THE EFFECT OF LEAN MANUFACTURING TOWARDS FINANCIAL PERFORMANCE AT HICOM AUTOMOTIVE MANUFACTURERS, PEKAN, PAHANG.

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Abstract

Lean manufacturing plays an important role in improving employee performance and increase financial performance. This study an exploratory the relationship between the effects of lean manufacturing implementation on the financial performance. Lean manufacturing is to help the firm improve their financial performance due to this exercise can give a variety of new benefits such as cost savings, and time. In this age of development now, many firms are struggling to improve their performance along with the development of the industry, especially in the industrial and automotive industries. Therefore, this study is to prove that this relationship does actually have a positive effect on the development of the company's performance. This study was conducted in Hicom Automotive, Pekan, Pahang. This study is based on quantitative methods and using a questionnaire as a tool to collect data which has been developed by a number of instruments from previous studies. Respondents who participated in this study were employees in the management as well as human resources and finance. The respondents were 108 workers. In this study, researchers used SPSS 19 to analyze the data to measure the influence and strength of the relationship between the independent variables. Through this study, the results obtained is the relationship between lean manufacturing and the company's performance also have a positive relationship. Thus, through this study can be said lean manufacturing is something that can help improve the company's performance.

Keywords: *Lean Manufacturing, Financial Performance, Automotive Industry.*

Abstrak

Pembuatan Lean memainkan peranan penting dalam meningkatkan prestasi pekerja dan seterusnya meningkatkan prestasi kewangan. Kajian ini adalah untuk mengkaji hubungan antara kesan perlaksanaan pembuatan lean terhadap prestasi kewangan yang dilakukan. Pembuatan lean dikatakan mampu membantu sesebuah firma meningkatkan prestasi kewangan mereka kerana dengan perlaksanaan ini dapat memberi pelbagai faedah baru seperti dapat menjimatkan kos dan masa. Dalam zaman pembangunan kini, banyak firma yang bertungkus lumus meningkatkan prestasi masing-masing seiring dengan perkembangan sesebuah industi terutama dalam industri perindustrian dan automotif. Justeru itu, kajian ini adalah untuk membuktikan bahawa adakah kaitan ini benar-benar memberi kesan positif terhadap perkembangan kewangan syarikat. Kajian ini dilakukan di Hicom Automotive, Pekan, Pahang. Kajian ini dijalankan berdasarkan kaedah kuantitatif dan menggunakan soalan kaji selidik sebagai alat untuk mengumpul data yang telah dibangunkan berdasarkan beberapa instrumen daripada kajian terdahulu. Responden yang terlibat dalam kajian ini adalah pekerja di bahagian pengurusan seperti bahagian sumber manusia dan juga kewangan. Responden yang terlibat adalah seramai 108 orang pekerja. Dalam kajian ini, penyelidik menggunakan SPSS 19 untuk menganalisis data untuk mengukur pengaruh dan kekuatan hubungan antara pemboleh ubah. Melalui kajian ini, keputusan yang didapati adalah hubungan antara pembuatan lean dan juga prestasi kewangan mempunyai hubungan positif. Justeru itu, melalui kajian ini boleh dikatakan pembuatan lean merupakan sesuatu yang mampu membantu meningkatan prestasi kewangan syarikat.

Kata kunci: *Pembuatan Lean, Prestasi kewangan, Industry Automotif.*

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CHAPTER 1

INTRODUCTION

This chapter presents the background of the study, company profile, problem statement, followed by the research objectives, significant of study, scope and limitation of study, and finally the organization of the thesis.

1.1 Background of Study

Manufacturing industries have extensive involvement, especially in the manufacture and processing of goods and enjoy either the creation of a new commodity or as an additional value. The manufacturing industry accounted for most of the industrial sector in the developed countries. In the manufacturing industry the resulting end product can be either ready to be sold directly to customers or as intermediate goods or work in the processes used in the production process.

Manufacturing is the production of goods to be used or sold for labor or machinery that refers to a range of human activity, from handicraft to high tech, but is most commonly used for industrial production, where raw materials are transformed into finished goods on a large scale. Manufacturing is commonly found in all types of economic systems, especially in the free market economy that usually directed toward the mass production of products for sale to consumers at a profit. While in a collectivist economy, the more frequently directed by the state to supply a centrally planned economy. In a mixed market

economy, manufacturing occurs under some regulatory agency of a government. Through history, the earliest in manufacturing is usually done by a single skilled artisan with assistants with their apprenticeship training. Before the Industrial Revolution, most of the production occurs in rural areas where the creation of home-based service as a strategy in addition to subsistence agriculture and continues to do so in places. Entrepreneurs also recommends the creation of some households to become a single company through the putting-out system.

According Tom Bonine (2014) the main problems facing manufacturing, especially in traditional manufacturing, is finding good people to the company. Has been a major challenge in the making for more than 10 years ago that are not necessarily educated or skilled labor shortages, although it is an issue, compared to searching for people who have good work ethics or discipline. Manufacturing companies today have a hard time finding employees who will show up and be on time for work, staying at their work stations, and profits, continue with their work. This causes difficulty employers have to spend excessive time to hire and train new employees, especially in terms of financial cost and efficiency.

Because of this problem often occurs in the manufacturing industry, companies must think of something to overcome this problem. Various theories introduced to overcome this problem. Multi-step renewal enhancer made to improve the company's performance compared with other competitors. Through problems that plagued the problem of workers who are not disciplined and often stop working very negative impact on the company's performance, particularly its financial performance.

Therefore this study was conducted to determine the relationship of lean manufacturing to the company's performance, especially in financial performance to solve this problem in line with the goal of lean manufacturing is to minimize waste in production and to focus on activities that can add value. Many companies implement improvements by various methods. Lean manufacturing is one of the ways to overhaul the way to reduce costs, improve product quality and service, and can save time.

Olsen (2004) states that the study of empirical research falls short in consistency that confirm this relationship that relate to the set extends operation known as the practice of lean manufacturing and is considered as a set of synergistic management practices of modern manufacturing integrated that are normally classified under a subset of the total maintenance like productive maintenance (TPM), total quality management (TQM), just-in-time (JIT), and management of human resource that supports the practice of including employee empowerment and teamwork. Lean Manufacturing include statistical process control (SPC), the rationalization of the supply base, customer integration requirements, in-house designed technology, setup engineering, integrated product design, team employee, pull production, employee participation in problem solving, information providers sharing and partnership, and cellular manufacturing.

The several of organizations have been using lean manufacturing to compete global basis, and it is considered as an evolution in the process of continuous improvement in the manufacture concept (Womack & Jones, 1996; Womack, Jones, & Roos, 1990; Ohno, 1988). The way products are manufactured has included mass production, craft, and lean

manufacturing. Craft led to the mass production and mass production led to lean manufacturing that has revolutionized the way products are manufactured in modern times.

Lean manufacturing commonly known as the Toyota Production System (TPS) emerges out of necessity as a means for Japanese automobile manufacturers to compete, beginning with the Toyota Motor Company (Ohno, 1988). Henry Ford (1863-1947) invented the mass production that changed the way products are made in many industries and is very important in promoting the concept that led to the creation of world led to world dominance in automobile manufacturing for domestic automobile manufacturers. In 1955, big three automobile manufacturing accounted for 95 percent of all sales for Ford, GM, and Chrysler (Womack et al., 1990). Both Henry Ford and Taiichi Ohno (1912-1990) were renaissances in their day, in the improvement of manufacturing methods.

In comparison to lean manufacturing, mass production is more to human effort, more to manufacturing space, more to investment in tools, and more to development time. It results in more defects, higher costs, less quality, and longer response time, that leads to reduced organizational performance (Hogg, 1993).

The lean manufacturing system is a method of manufacturing products just in time. The concept of lean manufacturing principles, employs simple means for communicating material requirements, and a manual method called Kanban provides a signal for replenishment of materials required by the operator. This is made possible with instructions on a card enclosed in a plastic envelope (Womack & Jones, 1996; Womack et al., 1990;

Ohno, 1988). Based on teamwork between employees, and the Kanban for material replenishment and problem solving approaches, lean manufacturing has propelled the Japanese automobile manufacturers to a competitive advantage (Lathin& Mitchell, 2001).

Toyota Motor Company's is original created just-in-time (JIT) philosophy has evolved into a lean production paradigm that has transformed the US manufacturing landscape. But the evidence on lean production's financial performance effects is mixed (Callen et al., 2000;Kinney and Wempe, 2002; Lau, 2002; Eriksson and Hansson, 2003; Fullerton et al.,2003; Nahm et al., 2003; Ahmad et al., 2004; York and Miree, 2004; Boyd et al., 2006;Wayhan and Balderson, 2007).

Shah and Ward (2007) states that there are some variation in the previous results in that not consistency among researchers regarding the definition and components of lean production. Cua et al. (2001) also asserted that the variation in performance effects is due in part to manager's piecemeal adoption of lean production's various components and contextual factor also contribute to variation in lean production's performance effects. For example, Hendricks and Singhal (2001) find that many contextual factors that impact total quality management (TQM) to performance effects, and Balakrishnan, et al. (1996) report smaller financial benefits for just-in-time adopters with concentrated customer base.

In this research, automotive industry are involved to show the relationship between the variables. Automotive industry in Malaysia is a large industry and it must have the best commitment to get the best performance. Hicom Automotive Manufacturers (Malaysia)

Sdn Bhd or HA is located at Pekan Pahang was incorporated in 1983 is a subsidiary of DRB-HICOM Berhad. The automotive assembly plant occupies 143.7 acres in land size, and has been gazette as a National Automotive Hub in Malaysia. HICOM Automotive Manufacturers (Malaysia) Sdn Bhd have produced almost half a million vehicles of various international marques, with a vision to become the preferred assembler in the automotive industry for over 30 years in operation. HICOM Automotive Manufacturers (Malaysia) Sdn Bhd specializes in assembly of automotive units for passenger cars and commercial vehicles that contributing to the company's revenue with the assembly of passenger cars lending a large chunk to the total. HICOM Automotive Manufacturers (Malaysia) Sdn Bhd also providing assembly services to a number of leading marques.

1.2 Problem Statement

With an increasing challenge in today's global competition have encourage many manufacturing firms to adopt new manufacturing strategies in order to increase the firm's efficiency and competitiveness (Nordin et al., 2010). According to Holweg (2007), many countries and industries acceptable and adaptable lean manufacturing widely.

Holt et al., (2005) stated that research is often not consistent and not clear, even of the constantly going debate on the relationships between environmental, management and financial performance. According to Olsen (2004) financial performance level can improve with implementing best practices on the factory floor.

