did not lead to the attainment of competitive advantage, then these resources are not valuable.

3.6 H6: Performance mediates the relationships in H1 and H2

3.6.1 Financial Performance has a positive effect on Lean management

Kamukama, Ahiauzu, and Ntayi (2011) assert that positive financial performance shows that a lean system has clearly led to financial gain. Positive financial performance may also mean that the stakeholders are satisfied and that they have contributed accordingly to ensure that the lean management is successful. Some of the stakeholders are the customers who must be satisfied before making any decision to purchase a product. Also, a positive financial performance is an indication of what is working for an organization because the main goal of any organization is making a profit and a good financial performance means that a firm is making a profit(Kamukama, Ahiauzu and Ntayi (2011). A proof that all the organizations' capabilities are working is positive financial performance. Unless the capabilities work well, it may not be easy to attain positive financial performance.

In addition, a positive financial performance indicates that the lean system has led to greater operational flexibility and reduction of the lead time as well as improved efficiency such as an improvement in labor utilization. Williams (2010) posits that efficient management of resources is likely to reduce the cost of production and any other unnecessary costs hence leading to a higher profit margin. There will be an indication of improvement in productivity meaning that an organization does well in converting resources to cash. Lean management can also lead to good financial performance if the management understands the surrounding that they operate in and shows competency in their operation. Understanding the surrounding macroeconomics may help in the successful execution of duties or certain management style thus leading to good financial performance (Kamukama, Ahiauzu & Ntayi, 2011). Generally, positive financial performance indicates that a

lean management is successful and that an organization has reaped positive outcome from their management style. In most cases, realizing positive financial performance from a lean management may sometimes take longer time and therefore, if it is realized at a particular stage, it means that the business is stable and that the lean management system must have been applied sometimes back.

3.6.2 Financial Performance has a positive effect on Lean manufacturing

Financial performance tends to help lean manufacturing by improving operations and processes and therefore, positive financial performance shows that an organization is able to produce high-quality products at a reduced waste (Hadid, Mansouri, & Gallear, 2016). Also, positive financial performance is a sign that an organization should continue with lean manufacturing system because it generates financial profitability and that a firm successfully manages to produce a customer satisfying product. It shows that there is an existence of enhanced productivity measures in the manufacturing process and that the environment in which a business operates is favorable. According to Elking et al. (2017), a positive financial performance is a clear indication that waste during the manufacturing process is reduced to the minimum and may motivate the management of a firm to introduce even more stringent measures to reduce waste and increase the profitability of the organization because they are already motivated by the positive results.

The application of lean helps in improved stock turns. The reduced stockpile in the form of finished goods automatically helps to reduce the money associated with the store. Moreover, reduced stockpile also minimizes chances of borrowing money from the bank that may be used to produce the unwanted stockpile. It also

improves the performance of an organization because it helps the workers have a new perspective of ownership.

Lean production requires involvement and practice by the higher management for it to achieve positive results and this can be proved by a positive financial performance which acts as a sign of successful implementation of lean manufacturing by the top management (Elking et al., 2017). Also, positive financial performance implies that the lean manufacturing has achieved a reduction in waiting time and proves that a firm is able to produce output as per the real market demands thus increasing productivity (Hadid, Mansouri, & Gallear, 2016). In that case, positive financial performance promotes the continuous application of the lean manufacturing process because of the positive outcome which clearly shows that the existing system is effective.

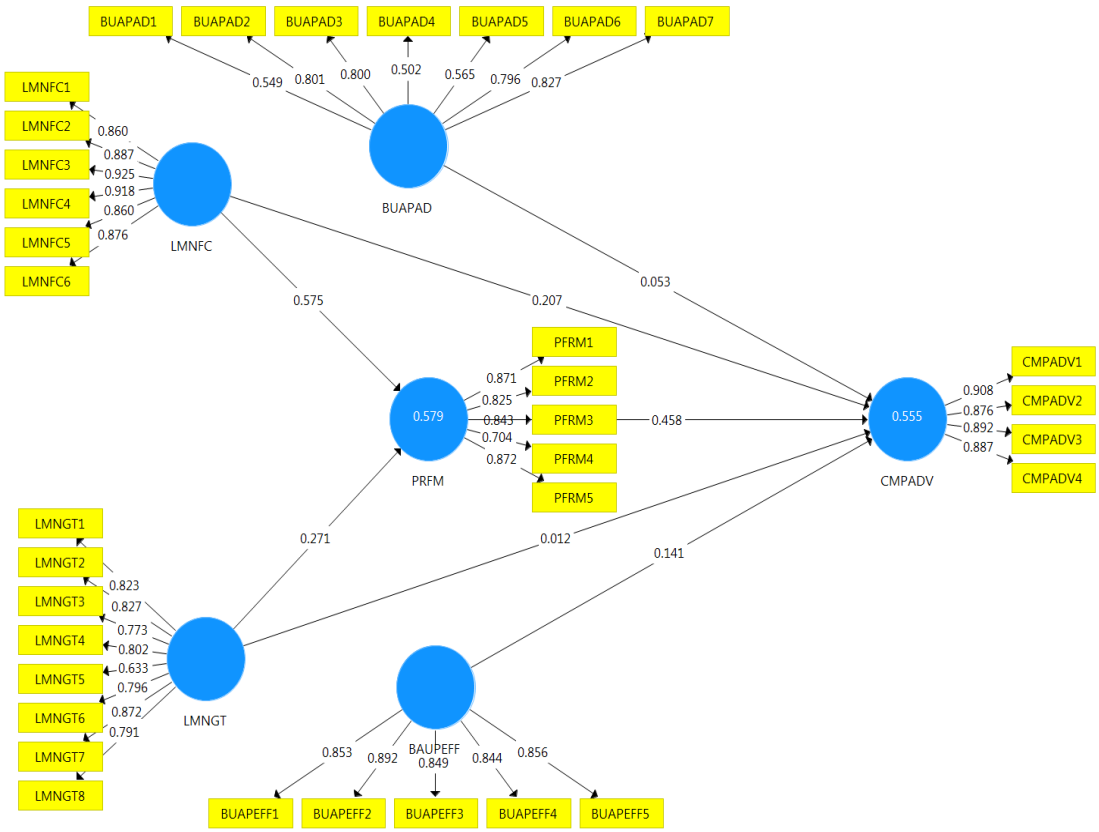
3.7 Chapter summary

The lean type of management is geared to eliminate inefficiencies, resulting in a positive influence on the performance of the organization. The customer satisfaction is almost doubled when lean management approach is used in an organization. Clients can get their products in a timely manner and precise location. On the other hand, bottom-up type of management has the ideas governing the organization coming from junior staff. Bottom-up has a competitive advantage because products and services are enhanced for the simple reason that employees are motivated to materialize their ideas.

The research has shown that contemporary cooperate world is having firms adopting the lean and bottom-up type of management. Firms are increasingly adopting bottom-up or are incorporating the components of bottom-up together with

top-up management approach. The critical components that are realized by the organization as a result of using a bottom-up type of management are innovation and creativity. The employees are more engaged with the running of business when bottom-up method is in use within an organization.

The model of this research paper is as shown below:



Chapter Four

Methodology

In this Chapter, we begin by the sample and variables measured in this study, then we move to the scales used and the instruments needed to complete the research.

4.1 Sample and Measured Variables

The research used will be both quantitative and qualitative. Quantitative research will be used in order to provide a measure of how employees and managers both behave and feel towards a systematic waste free environment in the workplace. Qualitative research will be used in order to explore user's opinion, interest and perception towards applying the lean system in their organization.

The survey was dispersed to 2,000 working individual. The sample contains 110 respondents of working MBA students and none students. The respondents are knowledgeable about the adoption level of lean manufacturing and the adoption level of bottom-up approach in their company as well as the performance of their organization, financially and in comparison with their competitors.

The survey starts by indicating the level of adoption of Lean Manufacturing in the organization, and then measures the degree of adoption of the bottom-up approach. It aims to show the effectiveness of the implementation of both methods, and the direct and indirect relationship it has with the company's performance, in addition to the demographics factors.

The survey includes 35 questions in total. It includes questions about lean management (8 items) and lean manufacturing adoption (6 items), bottom-up

effectiveness (5 items), bottom-up adoption level (7 items), level of performance (5 items) and competitive advantage (4 items). The questionnaire is accessible in Appendix A.

The level of adoption of lean manufacturing and the performance questions are measured using: *1: poor, 2: fair, 3: good, 4: very good, and 5: excellent*, whereas, the level of adoption of the bottom-up components, the effectiveness of lean management and the effectiveness of the bottom-up questions is weighted with 5-point Likert scale: *1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree.*

4.2 Instrumentation

Statistical analysis will be used to determine reliable and valid results of the relationship between lean manufacturing, bottom-up approach and performance. With the results obtained, this paper will evaluate the interdependency of the different variable using SPSS IBM software and the Smart-PLS 3 software. In this paper, the statistical systems implemented are: *Descriptive Analysis, reliability analysis, discriminant validity analysis, path coefficients, and correlation analysis.*

Chapter Five

Statistical Analysis

This chapter studies the statistical analysis of the survey's result. In this thesis the Smart-PLS 3 software was used to construct the PLS-SEM for the variables in the model (i.e., lean management, bottom up approach, performance, and competitive advantage). All variables are first-order construct factors.

5.1 Descriptive Analysis

The study consists of 110 samples. Table 1 shows the level distribution of the educational level. The result showed that 39 employees have an undergraduate degree (35.5%), and 65 with a graduate degree (59.1%). The results are shown in the table below.

TABLE 1: EDUCATION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High school	6	5.5	5.5	5.5
	Undergradute degree	39	35.5	35.5	40.9
	Graduate degree	65	59.1	59.1	100.0
	Total	110	100.0	100.0	