According to Rouhollah et al., (2012) this topic aim carries out a theoretical on the relationship between lean manufacturing management and financial performance. This research was to convince management to take a serious attention on the relationship between lean manufacturing management and financial performance.

Nordin et al. (2010), studied about lean manufacturing implementation in the automotive industry. Their research focused on the drivers and barriers that influence the implementation of lean manufacturing and he focuses the factors that drive the implementation of lean manufacturing are desiring to focus on customers and to achieve the organization's continuous improvement.

The previous research, overall discussing about lean manufacturing and the implementation of lean manufacturing to firm. Every research has their gap and this research hopefully this study will help fill the previous gap. The main objective of this study is to find the effect of lean manufacturing on financial performance.

1.3 Research Question

This research aims to answer these following research questions:

i. Does just-in-time have a positive effect toward financial performance?

ii. Does quality management have a positive effect toward financial performance?

iii. Does employee's involvement have a positive effect toward financial performance?

1.4 Research Objectives

This study explores the relationships between lean manufacturing practices and financial performance. The objectives of this study are:

i. To examine the effect of just-in time toward financial performance.

ii. To examine the effect of quality management toward financial performance.

iii. To examine the effect of employee involvement, toward financial performance.

1.5 Significant of study

The purpose of conducting a study on this is to investigate the effect of lean manufacturing toward financial performance. Most companies have a problem to achieve the maximum profit at the level of the company, due to some problems such as the quality of labor, quality of products, and others. Through improvements by adopting lean manufacturing, most likely the problem can be resolved.

1.6 Scope and limitation of study

The scope of this study is limited to investigating the effects of lean manufacturing towards financial performance in the automotive industry. This study was conducted in Hicom Automotive Manufacturers, Pekan, Pahang. Sampling was conducted in the administrative department. In this study, the researcher just focuses on the effect of lean manufacturing toward financial performance, the researcher did not study about how the implementation is done. According to Yang et al., (2010) explores the relationship between lean

manufacturing practices and environmental management and financial performance. In this research, just explore between lean manufacturing and financial performance only.

1.7 Organization of the thesis

This thesis comprises of five chapters. The first chapter presents the background of the study, the problem statement, objective of the study, research question, significant of study and scope of the study. Chapter two focuses on review of the existing literature which relate to the variables in this study. Chapter three discusses research methodology that includes research design, variable measurement, population and sample, data collection procedure questionnaire design, and data analysis.

Chapter four discusses the findings of the study, which include the profile of respondents, the measurement, descriptive analyses and also the result. Chapter five concludes the research by explaining the implication of the research and practice and qualifies the result within the frame of theoretical and statistical limitations with limitation of the study, suggestion for the future research and the final thoughts regarding this and similar studies within lean manufacturing success.

CHAPTER 2

LITERATURE REVIEW

This chapter will provide definitions of the lean manufacturing (LM) including Just-In-Time (JIT), quality management (QM), employee involvement (EI) and financial performance.

2.1 Financial Performance

According Menor et al. (2007), financial performance is the degree to which an organization achieves profit oriented outcomes, for example return of sale (ROS) and return of investment (ROI).

Financial performance in broader sense refers to the degree to which financial objectives being or has been accomplished and is an important aspect of finance risk management. It is the process of measuring the results of a firm's policies and operations in monetary terms. It is used to measure firm's overall financial health over a given period of time and can also be used to compare similar firms across the same industry or to compare industries or sectors in aggregation (Eshna, 2012).

The term financial performance is a composite of an organization's financial health, its ability and willingness to meet its long term financial obligations and its commitments to provide services in the foreseeable future, the time frame for objectives and strategies

should be consistent, usually from two to five years. Financial performance refers to the act of performing financial activity. In broader sense, "financial performance refers to the degree to which financial objectives being or has been accomplished. It is the process of measuring the results of a firm's policies and operations in monetary terms" (Weber, 2008).

2.2 Lean Manufacturing

Womack (1990) lean manufacturing concept was pioneered by Japanese automotive company during1950's. The Japanese automotive company was Toyota which was famously known as Toyota Production System (TPS) (Nordin et al., 2010). Reduce the cost and to improve productivity by eliminating waste or non-value added activities were the primary goal of Toyota Production System. Holweg (2007) states the conception of the assembly line and the following development of the Toyota Production System efficiency has been a central objective of manufacturing.

The systematic elimination of waste focuses on lean manufacturing that are organization's operations through a set of synergistic work practices to produce products and services at the rate of demand (Shah and Ward, 2007). Lean manufacturing also represents a various concept that may be grouped together as of organizational practices (McLachlin, 1997). According to Browning and Heath (2009), lean manufacturing as a set of practices focused on reduction of wastes and non-value added activities from a firm manufacturing operation.

After the oil crises in the early of 1990's, the concept of lean manufacturing was transferred across the countries and industries due to its global superiority in cost, quality, flexibility

and quick response (Schonberger, 2007). According Nordin et al. (2010), lean manufacturing aimed to achieve smooth production flow by eliminating waste and by increasing the activity's value and the company would not be able to stand a chance against the current global competition for higher quality, faster delivery and lower costs if ignored the lean manufacturing strategy in an organization. Oliver et al., (1996), proves that lean manufacturing principles could produce high performance firms.

The main focus of lean manufacturing was to reduce the cost and to improve productivity by eliminating waste or non-value added activities. Womack and Jones in their book Machine that changed the world (1990) stated the lean approach consists of various practices, which aim to improve efficiency, quality and responsiveness to customers. Todd (2000) defines lean production as initiative, whose goal is to reduce the waste in human effort, inventory, time to market, and manufacturing space to become highly responsive to customer demand while reducing world class quality products in the most efficient and economical manner. While Bahsin & Burcher (2006) have defined lean manufacturing as a philosophy that when implemented reduces the time from customer order to delivery by eliminating sources of waste in the flow. Lean manufacturing is a manufacturing strategy that aimed to achieve smooth production flow by eliminating waste and by increasing the activities value. Some analysts even pointed out that if an organization ignores the lean manufacturing strategy, the company would not be able to stand a chance against the current global competition for higher quality, faster delivery and lower costs. Shah and Ward (2003) categorized into four bundles associated with Just-in-Time, Total Quality

Management, Total Preventive Management and Human Resource. Table 2.1 summarize all definition of lean manufacturing from previous research.

Table 2.1

Definition of Lean Manufacturing

Author	Lean Manufacturing Definition
Cox and Blackstone (1998)	Lean production is a philosophy of production that emphasizes the minimization of the amount of all the resources (including time) used in the various activities in the enterprise. It involves identifying and eliminating non-value adding activities in design, production, supply-chain management, and dealing with the customers. Lean producers employ teams of multi-skilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in a potentially enormous variety.
Singh (1998)	Lean manufacturing is a philosophy, based on the Toyota Production System, and other Japanese management practices that strive to shorten the timeline between the customer order and the shipment of the final product, by consistent elimination of waste.
Naylor et al. (1999	Leanness means developing a value stream to eliminate all waste, including time, and to ensure a level schedule.

Storch and Lim (1999	Lean production is an efficient way to satisfy customer needs while giving producers a competitive edge.
Howell (1999	A new way to design and make things differentiated from mass and craft forms of production by the objectives and techniques applied on the shop floor, in design and along supply chains aiming to optimize performance of the production system against a standard of perfection to meet unique customer requirements.
Framework of the Lean Advancement Initiative (MIT, 2000)	Not being merely a set of practices usually found on the factory floor. Lean is rather a fundamental change in how the people within the organization think and what they value, thus transforming how they behave.
Comm and Mathaisel (2000)	Leanness is a philosophy intended to significantly reduce cost and cycle time throughout the entire value chain while continuing to improve product performance. This value chain is composed of a number of links. The links exist within government as well as within the industry, and they exist between government and industry.
Liker and Wu (2000)	A philosophy of manufacturing that focusses on delivering the highest quality product on time and at the lowest cost.
Cooney (2002)	Lean takes a broad view of the production and distribution of manufactures, developing a production concept that encompasses the whole manufacturing chain from product

	design and development, through manufacturing and distribution.
Shah and Ward (2003	Lean manufacturing can be best defined as an approach to deliver the upmost value to the customer by eliminating waste through process and human design elements. Lean manufacturing has become an integrated system composed of highly inter-related elements and a wide variety of management practices, including Just-in-Time (JIT), quality systems, work teams, cellular manufacturing, etc.
Alukal (2003)	Lean is a manufacturing philosophy that shortens the lead time between a customer order and the shipment of the products or parts through the elimination of all forms of waste. Lean helpful firms reduce costs, cycle times and unnecessary, non-value added activities, resulting in a more competitive, agile, and market responsive company.
Hopp and Spearman (2004)	Lean production is an integrated system that accomplishes production of goods/services with minimal buffering costs.
Haque and Moore (2004)	Lean is by definition an enterprise initiative with a common format for all business processes with the single strategic goal of eliminating waste and improving the flow of value.
Rothstein (2004)	Lean production is more commonly considered as a broad production paradigm including an array of manufacturing systems containing some variety of lean practices, such as just-

	in-time inventory systems, teamwork, multi-tasking, employee involvement schemes, and policies for ensuring product quality throughout the production process.
Worley (2004)	Lean manufacturing is defined as the systematic removal of waste by all members of the organization from all areas of the value stream.
Simpson and Power (2005)	Lean is a practice with the objective to generate a system that is efficient and well organized and devoted to continuous improvement and the elimination of all forms of waste.
Seth and Gupta (2005)	Lean production refers to a manufacturing paradigm based on the fundamental goal of continuously minimizing waste to maximize flow.
Taj and Berro (2006)	Lean means manufacturing without waste. The lean approach is focused on systematically reducing waste (Muda) in the value stream.
Narasimhan et al. (2006)	Production is lean if it is accomplished with minimal waste due to unneeded operations, inefficient operations, or excessive buffering in operations.
De Treville and Antonakis (2006)	Integrated manufacturing system intended to maximize capacity utilization and minimize buffer inventories through minimizing system variability.
Shah and Ward (2007)	Lean is a management philosophy focused on identifying and eliminating waste throughout a product's entire value stream,

	extending not only within the organization, but also along its entire supply chain network.
Holweg (2007)	Lean manufacturing extends the scope of the Toyota production philosophy by providing an enterprise-wide term that draws together the five elements – product development process, supplier management process, customer management process, and policy focusing process.
Hallgren and Olhager, 2009	Lean manufacturing is a program aimed mainly at increasing the efficiency of operations.
Taj and Morosan (2011)	A multi-dimensional approach that consists of production with minimum amount of waste (JIT), continuous and uninterrupted flow (Cellular Layout), well-maintained equipment (TPM), well established quality system (TQM), and well-trained and empowered work force (HRM) that has a positive impact on operations/competitive performance (quality, cost, fast response, and flexibility).
Alves et al. 2012	Lean production is evidenced as a model where the persons assume a role of thinkers and their involvement promotes the continuous improvement and gives companies the agility they need to face the market demands and environment changes of today and tomorrow.

Table 2.2 shows summarize of definition lean manufacturing and their supporting literature.

Table 2.2

Variables definition and supporting literature

Variables	Definition	Supporting literature
Lean manufacturing	A set of practices focused on reduction of waste and non-value added activities from a firm manufacturing operation.	Womack et al. (1990), McLachlin (1997), Shah and Ward (2003, 2007), Li et al. (2005), Browning and Heath (2009).
Just-in-time flow	A set of interrelated practices for managing production flow.	McLachlin (1997), Shah and Ward (2003), Swink et al. (2005).
Quality management	A set of interrelated initiatives to assure the quality of the products and the equipment used to manufacture them.	McKone et al., (1999), Fullerton et al. (2003), Shah and Ward (2003, 2007), Linderman et al. (2006).
Employee involvement	The human element of lean manufacturing such as formal training programs, problem solving groups, self-directed work teams and autonomous problem solving.	MacDuffie (1995), McLachlin (1997), Shah and Ward (2003, 2007), Tu et al. (2006).

Table 2.3 shows time line marking the critical phases in the lean manufacturing evolution. This table show the flow of evolution lean manufacturing.

Table 2.3

Time line marking the critical phases in the lean manufacturing evolution

1927 and before	• Henry Ford outlines his production philosophy and the basic principles underlying the revolutionary Ford Production System (FPS) in Today and tomorrow in 1927.
1945– 1978 progress in Japan	• 1937 – Toyoda (later Toyota) Motor Company is established in Koromo, Japan.Toyoda cousins Kiichiro and Eiji, with Taiichi Ohno study FPS and perfect the principles concepts and tools constituting Toyota Production System (TPS). Just in time (JIT) production method is a key component of TPS. • 1978 – Ohno publishes "Toyota Production System" in Japanese. He credits FPS and the American supermarket behind his just in time thinking. According to Ohno, the primary goals of TPS are cost reduction (waste elimination), it can be achieved through quantity control, quality assurance, and the respect for humanity. He recommends producing only the kind of units needed, at the time needed and the quantities needed.

1973- 1999 TPS arrives in North America	• 1973 – Oil crisis hits North America and generates immense interest I the (new) Japanese manufacturing and management practices followed by publication of numerous academic and practitioner books and articles. • 1977 – First academic articles is published by Sugimori ar al.; Narrowly focused articles on topics such as Kanban and just in time production (Monden 1981b), production smoothing and level loading (Monden 1981c) appear. • 1984 - NUMMI, a joint venture between Toyota Motor Company and General Motors opens in California. • Mid 1980s – Noteworthy books including Moden's Toyota Production System (1983); Ohno's Toyota Production System: Beyond large-scale production (1988) are published in English. • There is only a piecemeal understanding of TPS and its constituent elements; equivalence between JIT production, Kanban and TPS is suggested.
1988- 2000 Academic progress	• 1988 - Krafcik coins the term "lean" to describe the manufacturing system used by Toyota. • 1990 – The machine that changed the world by Womack, Jones and Roos is published. The machine establishes "lean production" to characterize Toyota's production system including its underlying components in the popular lexicon.

	The book describes a lean system in detail; but does not offer a specific definition. • Mid 1990s - Articles related to measuring just in time (Sakakibara et al., 1993; Flynn et al., 1995; McLachlin, 1997), total quality management (Ross, 1993; Dean and Bowen, 1994; Sitkin et al., 1995; Flynn et al., 1995), their interrelationships (Flynn et al., 1995; Sakakibara et al., 1997) and the impact of other organizational variables on their implementation are published in the academic journals. • 1994 - Lean Thinking by Womack and Jones is published. The book extends the philosophy and the guiding principles underlying lean to an enterprise level.
2000- present	• Numerous books and articles written by practitioners and consultants, and a few academic conceptual (Hopp and Spearman, 2004; de Treville and Antonakis, 2005) and empirical articles (Shah and Ward, 2003) highlighting the overarching nature of lean production are published; yet no clear and specific definition is available. • 2006 – Toyota Motor Company is projected to become #1 automobile manufacturer in North America.

Source: Shah & Ward (2003)

2.2.1 Just-in-time flow

Just-in-time (JIT) philosophy is directed toward the elimination of waste by streamlining production processes, reducing setup times, controlling flow of materials, and providing preventive maintenance of equipment and machinery. Through these activities, inventory and resources can be reduced and used more efficiently (Kannan and Tan 2005).

Power and Sohal (2000) defines Just-in-time is the continuous improvement and indirectly to commit to total quality with the participation of all the human resources that aims to produce only what is needed and based on demand to minimize the number of manufacturing. The general objectives of Just-in-time is to continuous make improvement of quality, organizational productivity, and flexibility (White and Prybutok 2001).

Garcia-Alcaraz (2014) state Just-in-time using materials and waste management in a company with lean manufacturing management is a measure to simplify the manufacturing system and reduce inventory levels in each stage to identify problems and quickly find solutions. Singh and Garg (2011) recognize the definite main goal of the Just-in-time philosophy is to involve all employees in their elimination and expose hidden problems.

According to Yasin et al., (2003), developing and using innovative manufacturing methods, such as Just in Time, Advanced Manufacturing Technologies, and Total Quality, in response to demands and in order to increase their efficiency, effectiveness, and responsiveness to their customers, companies must be willing to make the strategic

adjustment. Just-in-Time methodology and recognized to achieve competitiveness and excellence for companies in the market demand (Inman et al. 2011).

To aim at eliminating all operations that do not add value to products, process and services, there are several tools in Lean Manufacturing (LM). According to Sundar et al., (2014), companies seek to eliminate what is not required and increase the value of each action (Sundar et al. 2014). These tools is to reduce waste and improve operations always based on respect for the worker who performs them.

Thus, lean manufacturing is to reduce costs, improve processes, and eliminate waste with implementation Just-in-time that enhance customer satisfaction and maintain profit margins for the continuous improvement. This allows them to survive in a global market that demands higher quality of a product, at a faster delivery and lower price, and in the required amount.

2.2.2 Quality management

Quality is often used to signify the excellence of a product or service. In some engineering organizations, the word quality may be used to indicate that a piece of metal conforms to certain physical dimension or characteristics often set down in the form of a particularly tight specification. If we are to define Quality in a way, which is useful in its management, then we must recognize the need to include in the assessment of quality, the true requirements of the customer (R. Ashley Rawlins 2008).

The word quality has different meanings under different circumstances and easiest way to define quality would be the degree to which a product meets the requirements of a customer or still simply, the fitness of a product or service for its intended use.

2.2.3 Employee involvement

Employee involvement can be defined as when employees participate directly to help an organization fulfill its mission and meet its objectives by applying their ideas, expertise, and efforts towards problem solving and decision making Dr. Jevon Powell (2011).

2.3 Lean Manufacturing and Financial Performance

Manufacturing productivity, enhance by lean manufacturing practices by reducing setup time and work in process inventory, improving throughput times, and thus improve market performance (Tu et al., 2006). Innovative problem such as new product development, order fulfillment, customer services and can achieve customer satisfaction can be solved by increasing customer responsiveness and reducing customer lead time (Shah and Ward, 2003; Ward and Zhou, 2006). Through lean manufacturing will enhance market performance of firms by improving customer value in terms of lower prices and quality products (Yang et al., 2011).

Through improving organizational process, cost efficiencies Lean manufacturing influences financial performance (Christopher and Towill, 2000; Fullerton et al., 2003; Fullerton and Wempe, 2009).

Figure 2.1 shows the Theory Acceptance Model (TAM) developed by Yang et al., 2011. The Theory Acceptance Model proposes to explain the effects lean manufacturing towards business performance (financial performance).

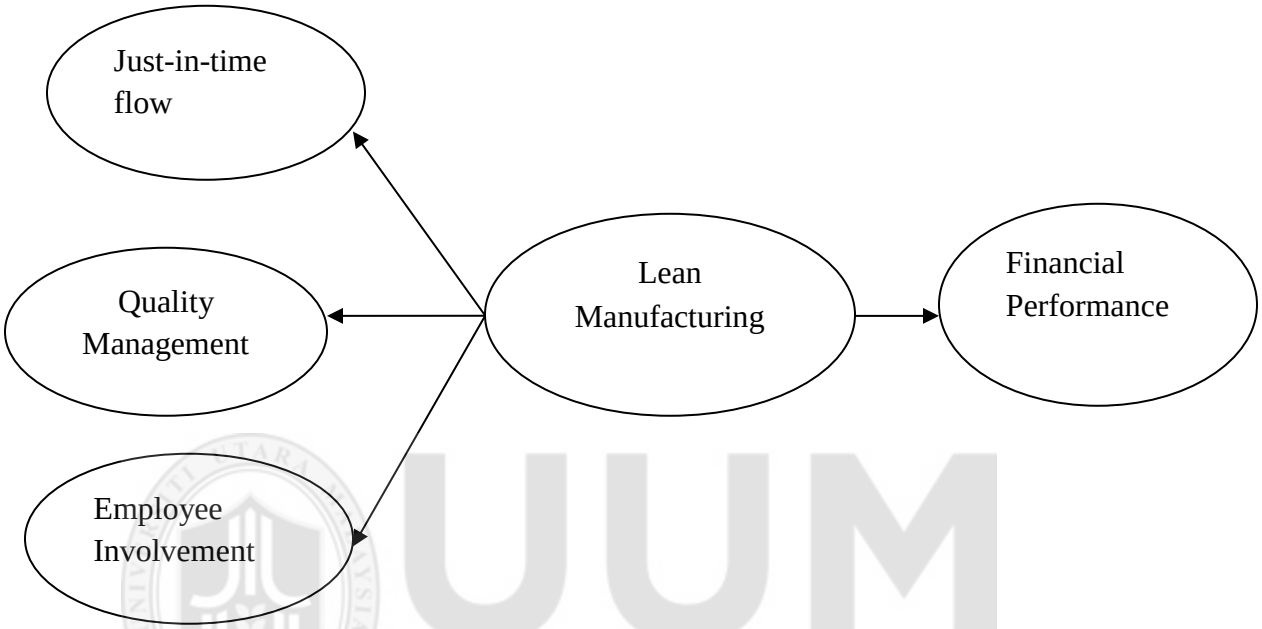

Figure 2.1
Research Model by Yang et al., (2011)

2.4 Success Factors in Lean Implementation

Implementation of Lean philosophy and principles can be described as a set of actions and processes starting from planning the change, defining the success factors and finishing by implementation and measuring the progress. Figure 2.2 shows summarizing the model of Lean implementation process from author Martinez & Perez (2001), Anchanga (2006), Pettersen (2009), Sim & Rogers (2009), and Duque & Cadavid (2007).