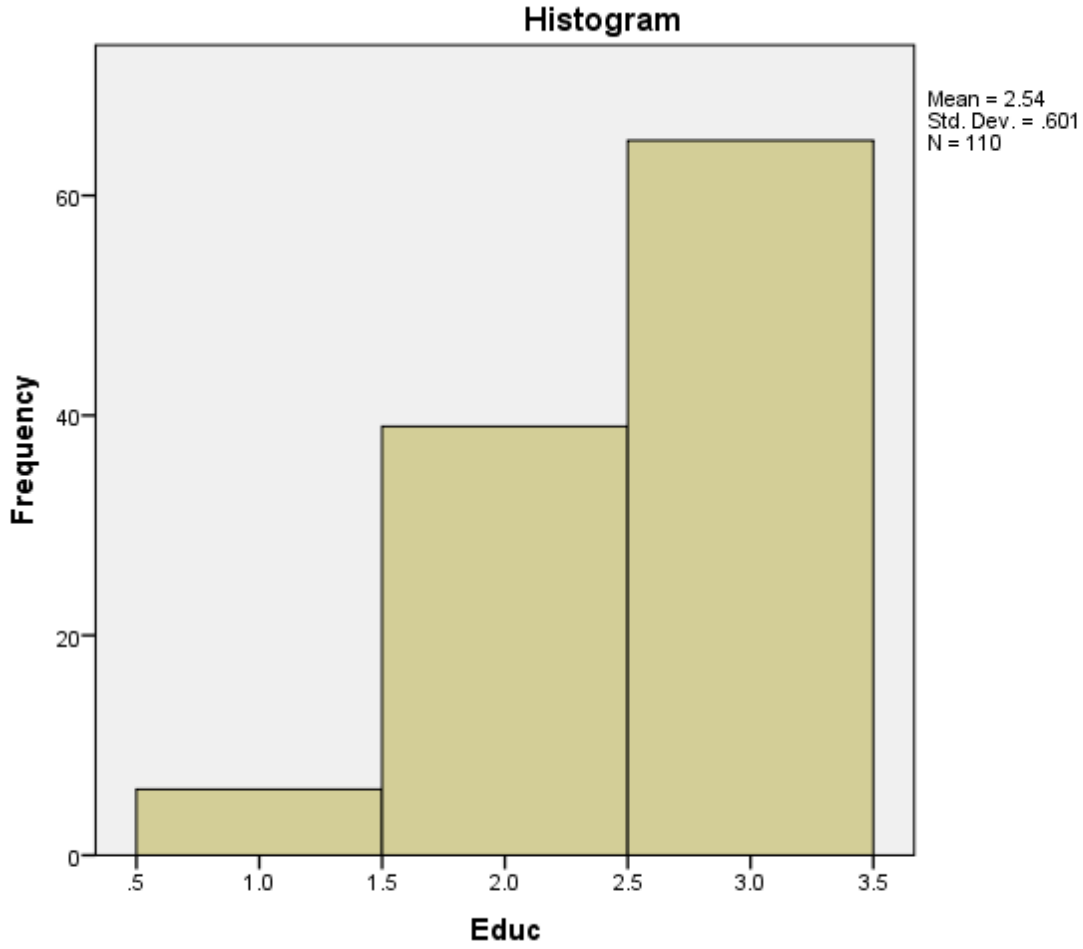


FIGURE 1: DEGREE DISTRIBUTION

TABLE 2: POSITION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Top Management	20	18.2	18.2	18.2
	Middle Management	35	31.8	31.8	50.0
	Supervisory	24	21.8	21.8	71.8
	Employee	31	28.2	28.2	100.0
	Total	110	100.0	100.0	

Table 2 shows the position level of the respondents. It consists of 20 employees in the top management level (18.2%), 35 in the middle management level (31.8%), 24 employees are supervisors (21.8%) and 31 employees in the none-managerial position (28.2%).

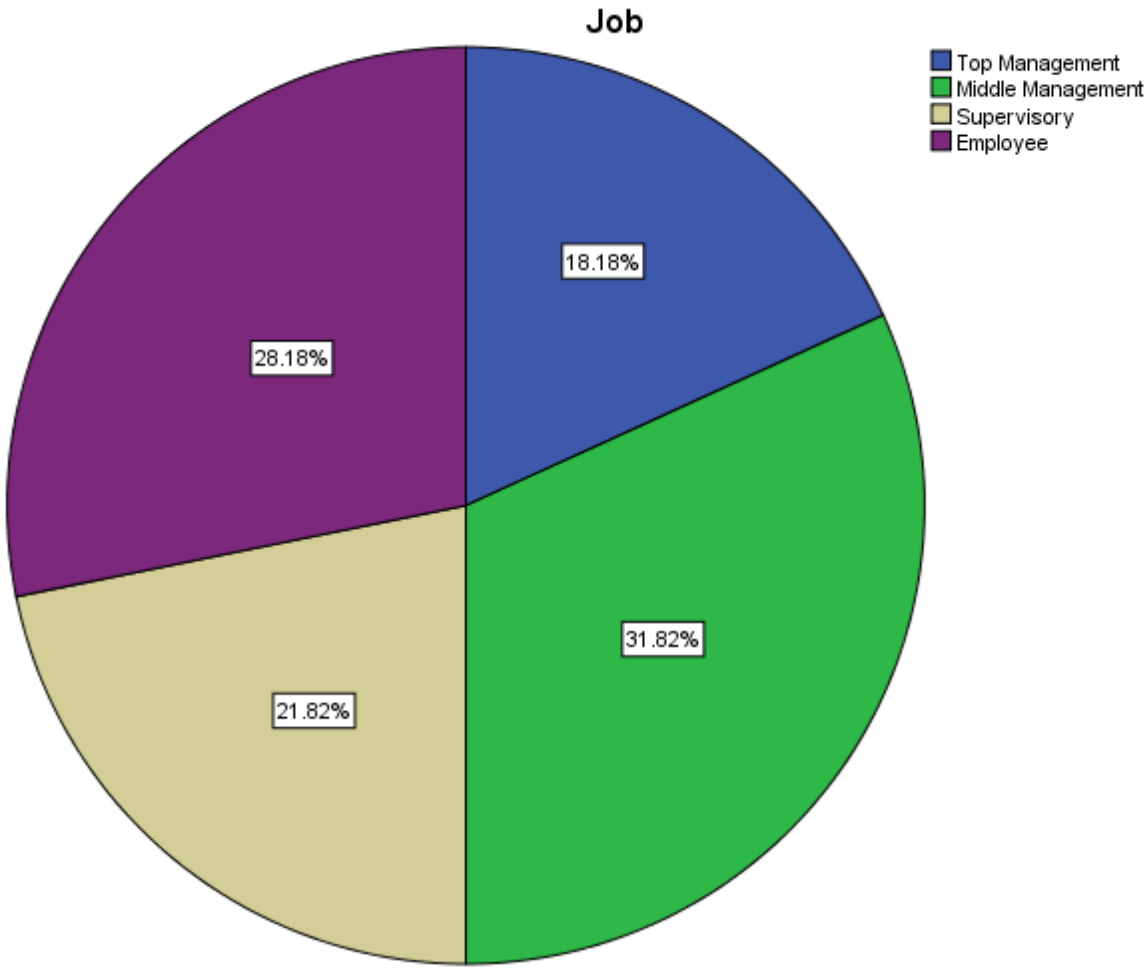


FIGURE 2: EMPLOYMENT DISTRIBUTION

TABLE 3: AGE

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 20 years	3	2.7	2.7	2.7
	20 to 30 years	42	38.2	38.2	40.9
	31 to 40 years	35	31.8	31.8	72.7
	41 to 50 years	18	16.4	16.4	89.1
	More than 50 years	12	10.9	10.9	100.0
	Total	110	100.0	100.0	

The 110 sample of employees show that the highest percent of respondents are between 20 to 30 years, 42 respondents (38.2%), 35 are set between 31 to 40 years (31.8%), 18 employees are between 41 to 50 years (16.4%), and only 12 respondents are more than 50 years (10.9%). Figure 3 below show the distribution of age.