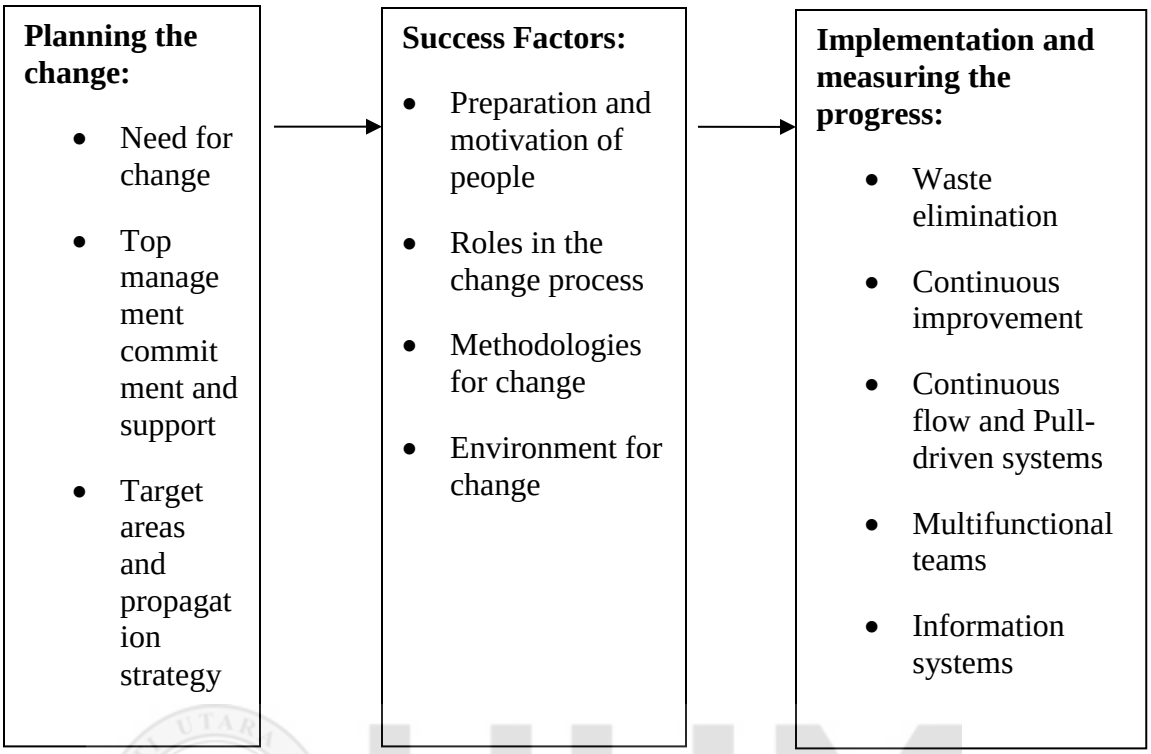

Figure 2.2

Model of Lean implementation process

2.4.1 Planning the change

The first step of the Lean philosophy implementation process is planning the change. Three things should be present at the very beginning as per below:

1) Define the need for change to provide guidance and clarity to everybody in the company. It is essential to understand and communicate continuously what is the motivation for a Lean transformation effort.
2) Top management commitment and support with involvement and support should be not only verbal but also factual, with managers participating in shop floor activities. If employees don't see, feel and believe in a real commitment from upper management, nothing much will happen.

3) Identify target areas and propagation strategy to indicating which processes and production lines will be transformed to Lean, in what sequence and time frame.

2.5 Advantages and Risks of Lean Production

The key idea of Lean manufacturing is to increase value to customers while reducing the number of resources consumed and cycle times via waste elimination. As with any financial management theory, there are a number of advantages and risks that must be balanced for each organization (Holweg, 2007; Sim & Rogers, 2009; Kropf, 2008; Wood, 2012 and Kelly, 2012). Table 2.4 shows the advantages and risk of lean production.

Table 2.4
Advantages and Risks of Lean Production

Advantages		**Risk**	
Customer satisfaction	By reducing waste, the final product is delivered to a customer with value. The advantage of this increased customer satisfaction.	Customer Dissatisfaction Problems	Because lean manufacturing processes are so dependent on supplier efficiency, any disruption in the supply chain and therefore, on production can be a problem that adversely affects customers. Delivery delays can

			cause long-lasting marketing problems.
Productivity	Productivity is increased because of the focused improvements made to processes with the intent of eliminating waste.	Productivity Costs	In order to achieve such productivity, there is a significant upfront investment in achieving a level of standardized processing which can be a disadvantage during the implementation process.
Change of Attitude	Implementing lean production often demands a significant change in an organization's attitude, which can be very challenging if an organization is not well slated to deal with the changes.	Lack of Acceptance by Employees	Lean manufacturing processes require a complete overhaul of manufacturing systems that may cause stress and rejection by employees. Lean manufacturing requires constant employee input on quality control, which some employees may feel disinclined or unqualified to do. There

			may also be some difficulty finding managers with sufficient leadership and persuasion skills to overcome this.
Quality	As a result of process improvement initiatives, the overall quality of a company's product is also improved in the process.	High Cost of Implementation	Implementing lean manufacturing often means completely dismantling previous physical plant setups and systems. The purchase of efficient machinery and training employees can add considerably to companies' payroll expenses.
Delivery times	Another fundamental element of lean production is just in time production, which is the idea that excess inventory will not be	Supply Problems	Because only a small amount of inventory is kept on hand, lean manufacturing depends heavily on suppliers. Problems like employee strikes, transportation

	maintained in order to fulfill customer orders.		delays and quality errors on the part of suppliers can create manufacturing hold ups that can be fatal. Vendors may be unable or unwilling to supply parts or products on a tighter schedule or in smaller amounts.

2.6 Previous Research

The purpose of this research is to identify the effect of lean manufacturing on financial performance. Rouhollah (2012) state the practice performance connection not enough, especially regarding financial performance and operations management studies have extended a valid and reliable set of constructs for measuring lean practices.

According Howton et al (2000) claiming the practice is not equivalent to measuring the extent of its practice usage and Descriptive studies in the literature testify to this lack of uniformity in a mix and extent of practical implementation. Table 2.5 shows the sample of journal reviews.

Table 2.5

Sample of Journal Reviews

Author & year	Variable (s)	Tool(s) of analysis	Findings	Variable(s) used
Yang, M., Hong, P., & Modi, S. (2011)	• Lean manufacturing practices a. Just-in-time b. Quality management c. Employee involvement • Environmental management a. Environmental management practices b. Environmental performance • Business performance a. Market b. Financial performance	AMOS	Lean manufacturing experiences are positively related to environmental management practices.	• Lean manufacturing practices a. Just-in-time b. Quality management c. Employee involvement • Environmental management a. Environmental management practices b. Environmental performance • Business performance a. Market b. Financial performance
Nodin, N., Deros, B., & Wahab, D. (2010)	• Lean practices a. Process and equipment	SPSS (ANOVA)	The main barriers that prevent or delay	• Lean practices a. Process and equipment

	b. Manufacturing planning and control c. Human resources d. Supplier relationship e. Customer relationship • Lean barriers		the lean implementation.	b. Manufacturing planning and control c. Human resources d. Supplier relationship e. Customer relationship • Lean barriers
Mojtahedzadeh, R., Arumugam, V., Fallah, A., & Mehrizi, A. (2012)	• Lean manufacturing a. Total productive maintenance TPM) b. Group technology to enhance the flow of product (GT) c. Employee involvement in problem solving (EMP) d. SPC to monitor quality e. Just-in-time production methods • Business financial performance a. Return on equity b. Sales growth c. Stock return	SPSS and AMOS	Lean manufacturing management had positive effect on operation and business financial performance.	• Lean manufacturing a. Total productive maintenance TPM) b. Group technology to enhance the flow of product (GT) c. Employee involvement in problem solving (EMP) d. SPC to monitor quality e. Just-in-time production methods

	• Operational financial performance a. Asset productivity b. Employee productivity c. Gross margin ratio d. Cycle time			• Business financial performance a. Return on equity b. Sales growth c. Stock return • Operational financial performance a. Asset productivity b. Employee productivity c. Gross margin ratio d. Cycle time

CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents the framework as well as the research methodology used in the study. This chapter also describes the research model, hypotheses development, the sampling framework and the sample selection, the data collection method, the questionnaire development, the reliability and validity measurement and the statistical methods used.

3.1 Research Framework

Based on the preceding hypotheses, the research model develops and illustrated in figure 3.1. The model involves 4 construct which include just-in-time, quality management, employee involvement and financial performance as the dependent variable. The framework is adapted by previous study from Yang et al., (2011).

Independent Variable **Dependent Variable**

Lean Manufacturing

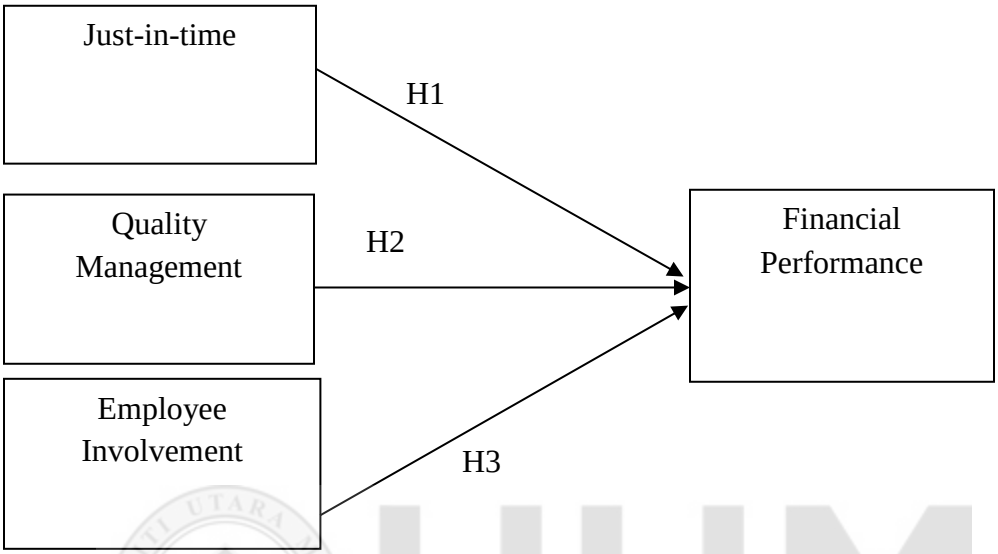

Figure 3.1

Theoretical framework for business performance

3.2 Hypotheses Development

To test theoretical framework of the study, the following hypotheses are developed;

1. Hypotheses 1: There is a significant influence between just in time toward financial performance.
2. Hypotheses 2: There is a significant influence between quality management toward financial performance.
3. Hypotheses 3: There is a significant influence between employee involvements toward financial performance.