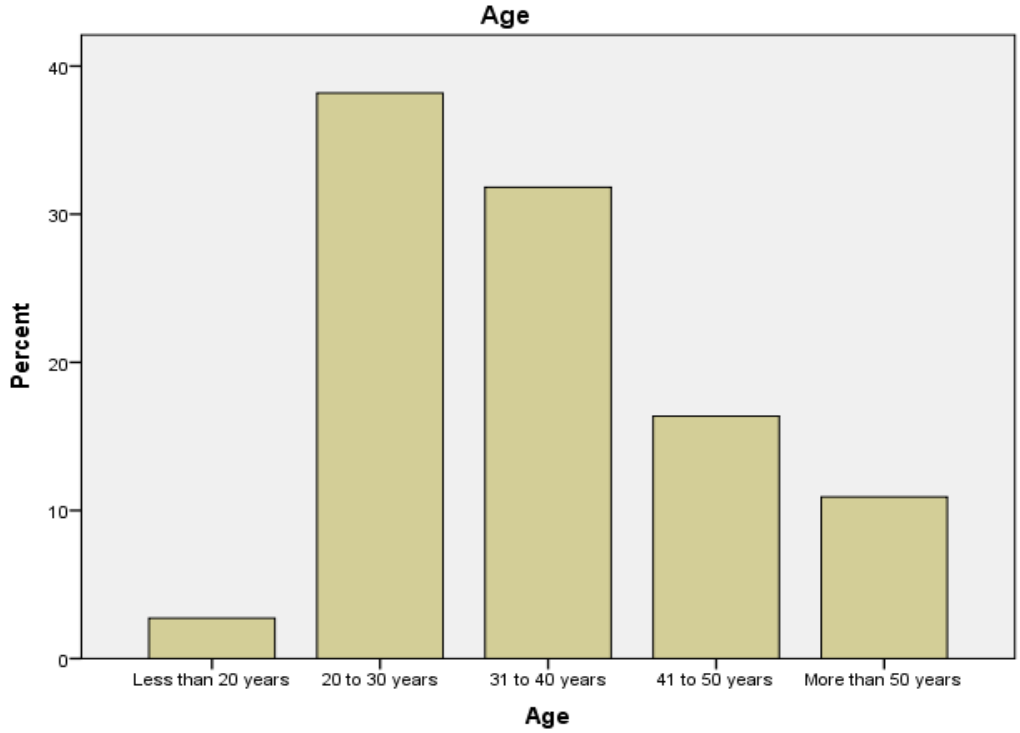


FIGURE 3: AGE

Expr

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3 years	23	20.9	20.9	20.9
	3 to 5 years	35	31.8	31.8	52.7
	6 to 10 years	21	19.1	19.1	71.8
	More than 10 years	31	28.2	28.2	100.0
	Total	110	100.0	100.0	

TABLE 4: EXPERIENCE LEVEL

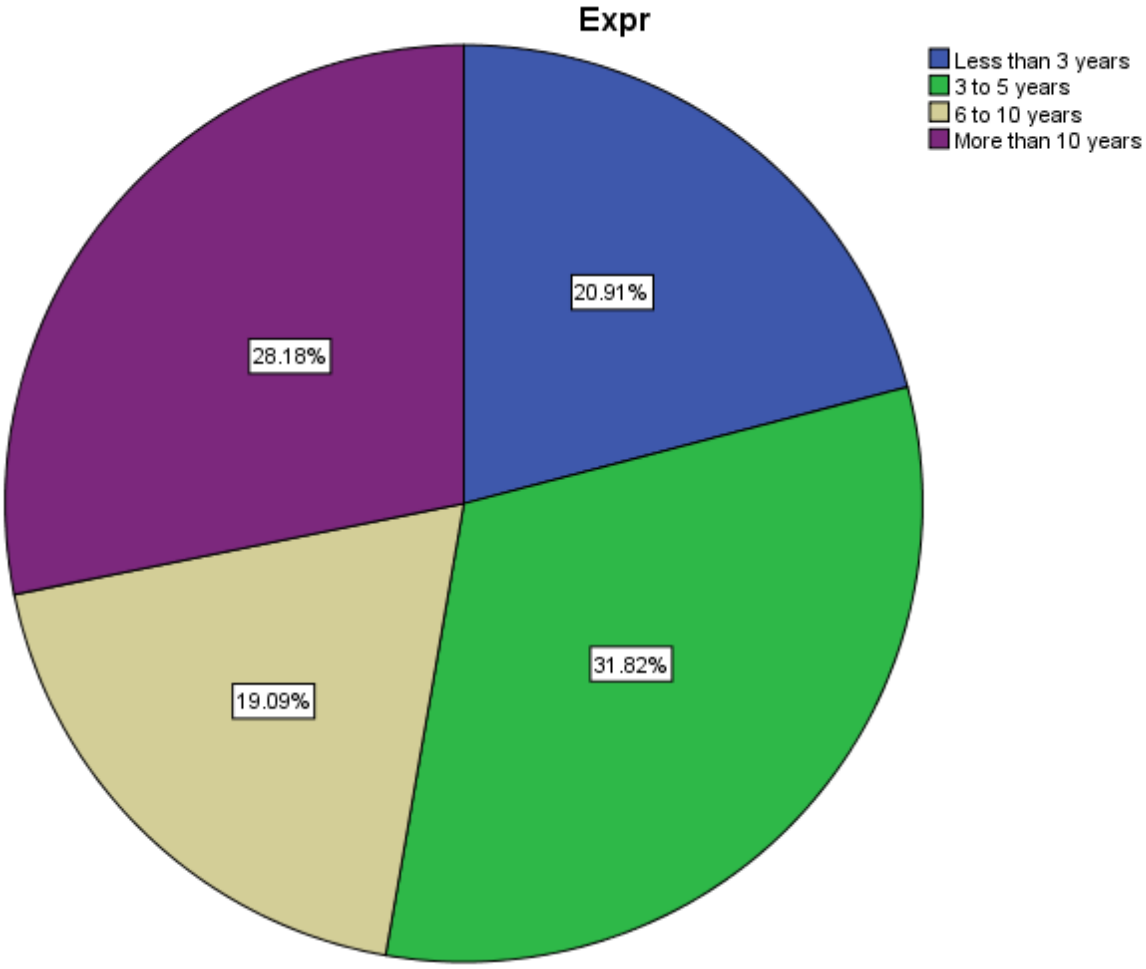


FIGURE 4: EXPERIENCE LEVEL

In table 4 above, the experience of the sample taken shows that 35 of the employees show that they have an experience of only 3 to 5 years (31.8%), 31 respondents are more than 10 years (28.2%), 23 are less than 3 years (20.9%), and 21 are between 6 to 10 years (19.1%).

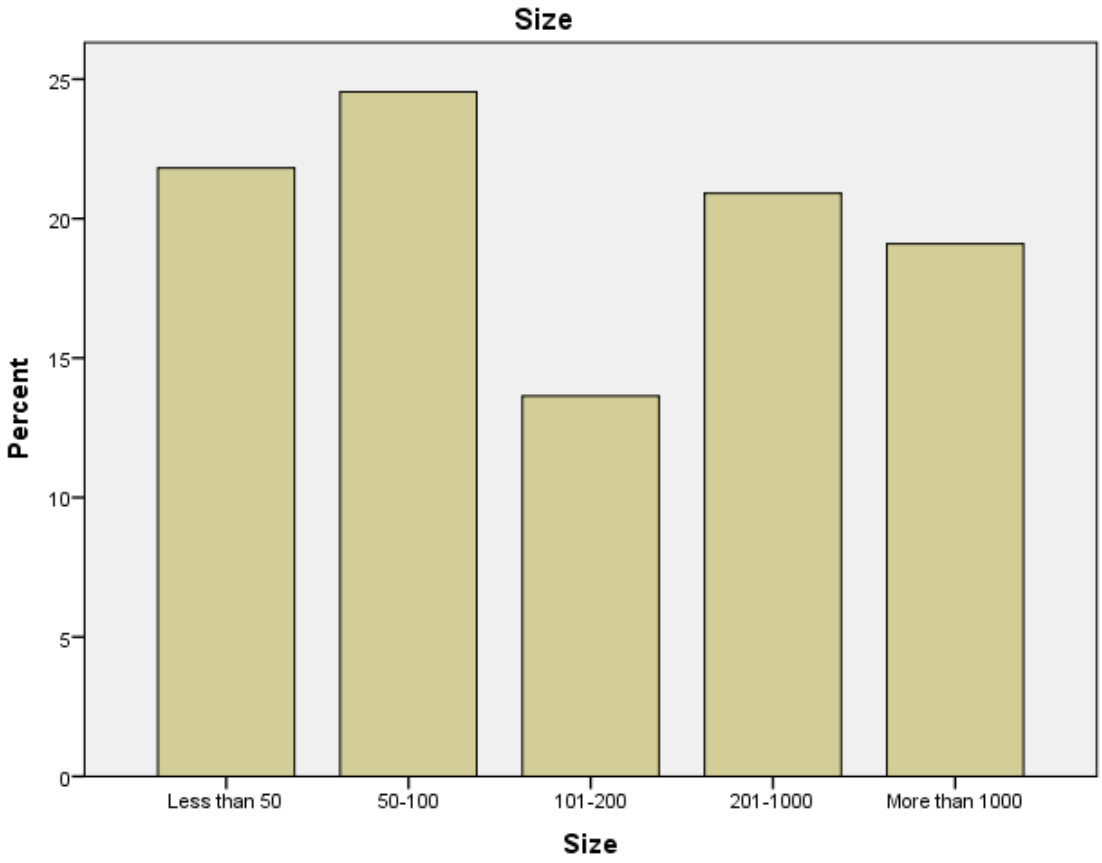


FIGURE 5: SIZE OF THE COMPANY

Size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 50	24	21.8	21.8	21.8
	50-100	27	24.5	24.5	46.4
	101-200	15	13.6	13.6	60.0
	201-1000	23	20.9	20.9	80.9
	More than 1000	21	19.1	19.1	100.0
	Total	110	100.0	100.0	

TABLE 5: SIZE OF THE COMPANY

The figure and table above show the size of the company the respondents work in. It shows that 27 out of the 110 sample work in 50-100 employee company (24.5%), 24 work in a less than 50 (21.8%). 23 shows they work in a 201-1000 sized company (20.9%). 21 respondents work in a more than 1000 sized company (19.1%) and the minority work in a 101-200 sized company (13.6%).