3.3 Population and Sampling Technique

The target population in this study is an administrative department at Hicom Automotive Manufactures, Pekan, Malaysia. The affected department is human capital, finance and accounting, purchasing and retailing, and information technology (IT) department. The position level was involved are non-executive, new entry, junior executive, senior executive, and manager. Number of persons employed in the administrative department is total of 150 workers. Of the total population of that we are able to obtain a small sample of respondents and according to specifications. Based on the table 3.1, the selected sample is a sample of 108 respondents out of a total population of 150 workers.

3.4 Data Collection Method

A number of the working population is taken in Hicom Automotive to obtain a number of samples. Based on Table 3.1, the population of 150 is equivalent to 108 samples. Thus the questionnaire was distributed to 108 to ensure a sufficient number of responses respondents. Forms are distributed by one of the employees Hicom Automotive to simplify the process. The 108 questionnaire distributed was collected.

Table 3.1

Determination of Sample Size of Population

N	***S***	***N***	***S***	***N***	***S***
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	169	1900	320
50	44	300	175	2000	322
55	48	320	181	2200	327
60	52	340	186	2400	331
65	56	360	191	2600	335
70	59	380	196	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	**108**	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	376
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Notes: *N* is population size,

S is sample size.

Source: Krejcie & Morgan. (1970)

3.5 Questionnaire Design

In this research where some questionnaires were distributed to the sample which supports the study the relation between the effects of implementing lean manufacturing to financial performance. The questionnaire was adapted from previous research. Lean manufacturing item is adapted from the previous researches Olsen, E.O (2004), Ali, A (2010) and Yang et al., (2011). Financial performance adapted from the previous researches Yang et al., (2011).The sample of questionnaires can be refer in appendix 1.

The questionnaire in this study using English language as well because consider the respondents consist medium and top level that there have high education to understand this language in that questionnaire. The questionnaire consists of four sections. Section one consists of questions on demographic profile; section two consists about company profile; section three consists about lean manufacturing and the last section consists about financial performance. All the sections have a total of 28 questions. The table 3.2 show details about the summary of questionnaire.

Table 3.2

The Description of Questionnaire Section

Questionnaire Sections	Descriptions
Section one	This section consists 6 questions of respondents demographic.
Section two	This section consists 3 questions of company profile.

Section three	This section consists 14 questions of lean manufacturing. This section about independent variable that are includes just-in-time, quality management and employee involvement.
Section four	This section consists 5 questions of financial performance. This section about dependent variable.

3.6 Measurement of Variables

Measurement of variables is an integral part of research and important design. The total 28 items are constructed consists of 14 items represent the independent variables and 5 items represent the dependent variables.

3.6.1 Lean Manufacturing Management and Financial Performances

In order to measure integrated marketing communication management, twenty items were used. Lean manufacturing management consists of three dimensions; quality management, just-in-time, and employee involvement. The items are originally derived from Olsen, E.O (2004), Ali, A (2010) and Yang et al., (2011). Five point rating scale is used, which start with 1= strongly disagree, to 5= strongly agree.

3.7 Data Analysis Technique

Several statistical methods used to analyze the data collected from respondents. The data for the whole study will be input into the statistical package for social science version (SPSS) 19.0 for windows is interpreting the results. These include Cronbach's alpha

coefficient computed to investigate the reliability of the instrument, descriptive statistics to describe the characteristic of respondents, correlation analysis to describe the relation between variable and regression analysis to test the impacts of the independent variable on dependent variables. Data analysis will be conducted to find out the result, whether the hypotheses are significant or not. Additionally, a pilot study was conducted to determine the reliability of the instrument to ensure the items are reliable.

3.7.1 Descriptive Statistics

Descriptive statistics such as frequency and percentage are used to describe the respondent characteristics. The purpose of descriptive analysis was to present raw data transformed into a form that will make them easy to understand and interpret.

3.7.2 Analysis of Variance (ANOVA)

The term ANOVA stands for analysis of variance. An analysis of variance (ANOVA) helps to examine the significant mean differences among more than two groups on an interval or ratio-scaled dependent variable (Sekaran, 2003). The dependent variables are metric and independent variable is nonmetric. One way analysis of variance used in this study and it has single nonmetric independent variable. One way analysis of variance is a statistical test used to compare the mean of three or more independent sample group. This test will determine whether there is a significant difference in the population mean from which the samples were drawn.

3.7.3 Correlation Analysis

Correlation analysis examines the association between two metric variables. The strength of the association is measured by the correlation coefficient. The Pearson correlation measure the linear association between two metric variables. The Pearson correlation is referred to as a correlation coefficient.

The correlation can be either positive or negative, depending upon the directions of the relationship between variables (Hair et al., 2007). The correlation in this study was used to analyze the relationship between dependent variable is financial performance and the independent variables are just-in-time, quality management, and employee involvement.

Table 3.3
Coefficient Correlation

Coefficient Correlation	Level of Correlation
0.000 – 0.199	Very low
0.200 – 0.399	Low
0.400 – 0.599	Medium
0.600 – 0.799	Strong
0.800 – 0.999	Very Strong

3.7.4 Regression Analysis

Regression analysis was used to find out the contextual factors that influence the financial performance. The hypotheses and research questions were tested by multiple regression.

Multiple regression is a more sophisticated extension of correlation and are used to explore the predictive ability of a set of independent variables on one dependent variable. To test the hypotheses, multiple regression analysis is conducted.

3.8 Pilot Study

In this study, a pilot study was conducted with the intention to make certain in regards of the reliability and validity of the significant number of the distributed questionnaires. This pilot study took about a week to complete. The respondent was assigned to acknowledge their understanding or criticism of the questionnaire. A total number of 50 questionnaires were distributed and 50 were returned.

The reliability of the questionnaire was tested by Cronbach's Alpha to show internal consistency of the questionnaire. According to Sekaran (2003), then closes the reliability coefficient of 1.00 is better. In general, reliabilities less than 0.60 are considered poor, and in the range of over 0.80 are considered good and acceptable. The additional information is stated in Table 3.4.

Table 3.4

Rules of Thumb about Cronbach's Alpha Coefficient Size

Alpha Coefficient Size	Internal Consistency Reliability
<0.60	Poor
0.60 to < 0.70	Moderate
0.70 to < 0.80	Good
0.80 to <0.90	Very good
0.90	Excellent

3.8.1 Reliability Coefficient

Reliability test was used to test the degree level of stability and consistency of the questionnaire. It measures the degree of the freedom of the data for errors and therefore yield consistent results. Consistency indicated how well the item measured hang together as a set. Many researchers used the Cronbach's alpha to indicate the reliability of the instrument to show internal consistency of the questionnaire. The reliability result for all variables of this research is exhibited in Table 3.5.

Table 3.5

Reliability Coefficient of Variables

Variables	Total items	Alpha
Independent Variable		
Just In Time (JIT)	4	0.884
Quality Management(QM)	5	0.888
Employee Involvement(EI)	5	0.858
Dependent Variable		
Financial Performance	5	0.925

From these results, the internal consistency reliability or the Cronbach's alpha reliability coefficients of the three independent and one dependent variables were obtained. The results demonstrated on Table 3.6 show that the Cronbach's alpha for 4 items of the Just-in-time is 0.884, which is very good. Cronbach's alpha for Quality management is 0.888 which is very good. The Employee Involvement the Cronbach's alpha is 0.858 also very good. The dependent variable, the Cronbach's alpha is 0.925 which is excellent. According

to Cavana et al. (2001), they stated that the closer the reliability coefficient gets to 1.0 is the best. All variants have indicated strong internal consistency among the items for each variable. It means the respondent who tend to select the high scores for one item will select the high scores for others. This questionnaire has been proved reliable by using reliability analysis from the pilot test, and can be proceed to be distributed to samples. In examining the validity test, researchers used the table of Corrected Item-total correlation from SPSS output refer appendix 2. The results of the validity test are given in Table 3.6.

Table 3.6

Corrected Item-Total Correlation Values

Item no.	Variable			
	Just In Time (JIT)	Quality Management (QM)	Employee Involvement (EI)	Financial Performance
1	0.795	0.795	0.795	0.663
2	0.722	0.722	0.429	0.581
3	0.908	0.908	0.908	0.723
4	0.831	0.831	0.831	0.512
5		0.655	0.655	0.581

After the results for each item was obtained, all the values were compared to the *r* value. The *r* value at 0.05 significance level can be determined based on the total respondent in this test (*N*). Since $N = 50$, so the degree of freedom (*df*) is $N - 2 = 50 - 2 = 48$.

Table 3.7

Correlation of variable

		Just In Time (JIT)	Quality Management(QM)	Employee Involvement(EI)
Just In Time (JIT)	Pearson Correlation	1	.989**	.958**
	Sig. (2-tailed)		0	0
	N	50	50	50
Quality Management(QM)	Pearson Correlation	.989**	1	.980**
	Sig. (2-tailed)	0		0
	N	50	50	50
Employee Involvement (EI)	Pearson Correlation	.958**	.980**	1
	Sig. (2-tailed)	0	0	
	N	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

From the table 3.7 looking at the Pearson Correlation output, it can be seen that between just-in-time, quality management, and employee involvement, there is a possibility for multicollinearity to exist since the r value is greater than 0.6.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter presents the findings of the research. It includes a review of the organization, the response rate and the main discussion is also presented based on the research objectives which were clarified and recapped in the following section. The data analyzed is using the SPSS version 19.0. Furthermore, frequency distribution analysis was used to examine the respondents' personal background, gender, race, age, qualifications and working experience, while simple and multiple regression analysis was used to analyze the correlation as well as the influence of lean manufacturing management (just-in-time, quality management and employee involvement) as independent variables toward financial performance as the dependent variable.