5.2 Cross Tabulations and Chi-Square Tests

	Less than 20 years	20 to 30 years	31 to 40 years	41 to 50 years	Higer than 50 years
Top Management	0%	2.7%	8.2%	2.7%	4.5%
Middle Management	0%	7.3%	14.5%	6.4%	3.6%
Supervisory	0%	12.7%	4.5%	4.5%	0%
Employee	2.7%	15.5%	4.5%	2.7%	2.7%
% Within Age (Total)	2.7%	38.2%	31.8%	16.4%	10.9%

TABLE 6: AGE IN RELATION WITH POSITION

The results shown in table 6 indicate that workers less than 20 years old are mainly employees. Whereas the employees that are between 20 to 30 years, 2.7% are Top managers, 7.3% are in the Middle management, 12.7% are supervisory and 15.5% and employees. Though workers that range between 31 to 40 years, 8.2% are in Top management, 14.5% are in middle management, 4.5% are supervisory as well as 4.5% also are employees. For the employees that stand between 41 to 50 years, 2.7% work in top management, 6.4% in middle management, 4.5% supervisory, and 2.7% are none managerial. Lastly, the employees that are higher than 50 years, 4.5% are in higher position (top management),3.6% in middle management and 2.7% are simply employees.

	Less than 3 years	3 to 5 years	6 to 10 years	More than 10 years
Top Management	1.8%	2.7%	1.8%	11.8%
Middle Management	3.6%	7.3%	11.8%	9.1%
Supervisory	1.8%	12.7%	2.7%	4.5%
Employee	13.6%	9.1%	2.7%	2.7%
% Within Experience (Total)	20.8%	31.8%	19%	28.1%

TABLE 7: EXPERIENCE IN RELATION WITH POSITION

Results in Table 7 show that employees with experience less than 3 years mainly are none managerial with 13.6%, 3.6% are middle management, 1.8% are supervisors or in top management position. As for the people that have 3 to 5 years of experience 2.7% are in top management, 7.3% in middle management, 12.7% in supervisory and 9.1% are employees. As for the employees with 6 to 10 years of experience stand mostly in middle management 11.8%, 2.7% are either supervisors or employees and 1.8% are in top management. For personnel with 10 years' experience are mainly top managers 11.8%, 9.1% are middle managers, 4.5% are supervisors and the remaining 2.7% are none managerial.

	High school	Undergraduate	Graduate
Top Management	0%	1.8%	16.4%
Middle Management	1.8%	12.7%	17.3%
Supervisory	0.9%	10.9%	10%
Employee	2.7%	10%	15.5%
% Within Education (Total)	5.4%	35.4%	59.2%

TABLE 8: POSITION IN RELATION WITH EDUCATION

Table 8 above shows that 1.8% of employees with high school degrees are in middle management, 0.9% supervisory and 2.7% employees. Whereas 1.8% of employees with bachelor degrees are in top management, 10.9% are in supervisory positions, 12.7% in middle management and 10% are working a none managerial position. As for the employees with graduate degrees, 16.4% are in top management, 17.3% are in middle management, 10% are supervisors and 15.5% are employees.

Table 6 shows the cross tabulation of age in relation of the position. A chi-square test was made to study the relativeness of both variables. In this respect, the following hypothesis were made:

H_0: there is no correlation between age and job position

H_1: there is a correlation between age and job position

The correlation between these variables are significant, $\chi^2(12, N = 110) = 34.263$, p-value = 0.002. H1 is supported, there is a relation between age and job position.

Table 7 shows the correlation between the experience of the employee in relation with the position. The hypothesis tested are shown below:

H_0: there is no correlation between experience and position

H_1: there is a correlation between experience and position

The Chi-square test is $\chi^2(9, N = 110) = 41.820$, p-value = 0.000. The test shows that there is a relation between the variables.

As for table 8, it studies the relationship between education and position

H_0: there is no correlation between education and position

H_1: there is a correlation between education and position

The correlation between these variables are insignificant, $\chi^2(6, N = 110) = 13.466$, p-value = 0.007. We reject H1 and accept the null hypothesis H0, there is no relationship between the variables.

5.3 Measurement Model

Table 9 below shows the reliability test measures. The results indicate that all values are reliable with respect to the values of Composite Reliability, which requires a minimum of 0.7. Moreover, the average variance extracted (AVE) for each measure is higher than minimum value of 0.5 (Fornell and Larcker's, 1981). Thus, at least 50% of the variance was explained by the constructs. This indicates that the factors are reflective and a high scale reliability.

TABLE 9: COMPOSITE RELIABILITY ANALYSIS

	Cronbach's Alpha	Average Variance
BAUPEFF	**0.911**	**0.738**
BUAPAD	**0.821**	**0.500**
CMPADV	**0.913**	**0.794**
LMNFC	**0.946**	**0.789**
LMNGT	**0.914**	**0.628**

Table 10 shows the variables' discriminant validity analysis. The results show that each number on the diagonal is higher than all values on its left or below it.

TABLE 10: DISCRIMINANT VALIDITY ANALYSIS

	BAUPEFF	BUAPAD	CMPADV	LMNFC	LMNGT	PRFM
BAUPEFF	0.859					
BUAPAD	0.524	0.704				
CMPADV	0.434	0.596	0.891			
LMNFC	0.377	0.788	0.642	0.888		
LMNGT	0.644	0.756	0.533	0.566	0.792	
PRFM	0.390	0.647	0.705	0.728	0.596	0.825

5.4 Structural model

Figure. 6 represent the structural model. All path coefficients are positive.