4.1 Response Rate

From table determination of sample size of the population, a total of 150 population is 108 sample questionnaires were distributed to employees at HICOM Automotive Manufacturing, Pekan, Pahang. From the total number of 108 questionnaires distributed, all of them were collected back. The 108 respondents of questionnaires are the same respondent to answer the 50 question of the pilot test.

4.2 Analysis of Respondents

To analyze the first hand data collected from the questionnaire, descriptive statistical analysis was used to analyze personal background information of respondents. From descriptive statistics, several charts can be used to display the distribution of the samples for some categories, however researcher was interested to use pie charts since it is suitable for categorical variables measured on nominal scales.

4.2.1 Respondents' Gender

Table 4:1

Respondents' Gender

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	63	58.3	58.3	58.3
Female	45	41.7	41.7	100
Total	108	100	100	

Table 4.1 show that 63 respondent or 58.30% are male and the rest 45 respondents or 41.70% are female from the total 108 respondents. It shows that the male respondents are more dominant in this research. The researcher assumed it happened since HICOM Automotive is operated in the automotive industry, which mostly consists of male man power in operation and engineers.

4.2.2 Respondents' Race

Table 4.2

Respondents' Race

Race	Frequency	Percent	Valid Percent	Cumulative Percent
Malay	103	95.4	95.4	95.4
Chinese	1	0.9	0.9	96.3
Indian	3	2.8	2.8	99.1
Others	1	0.9	0.9	100
Total	108	100	100	

Table 4.2 indicates that 103 respondents or 95.40% is Malay, 1 respondents or 0.90% are Chinese, 3 respondents or 2.80% Indian and 1 respondents or 0.90% are others from the total 108 respondents.

4.2.3 Respondents' Age

From the results presented in Table 4.3, the age of 49 respondents or 45.40% is between 25 and 35 years. The next range between 36 and 45 years show 50 respondents or 46.30%. This is followed by the range of 46 and 55 years shows frequency of 9 respondents or 8.30% of the total 108 respondents. The researcher assumes HICOM keep the young and experienced people between 36 and 45 years because to increase the performance of the

organization by considering the energetic, innovative, creativity as well as high level of motivation of this generation.

Table 4.3

Respondents' Age

Age	Frequency	Percent	Valid Percent	Cumulative Percent
Between 25 and 35 years	49	45.4	45.4	45.4
Between 36 and 45 years	50	46.3	46.3	91.7
Between 46 and 55 years	9	8.3	8.3	100
Total	108	100	100	

4.2.4 Respondents' Qualification

Table 4.4

Respondents' Qualification

Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
SPM/STPM	19	17.6	17.6	17.6
Diploma	32	29.6	29.6	47.2
Degree	51	47.2	47.2	94.4
Master	6	5.6	5.6	100
Total	108	100	100	

Table 4.4 shows that the majority of respondents were 51 respondents or 47.20% have a complete bachelor degree as their highest educational level followed by 32 respondents or 29.60% have diploma and those have SPM/ STPM level consist of 19 respondents or 17.60%. The number of respondents who had Master level is only 6 respondents or 5.6% of total respondents. According to the result, the highest percent of educational is bachelor of degree that works at HICOM Automotive. From the analyze, this situation happened because many of them are fresh graduate people where they can directly implement and experience the practices in HICOM Automotive.

4.2.5 Respondents' Position Level

Table 4.5

Respondent's Position Level

Position Level	Frequency	Percent	Valid Percent	Cumulative Percent
Non-executive	26	24.1	24.1	24.1
New entry/fresh	1	0.9	0.9	25
Junior executive	33	30.6	30.6	55.6
Senior executive	29	26.9	26.9	82.4
Manager	19	17.6	17.6	100
Total	108	100	100	

Table 4.5 shows that position of 108 respondents in Hicom Automotive. The highest percent of the respondents' position level is the junior executive by 33 respondents or 30.60%. It is followed by a senior executive position with 29 respondents or 26.90%. The next position level is non-executive with 26 respondents or 24.1% and followed by manager with 19 respondents or 17.60%. The last position level is new entry/fresh with only 1 respondent or 0.90%.

4.2.6 Respondents' Working Experience

Table 4.6

Respondents' Working Experience

Working Experience	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5years	13	12	12	12
Between 5 and 10 years	39	36.1	36.1	48.1
Between 10 and 20 years	48	44.4	44.4	92.6
Above 20 years	8	7.4	7.4	100
Total	108	100	100	

Based on the table 4.6 above, most respondents have joined HICOM Automotive for between 10 and 20 years are 48 respondents or 44.40%. The second largest is between 5 and 10 years with 39 respondents or 36.10% and followed by less than 5 years with 13

respondents or 12.00%. The last range of working experience is above 20 years with 8 respondents or 7.40%.

4.3 Company Profile

4.3.1 Ownership of company

Table 4.7

Ownership of the company percentage

Ownership of the company percentage	Frequency	Percent	Valid Percent	Cumulative Percent
%Foreign (US, Japan, Britain, France, Germany and etc.) Please specify	1	0.9	0.9	0.9
% Malaysian	107	99.1	99.1	100
Total	108	100	100	

Table 4.7 shows that Malaysian have the highest percent to 99.1% or 107 frequency. The foreign company has 0.9% or 1 frequency.

4.3.2 Average sale per year for the last 3 years

Table 4.8

Average sales per year for the last 3 years

Average sales per year for the last 3 years	Frequency	Percent	Valid Percent	Cumulative Percent
Between RM100,000-RM500,000	6	5.6	5.6	5.6
Between RM501,000-RM1 Million	55	50.9	50.9	56.5
Between RM1.1 million-RM5 million	29	26.9	26.9	83.3
Between RM5.1 million-RM10 million	11	10.2	10.2	93.5
Above RM10 million	7	6.5	6.5	100
Total	108	100	100	

Table 4.8 shows the average sales per year for the last 3 years. The highest percentage is between RM501, 000-RM1 Million with 50.9% or 55 frequency. The second percentage is between RM1.1 Million - RM5 Million with 26.9% or 29 frequency. The average between RM5.1 Million – RM10 Million have 10.2% or 11 frequency and above RM10 Million have 6.5% or 7 frequency. The lower average is between RM100, 000 – RM500, 000 that have 5.6% or 6 frequency.

4.3.3 Average profit per year for the last 3 years

Table 4.9

Average profit per year for the last 3 years

Average profit per year for the last 3 years	Frequency	Percent	Valid Percent	Cumulative Percent
Between RM100,000-RM500,000	5	4.6	4.6	4.6
Between RM501,000-RM1 Million	62	57.4	57.4	62
Between RM1.1 million-RM5 million	26	24.1	24.1	86.1
Between RM5.1 million-RM10 million	11	10.2	10.2	96.3
Above RM10 million	4	3.7	3.7	100
Total	108	100	100	

Table 4.9 shows that average profit per year for the last 3 years. The highest average profit is between RM501, 000- RM1 Million with 57.4% or 62 frequency. The second highest is between RM1.1 Million – RM5 Million with 24.1% or 26 frequency. The average profit between RM5.1 Million – RM10 Million is 10.2% or 11 frequency and follow by between RM100, 000 – RM500, 000 to 4.6% or 5 frequency. The last average profit is between above RM10 Million with 3.7% or 4 frequency.

4.4 Regression Analysis

This section contains the regression results and analyzes the effects of just-in-time, quality management and employee involvement toward financial performance. To ascertain the influence among those variables, simple regression was used to examine the simultaneous influence of lean manufacturing toward financial performance.

In order to quantitatively describe the correlation among independent variables and the dependent variable, the correlation coefficient *r* was used; it indicates that strength of correlation among variables; the strength of association was reviewed based on the scale recommended by Sekaran (2003) and it's presented in the table 3.3.

Hypotheses 1: **There is a significant influence of just-in-time on financial performance.**

Table 4.10

Model summary of Just-in -time on financial performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.535[a]	.286	.279	1.75246

a. Predictors: (Constant), Just in Time (JIT)

A simple regression analysis was undertaken between just-in-time and financial performance; Table 4.10 shows the correlation result of these variables. The result of correlation shown in Table 4.10 indicates that there is a positive correlation between just-

in-time and financial performance. The correlation value (*R*) is 0.535, it shows that the strength of association between the two variables is medium. Moreover, referring to Table 4.10, the value of the coefficient of determination or *R*-square (R^2) is 0.286, it shows that 28.6% of variance in financial performance is influenced by just-in-time while the rest 71.4% were influenced by other factors that are not conducted in this research.

Table 4.11

ANOVA of Just in time (JIT) on Financial Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	130.340	1	130.340	42.440	.000[a]
	Residual	325.539	106	3.071		
	Total	455.880	107			

a. Predictors: (Constant), Just in Time (JIT)

b. Dependent Variable: Financial Performance

ANOVA table 4.11 shows that the F value of 42.440 is significant at the 0.000 level. In the column *df* (degree of freedom) in the table, the first number represents the number of independent variable (1) which is just in time, the second number (106) is the total number of complete responses for the variable in the equation (*N*) minus the number of independent variable (K) minus 1(N-K-1) ((108- 1 - 1) = 106. The F statistic produced (*F*= 42.440) is significant at the 0.000 level. This result provides a support for the first hypothesis (*H1*) which stated that there is a significant influence of just-in-time of financial performance and the hypothesis is hereby accepted.

Table 4.12

Coefficients of Just in Time (JIT) on financial performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.509	1.071		9.815	.000
	JIT	.474	.073	.535	6.515	.000

a. Dependent Variable: Financial Performance

Based on the Coefficients Table 4.12 Beta value (β) is 0.535 for just-in-time, which is significant at the 0.000 level. From the table 4.10, *B* (constant) = 10.509 which stated that if the just-in-time is omitted, it will cause the value of financial performance is 10.509. Moreover, the coefficient of 0.474 for just-in-time is also given in the table under unstandardized coefficients.

Hypotheses 2: **There is a significant influence of Quality Management (QM) on financial performance.**

Table 4.13

Model Summary of Quality Management (QM) on financial performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.521[a]	.272	.265	1.76986

a. Predictors: (Constant), Quality Management (QM)

The influence of quality management on financial performance was also tested using simple regression analysis. Model summary in Table 4.13 shows the results of the correlation between quality management and financial performance where there is a positive correlation between those variables. As can be seen, the correlation of those variable was 0.521 (R = 0.521) which is indicated as medium correlation. In addition, by referring to the table 4.11 above, R-square is 0.272 (R^2 = 0.272), it means that 27.2% of variance in financial performance has been influenced by quality management while the rest 72.8% has been influenced by other factors that are not conducted in this research. Overall, the result indicates that the increased presence of quality management positively affects the financial performance.