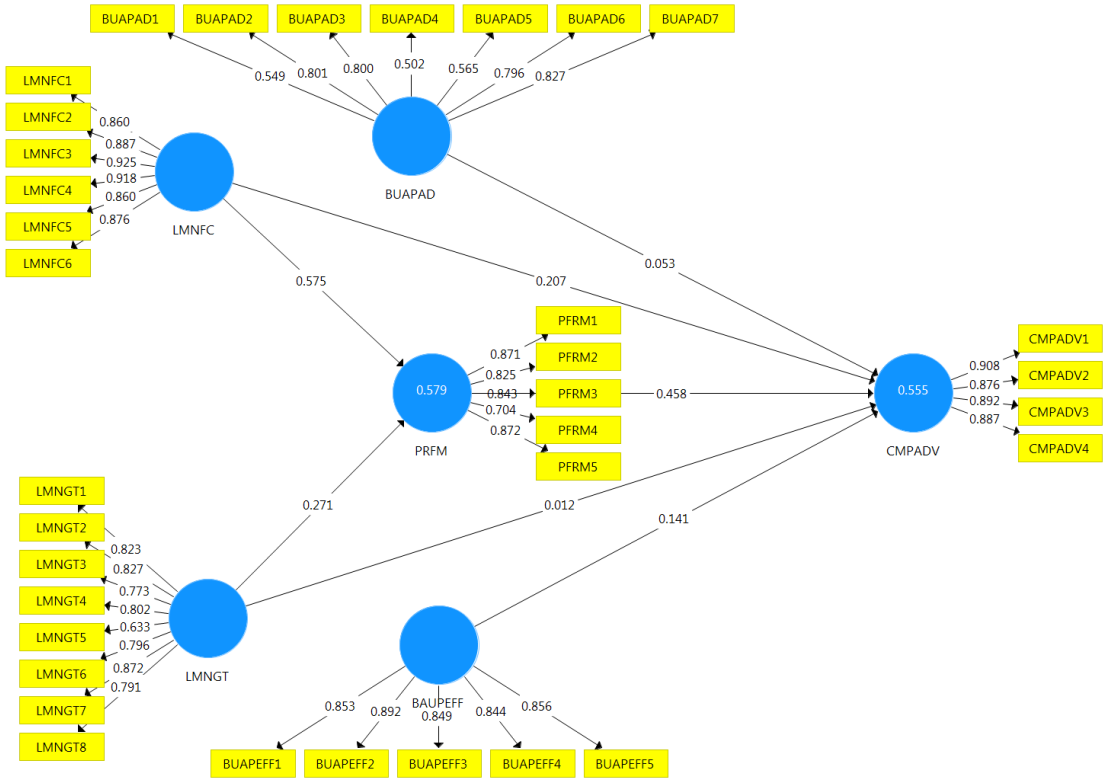


FIGURE 6: STRUCTURAL MODEL

To test for the significance of coefficients, bootstrapping method was implemented. Table. 10 show the results. The results indicate a significant impact of lean manufacturing adoption and lean management on corporate performance. Out of all independent variables, only corporate performance and lean manufacturing adoption had a significant impact on competitive advantage. Moreover, results show

that bottom up approach and bottom up approach adoption have an insignificant impact on competitive advantage with p-values of 0.096 and 0.733 respectively.

TABLE 11: PATH COEFFICIENTS

	Sample Mean	**Standard Deviation**	**T Statistics**	**P Values**
BAUPEFF -> CMPADV	0.155	0.085	1.665	0.096
BUAPAD -> CMPADV	0.096	0.154	0.341	0.733
LMNFC -> CMPADV	0.435	0.145	3.243	0.001*
LMNFC -> PRFM	0.565	0.093	6.151	0.000*
LMNGT -> CMPADV	0.124	0.136	1.004	0.315
LMNGT -> PRFM	0.285	0.110	2.463	0.014*
PRFM -> CMPADV	0.443	0.114	4.016	0.000*

Table 11 below shows the results of the indirect effect significance of lean management and lean manufacturing adoption on competitive advantage. The results indicate that both lean manufacturing adoption and lean management significantly and indirectly impact competitive advantage through corporate performance.

Therefore, performance fully mediates the effect of lean management on competitive advantage and partially mediates the effect of lean manufacturing adoption on competitive advantage.

TABLE 12. INDIRECT IMPACT OF LEAN MANAGEMENT AND LEAN MANUFACTURING ADOPTION ON COMPETITIVE ADVANTAGE

	Sample Mean	**Standard Deviation**	**T Statistics**	**P Values**
LMNFC -> CMPADV	0.253	0.085	3.113	0.002
LMNGT -> CMPADV	0.123	0.051	2.417	0.016

Chapter Six

Discussion and Conclusion

Following the success of the Toyota firm, many companies have made efforts to acquire the lean approach with the aim of improving their performance. As such, these companies have developed great interest in getting to know more about the requirements of lean implementation within a working company system and have dedicated their time and resources towards finding the best way to adapt to the system. The business world is always concerned about improving their profit as well as respond quickly and adequately to the demands of customers (Wan & Frank Chen, 2008), this comes along with stiff competition between firms in same product line, since they all strive to obtain the largest market share. In order to remain competitive and improve profits, a company would require a solid management system to help them control stock and distribution, however, this comes with a major challenge-incorporating the identified management system into the daily operations (Thomas & Chuke-Okafor, 2008). However, the lean approach is gradually advancing and will be able to secure and stabilize the life of a company during tough economic times (Sawhney & Capizzi, 2010). Its ability to eliminate excess inventory is vital as well as improving productivity by ensuring that quality is well considered. Quality products helps the company establish a strong bond with its customers and at the same time improves their public image. Generally, the firm will be able to acquire competitive advantage in the long run, a self-sustaining system and a company with little or no wastes. An economy that concentrates on the continuous improvement of the lean approach will be able to count on effective productivity, profitability and customer

responsiveness (Gapp & Kabayashi, 2008). However, based on real life research and data collection in Lebanon, we were able to differentiate the effect of each mentioned hypothesis and their impact on the competitive advantage of the company. Thus, results show that bottom-up approach and bottom-up adoption have an insignificant impact on competitive advantage. As for the mediation analysis, it shows that both lean manufacturing adoption and lean management significantly and indirectly impact competitive advantage through corporate performance. Therefore, performance fully mediates the effect of lean management on competitive advantage and partially mediates the effect of lean manufacturing adoption on competitive advantage. Many studies show a relationship between Lean and its positive impact on an organization, wherever these theories don't prove that lean has a direct effect on the competitive advantage of a firm, as it depends on a numerous interdependent variables. Further research is needed to evaluate the degree to which these outcomes can be generalised. Furthur research are suggested to clarify the relationship between operational management and competitive advantage.