Table 4.14

ANOVA of Quality Management (QM) on financial performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	123.846	1	123.846	39.537	.000[a]
	Residual	332.034	106	3.132		
	Total	455.880	107			

a. Predictors: (Constant), Quality Management (QM)

b. Dependent Variable: Financial Performance

According to ANOVA table 4.14, F value of 39.537 is significant at the 0.000 level. In the column *df* (degree of freedom), the first number represents the number of independent variables (1) which is quality management, the second number (106) is the total number of

complete responses for the variable in the equation (*N)* minus the number of independent variables (K) minus 1 *(N – K* – 1) ((108 – 1 – 1) =106). Since, the F statistic has produced (F= 39.537) is significant at the 0.000 level. The value of the correlation provides support for the second hypothesis (H2) which stated that there is a significant influence of quality management on financial performance.

Table 4.15

Coefficients of Quality Management (QM) on financial performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.139	1.167		8.689	.000
	Quality Management	.398	.063	.521	6.288	.000

a. Dependent Variable: Financial Performance

From the coefficient table 4.15, by looking at the column Beta under Standardize coefficients, the number in the beta (β) is 0.521 for quality management, which is significant at the 0.000 level. Furthermore, it is shown that *B* (constant) = 10.139 which stated that if the quality management is omitted, it will cause the value of financial performance is 10.139. Moreover, under unstandardized coefficients, the coefficient of 0.398 for quality management is also given.

Hypotheses 3: **There is a significant influence of Employee Involvement (EI) on financial performance.**

Table 4.16

Model Summary of Employee Involvement (EI) on financial performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.502[a]	.252	.244	1.79414

a. Predictors: (Constant), Employee Involvement (EI)

According to Table 4.16, the value of R-square is 0.252 (R^2= 0.252), it means that 25.2 % of variance in financial performance is influenced by employee involvement while the rest 74.8% were influenced by other factors that are not conducted in this research. Furthermore, as can be seen on the model summary table, R is 0.502 (R= 0.502), it is a positive correlation of the four variables in the correlation and it is as a medium correlation.

Table 4.17

ANOVA of Employee Involvement (EI) on financial performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.674	1	114.674	35.625	.000[a]
	Residual	341.206	106	3.219		
	Total	455.880	107			

a. Predictors: (Constant), Employee Involvement (EI)

b. Dependent Variable: Financial Performance

According to ANOVA table 4.17, F value of 35.625 is significant at the 0.000 level. As can be seen on the table, in the column *df* (degree of freedom), the first number represents the number (1) which is employee involvement, the second number (106) is the total number of complete responses for the variables in the equation (N) minus the number of independent variables (K) minus 1 (N – K – 1) ((108 – 1 – 1) = 106). Since the F statistic produced (F = 35.625) is significant at the 0.000 level.

Table 4.18

Coefficients of Employee Involvement (EI) on financial performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.685	1.304		7.428	.000
	Employee Involvement	.417	.070	.502	5.969	.000

a. Dependent Variable: FIRM a. Dependent Variable: Financial Performance

From the coefficients table 4.18, by looking at the column Beta under Standardize coefficients, the number in the beta (β) is 0.502 for employee involvement, which is significant at the 0.000 level. Furthermore, it shown that B (constant) = 9.685 which stated that if the employee involved is omitted, it will cause the value of financial performance is 9.685. Moreover, under unstandardized coefficients, the coefficient of 0.417 for employee involvement is also given.

There is a significant influence of Lean Manufacturing (JIT, QM, and EI) on Financial performance.

Table 4.19

Model Summary of Lean Manufacturing on Financial performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.524[a]	.275	.268	1.76599

a. Predictors: (Constant),Lean Manufacturing (LM)

According to table 4.17, the value of *R*-square is 0.275 ($R^2 = 0.275$), it means that 27.5% of variance in financial performance is influenced by lean manufacturing while the rest 72.5% were influenced by other factors that are not conducted in this research. Furthermore, as can be seen on the modal summary table, R is 0.524 (R = 0.524), it is a positive correlation of the four variables in the correlation and it is indicated as a medium correlation.

Table 4.20

ANOVA of Lean Manufacturing on Financial performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	125.296	1	125.296	40.175	.000[a]
	Residual	330.584	106	3.119		
	Total	455.880	107			

a. Predictors: (Constant), Lean Manufacturing (LM)

b. Dependent Variable: Financial Performance

According to ANOVA table above, F value of 40.175 is significant at the 0.000 level. As can be seen on the table, in column *df* (degree of freedom), the first number represents the number of independent variables (1) which are lean manufacturing, the second number (106) is the total number of complete responses for the variables in the equation (N) minus the number of independent variable (K) minus 1 (N – K – 1) ((108 – 1 – 1) = 106). Since, the F statistic produced (F = 40.175) is significant at the 0.000 level.

Table 4.21

Coefficients of Lean Manufacturing on Financial Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.938	1.189		8.358	.000
	Lean Manufacturing	.146	.023	.524	6.338	.000

a. Dependent Variable: Financial Performance

From the coefficient table, by looking at the column Beta under Standardize coefficients, the number in the beta (β) is 0.524 for lean manufacturing, which is significant at the 0.000 level. Furthermore, it is shown that B (constant) = 9.938 which stated that if the lean manufacturing is omitted, it will cause the value of financial performance is 9.938.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

In this chapter provides the summary of the interpretation of results and discussion presented in the previous chapter. In this chapter also discuss about the recommendation of this study. The significance of the findings is highlighted and the recommendation for future research and the conclusion of the research are presented at the end of this research. The key of findings is summarized based on the objective of the researcher presented in chapter one.

Research Objective 1: To examine the effect of just-in time toward financial performance.

In this research, there are three objective question that has been identified to measure the factor lean manufacturing influence financial performance in Hicom Automotive. The factor that has been identified are just-in-time, quality management, and employee involvement.

A simple regression analysis was undertaken between just-in-time and financial performance; model summary table 4.10 shows the correlation result of these variables. The result of correlation indicates that there is a positive correlation between just-in-time and financial performance. The correlation value was 0.535 (R = 0.535), it shows that the strength of association between the two variables is medium. The value of the coefficient

of determination or *R*-square is 0.286 (R^2 = 0.286), it shows that 28.6% of variance in financial performance is influenced by just-in-time while the rest 71.4% were influenced by other factors that are not conducted in this research.

Research Objective 2: To examine the effect of quality management toward financial performance.

Quality management was important in managing the financial performance. The results of the correlation between quality management and financial performance where there is a positive correlation between those variables. As can be seen, the correlation of those variable was 0.521 (R = 0.521) which is indicated as medium correlation. *R*-square is 0.272 (R^2 = 0.272), it means that 27.2% of variance in financial performance has been influenced by quality management while the rest 72.8% has been influenced by other factors that are not conducted in this research. Overall, the result indicates that the increased presence of quality management positively affects the financial performance.

Research Objective 3: To examine the effect of employee involvement, toward financial performance.

The value of R-square is 0.252 (R^2= 0.252), it means that 25.2 % of variance in financial performance is influenced by employee involvement while the rest 74.8% were influenced by other factors that are not conducted in this research. Furthermore, as can be seen on the model summary table in table 4.16, *R* is 0.502 (R= 0.502), it is a positive correlation of the four variables in the correlation and it is as a medium correlation.

5.1 Conclusions

The effect of lean management for Just-in-time, Quality Management and Employee Involvement toward financial performance refer value of *R*-square in table 5.1, it means that financial performance is influenced by lean manufacturing. It is a positive correlation of the 3 variables in the correlation and it is indicated as a medium correlation.

Table 5.1

Summary R-square lean management toward financial performance

lean management toward financial performance	***R*-square**	**Remark**
Hypotheses 1 (JIT)	0.535	Medium level of correlation and positive correlation
Hypotheses 2 (QM)	0.521	Medium level of correlation and positive correlation
Hypotheses 3 (EI)	0.502	Medium level of correlation and positive correlation

The result from multiple regression finding positive correlation and it is indicated as a medium correlation refer value of *R*-square 0.524 in the table 4.19. It means that financial performance is influenced by lean manufacturing.

5.2 Managerial Implication

These studies also present practical insight for automotive industry. Some of the relevant practical implications have been discussed all the way in the discussion of the finding based

on hypotheses and research question. The increasing financial performance in the manufacturing sector will be encouraging the implication of lean manufacturing. From the finding analysis that has been analyses in chapter four, the researcher has found that the needs of implementation lean manufacturing affecting the increasing of financial performance. Lean manufacturing management is to make the management activities in companies to improve their service. By using this system, the user like companies can improve their quality product, reduce cost, and getting the quality time. The implementation of lean manufacturing in manufacturing company has proven that the system and process will enable the companies and also its supplier to improve their cycle time, greater governance or control and enable timely information exchange to support the business trade.

The objective of this study was to carry out the effect of lean manufacturing on financial performance. The main contribution of this study was to convince management to take more attention on the relationship between lean manufacturing management and financial performance. Companies should aware and understand the lean concept and purpose, because the main barriers of these companies are the lack of real understanding of lean manufacturing concept and employee's attitude.

5.3 Limitation of study and future research direction

This study has a several limitation such as some respondent are refusing to give cooperation to answer the questionnaire because they were too busy doing their daily job. This situation caused time to collect this questionnaire are relatively slow. In addition, the researcher

collected the questionnaire by own and this situation makes the researcher have to be more patient.

Another limitation of this study is time constrains. The researcher has to collect the data within two weeks. The researcher manages to get 108 respondents that have distributed questionnaire by hand. The direction for future research is measuring the step forward for the implementation lean manufacturing in manufacturing industries. It is also an investigation for the benefit of lean manufacturing to the other sectors like government sector and SMEs companies. The potential benefit of lean manufacturing usage towards financial performance has been described in detail is needed to study. It is also about the underutilization of lean manufacturing management, especially effective for the business purpose was still a major issue to be studied.

The limitations in the search methodology because some quality papers on lean manufacturing may have been left out of this review. The techniques and large number of papers on the lean manufacturing was practically impossible for the researcher to get these papers as well as review all the papers.

The research on lean manufacturing through empirical and exploratory studies has different views. The different views devoid of concepts was led by the use of a wide variety of management practices. Development of process for lean manufacturing implementation is strongly required.

The management practices in lean manufacturing implementation have led to a wide variety of performance indicators. There is a need to develop lean manufacturing standard metrics for its evaluation before implementation, during implementation, and after implementation.