The applied bottom-up approach is required to be established statistically by further research. This is to ensure that the proposed theories are founded on facts and figures. In addition, the idea should be compared to the top-down approach and establish the suggested effectiveness of the approach against the top-down.

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Appendix A

Survey Questionnaire Sample

Consent to participate in a Survey/Questionnaire

You are kindly requested to complete the following questionnaire related to study that examines the effectiveness of lean management in using the bottom-up approach. Your participation in this study is voluntary. All information is confidential and your name is not required. If you choose to participate, please complete the survey as truthfully as you can. Your assistance is greatly appreciated.
By continuing with the questionnaire/survey, you agree with the following statements:

1. I have been given sufficient information about this research project
2. I understand that my answers will not be released to anyone and my identity will remain anonymous. My name will not be written on the questionnaire nor be kept in any other records
3. I understand that all responses I provided for this study will remain confidential. When the results of the study are reported, I will not be identified by name or any other information that could be used to infer my identity. Only researchers will have access to view any data collected during this research however data cannot be linked to me.
4. I understand that I may withdraw from this research any time I wish and that I have the right to skip any question I don't want to answer.
5. I understand that my refusal to participate will not result in any penalty or loss of benefits to which I otherwise am entitled to.
6. I have been informed that the research abides by all commonly acknowledged ethical codes and that the research project has been reviewed and approved by the Institutional Review Board at the Lebanese American University
7. I understand that if I have any additional questions, I can ask the research team listed below
8. I have read and understood all statements on this form
9. I voluntary agree to take part in this research project by completing the following survey

If you have any questions you may contact me:

Dr. Raed El Khalil	raed.elkhalil@lau.edu.lb	+961 1 786 456 ext. 1655
Dr. Abdul-Nasser El-Kassar	abdulnasser.kassar@lau.edu.lb	+961 1 786 456 ext. 1189

Gaelle Marguarossian gaelle.marguarossian@lau.edu +961 76 084 082

I. Demographics

a. Age

- Less than 20 years
- 20 to 30 years
- 31 to 40 years
- 41 to 50 years
- More than 50 years

b. Job Position

- Top Management
- Middle Management
- Supervisory
- Employee

c. Length of time being employed

- Less than 3 years
- 3 to 5 years
- 6 to 10 years
- More than 10 years

d. Educational Level

- High School
- Undergraduate University degree
- Graduate Degree

e. Size of the company

- Less than 50
- 50-100
- 101-200
- 201-1000

- More than 1000

II. Please indicate the level of adoption of Lean Manufacturing in the organization in the last 5 years (tick in the appropriate box):

5-point scale: 1=Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent

		1	**2**	**3**	**4**	**5**
LMNFC 1	Empowerment of the workforce towards lean manufacturing					
LMNFC 2	The company prioritized processes and implemented a standardization process					
LMNFC 3	The company has developed guidelines for waste management					
LMNFC 4	The company developed a visual management board					
LMNFC 5	The company developed a plan and execution for every process					
LMNFC 6	The company understands lean management initiatives					

III. Please indicate your company's bottom-up approach adoption level (Tick in the appropriate box)

5-point scale: 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

		1	**2**	**3**	**4**	**5**
BUAPAD 1	Executives set the direction and define the mission					
BUAPAD 2	Employers are involved in identifying and delivering optimizations					
BUAPAD 3	Organizational changes have increased visibility					
BUAPAD 4	The strategic decision that is implemented by the organization is based on top management					
BUAPAD 5	Operation is based on a decentralized organization					
BUAPAD 6	Meetings with the management is held more often					
BUAPAD 7	Employees draw out ideas and generate initiatives					

IV. Please indicate the effectiveness with the following statements regarding the lean management in the organization (tick in the appropriate box):

5-point scale: 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

		1	2	3	4	5
LMNGT 1	Lean management initiatives reduce the time in improving the process or a product					
LMNGT 2	Lean management maintains competitive advantage in price and service					
LMNGT 3	Lean management has encouraged reduction of costs					
LMNGT 4	Lean environment is geared towards improving quality					
LMNGT 5	Line balancing will ensure the efficiency in the workforce					
LMNGT 6	The model reduces the cost of management and it is useful in enhancing and improving the satisfaction level of customers					
LMNGT 7	Lean management reduces stress in the team members and improves employee morale					
LMNGT 8	Lean management makes managing an area much easier					

V. Please indicate the effectiveness with the following statements regarding the bottom-up approach in the organization (tick in the appropriate box):

5-point scale: 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

		1	2	3	4	5
BUAPEFF 1	Bottom-up approach improves team communication					
BUAPEFF 2	Bottom-up approach improves team building					
BUAPEFF 3	Bottom-up approach motivates employees to better achieve their goals					
BUAPEFF 4	Bottom-up approach empowers team members to think more creatively					
BUAPEFF 5	Schedule, projects and results become transparent					

VI. Please indicate your company's current level of performance in terms of (Tick in the appropriate box)

5-point scale: 1=Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent

		1	2	3	4	5
PFRM 1	Growth in sales revenue					
PRFM 2	Growth in the market share					

PRFM 3	Customer satisfaction level is high					
PRFM 4	Employee turnover is low					
PRFM 5	Satisfaction with the operations of the company					

VII. Please indicate the level of your company performance compared to your main competitors in the following areas?

5-point scale: 1=Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent

		1	**2**	**3**	**4**	**5**
CMPADV1	Consumption of resources					
CMPADV2	Customer satisfaction in relation to product design and Development					
CMPADV3	Quality of product and service					
CMPADV4	Production cost					