References

Ahmad, A., Mehra, S., and Pletcher, M. (2004). The perceived impact of JIT implementation on firms 'financial/growth performance. *Journal of Manufacturing Technology Management, Vol. 15 No. 2, 118-30.*

Alukal, G. (2003). Create a lean, mean machine. *Quality Progress, Vol. 36 No. 4, 29-34.*

Alves, A.C., Dinis-Carvalho, J. and Sousa, R.M. (2012). Lean production as promoter of thinkers to achieve companies' agility. *The Learning Organization, Vol. 19 No. 3, 219-237.*

Anchanga, P. (2006). Critical success factor for lean implementation within SMEs. *Journal of Manufacturing Technology Management, 17(4), 11-17.*

Balakrishnan, R., Linsmeier, T.J., and Venkatachalam, M. (1996). Financial benefits From JIT adoption: effects of customer concentration and cost structure. *The Accounting Review, Vol. 71 No. 2, 183-205.*

Bhasin, S. & Burcher, P. (2006). Lean viewed as a philosophy. *Journal of manufacturing Technology Management, Vol. 17 No. 1, 2006.*

Boyd, D. T., Kronk, L. A., and Boyd, S. C. (2006). Measuring the effects of lean manufacturing systems on financial accounting metrics using data envelopment analysis. *Investment Management and Financial Innovations, Vol. 3 No. 4, 40-54.*

Browning, T.R., Heath, R.D., (2009). Conceptualizing the effects of lean on production costs with evidence from the F-22 program. *Journal of Operations Management 27 (1), 23-44.*

Callen, J.L., Fader, C., and Krinsky, I. (2000). Just-in-time: a cross-sectional plant analysis. *International Journal of Production Economics, Vol. 63 No. 3, 277-301.*

Christopher, M., Towill, D.R., (2000). Supply chain migration from lean and functional to agile and customized. *Supply Chain Management: An International Journal 5(4), 206-213.*

Comm, C.L. and Mathaisel, D.F.X. (2000). A paradigm for benchmarking lean initiatives for quality Improvement. *Benchmarking: An International Journal, Vol. 7 No. 2, 118-127.*

Cox, J.F. and Blackstone, J.H. (Eds) (1998). APICS Dictionary, 9th ed., *APICS-The Educational Society for Resource Management, Falls Church, VA.*

Cooney, R. (2002). Is 'lean' a universal production system? Batch production in the automotive industry. *International Journal of Operations & Production Management, Vol. 22 No. 10, 1130-1147.*

Cua, K.O., McKone, K.E., and Schroeder, R.G. (2001). Relationships between Implementation of TQM, JIT, and TPM and manufacturing performance. *Journal of Operations Management, Vol. 19 No. 6, 675-94.*

De Treville, S. and Antonakis, J. (2006). Could lean production job design be intrinsically motivating? Contextual, configurational, and levels-of-analysis issues. *Journal of Operations Management, Vol. 24 No. 2, 99-123.*

Devdas Shetty, Ahad Ali, Robert Cummings, (2010). Survey-based spreadsheet model on lean implementation. *International Journal of Lean Six Sigma, Vol. 1 Iss: 4, 310- 334.*

Duque, D.F.M. & Cadavid, L.R. (2007). Lean Manufacturing Measurement: the Relationship between Lean Activities and Lean Metrics. *Estudios gerenciales, 23(105), 69-83.*

Dr. Jevon Powell (2011). Employee Involvement. *Scontrino-Powell From: http://www.scontrino-powell.com/2011/employee-involvement/*

Eric Oscar Olsen, (2004). Lean Manufacturing Management: The Relationship Between Practice and Firm Level Financial Performance. *The Ohio State University, 1.*

Eriksson, H., and Hansson, J (2003). The impact of TQM on financial performance. *Measuring Business Excellence 7, Vol. 7 No. 1, 36-50.*

Eshna (2012). *Financial Performance-Understanding its Concepts and Importance From: https://www.simplilearn.com/financial-performance-rar21-article*

Fullerton, R. R., McWatters, C. S., & Fawson, C. (2003). An examination of the relationships between JIT and financial performance. *Journal of Operations Management, 21(4), 383.*

Fullerton, R.R., McWatters, C.S., and Fawson, C. (2003). An examination of the Relationships between JIT and financial performance. *Journal of Operations Management, Vol. 21 No. 4, 383-404.*

Fullerton, R.R., Wempe, W., (2009). Lean manufacturing, non-financial performance measures, and financial performance. *International Journal of Operations and Production Management 29 (3), 214-240.*

Garcia-AIcaraz JL, Maldonado AA. Iniesta AA, Robles GC. Alor-Hernåndez G (2014). A systematic review/survey for JIT implementation. *Mexican maquiladoras as case study Comput Ind 65(4):761-773.*

Hair, J. F., Money, A. H., Samouel, P. & Page, Mike. (2007). Research Method for Business. *John Wiley & Son Ltd., England.*

Howton, S. D., Higgins, E. J., & Biggart, T. B. (2000). The information content of just-in time inventory system adoption announcement. *Journal of Business Finance & Accounting, 27(5/6): 711.*

Holweg, M. (2007). The genealogy of lean production. *Journal of Operations Management, Vol. 25No. 1, 420-437*

Hopp, W.P. and Spearman, M.L. (2004). "To pull or not to pull: what is the question?" *Manufacturing and Service Operations Management, Vol. 6 No. 2, 133-148.*

Howell, G.A. (1999). What is lean construction-1999?. *Proceedings Seventh Annual Conference of the International Group for Lean Construction, University of California, Berkeley, CA, July 26-28.*

Haque, B. and Moore, M.J. (2004). Measures of performance for lean product introduction in the aerospace industry. *Proceedings of the Institution of Mechanical Engineers Part B-Journal of Engineering Manufacture, Vol. 218 No. 10, 1387-1398.*

Hallgren, M. and Olhager, J. (2009). Lean and agile manufacturing; external and internal drivers and performance outcomes. *International Journal of Operations & Production Management, Vol. 29 No. 10, 976-999.*

Henry Ford (1863-1947). ProQuest, (2006). *Integrating Lean Manufacturing with Technology: Analyzing the Effects on Organizational Performance in Terms of Quality, Cost, and Response Time, 1.*

Holweg, M. (2007). The genealogy of lean production. *Journal of Operations Management, vol. 25, 420-437*

Hogg, T. M. (1993). Lean Manufacturing. *Human Systems Management, 12, 1.*

Inman R. Anthony RS. Sale KW. Jr G, Whitten D (2011). Agile manufacturing: relation to JIT, operational performance and firm performance. *J Oper Manage 29(4), 343-355.*

Kelly, M. (2012). Advantages & Disadvantages of Lean Production. Retrieved 20 December 2016, from http://www.ehow.com/about_5418429_advantages-disadvantages-lean-production.html.

Krejeie, RV. and Morgan, D.W. (1970). Determining Sample Size for Research. *Educational & Psychological Measurement. 30. 607-610.*

Kinney, M.R., and Wempe, W.F. (2002). Further evidence on the extent and origins of JIT's profitability effects. *The Accounting Review, Vol. 77 No. 1, 203-25.*

Kannan VR. Tan, KC. (2005). Just in time, total quality management, and supply chain management: understanding their linkages and impact on business performance. *Omega 33(20), 153-162.*

Li, S., Rao, S.S., Ragu-Nathan, T.S., Ragu-Nathan, B., (2005). Development and validation of a measurement instrument for studying supply chain management practices. *Journal of Operations Management 23 (6), 618-641.*

Linderman, K., Schroeder, R.G., Choo, A., (2006). Six sigma: the role of goals in improvement teams. *Journal of Operations Management 24 (6), 779-790.*

Lin, C., Chow, W.S., Madu, C.N., Kuei, C., Pei, Yu, P., (2005). A structural equation model of supply chain quality management and organizational performance. *International Journal of Production Economics 96 (3), 355-365.*

Lathin, D. and Mitchell, R. (2001). Lean manufacturing: techniques, people and culture. *Quality Congress Proceedings, Milwaukee, WI, June, 26.*

Lau, R.S.M. (2002). Competitive factors and their relative importance in the US Electronics and computer industries. *International Journal of Operations and Production Management, Vol. 22 No. 1, 125-35.*

Liker, J.K. and Wu, Y.C. (2000). Japanese automakers, US suppliers and supply-chain superiority. *Sloan Management Review, Vol. 42 No. 1, 81-93.*

McLachlin, R., (1997). Management initiatives and just-in-time manufacturing. *Journal of Operations Management 15 (4), 271-292.*

Martinez, A. & Perez, M. (2001). Lean Indicators and Manufacturing Strategies. *International Journal of Operations & Production Management, 21(11), 1433-1451.*

Menor, L.J., Kristal, M.M., Rosenzweig, E.D., (2007). Examining the influence of operational intellectual capital on capabilities and performance. *Manufacturing & Service Operations Management 9 (4), 559-578.*

MacDuffie, J.P., (1995). Human resource bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry. *Industrial & Labor Relations Review 48 (2), 197-221.*

McKone, K.E., Schroeder, R.G., Cua, K.O., (1999). Total productive maintenance: a contextual view. *Journal of Operations Management 17 (2), 123-144.*

MIT (2000).Transitioning to a lean enterprise: a guide for leaders, *retrieved 20 December 2016 from http://lean.mit.edu/Products/TTL/TTL-vol1.pdf.*

Narasimhan, R., Kim, S.W., (2002). Effect of supply chain integration on the relationship between diversification and performance: evidence from Japanese and Korean firms. *Journal of Operations Management 20 (3), 303-323.*

Nahm, A.Y., Vonderembse, M.A., and Koufteros, X.A. (2003). The impact of Organizational structure on time-based manufacturing and plant performance. *Journal of Operations Management, Vol. 21 No. 3,281-306.*

Nordin, N., Deros, B. M., & Wahab, D. A (2010). A survey on lean manufacturing implementation in Malaysian automotive industry. *International Journal of Innovation, Management and Technology, 374-380.*

Naylor, J.B., Naim, M.M. and Berry, D. (1999). Legality: integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of Production Economics, Vol. 62 No. 1, 107-118.*

Narasimhan, R., Swink, M. and Kim, S.W. (2006). Disentangling leanness and agility: an empirical investigation. *Journal of Operations Management, Vol. 24 No. 1, 440-457.*

Oliver Nick, Rick Delbridge, James Lowe (1996). Lean Production Practices. *International Comparisons in the Auto Components Industry. S29–S44.*

Ohno, T. (1988). The Toyota Production System; Beyond Large-Scale Production. *Productivity Press, Portland, OR.*

Olsen, O. E. (2004). Lean Manufacturing Management: the relationship between practice and firm level financial performance. *PhD dissertation, 1-83*

Ohno, T. (1988). Toyota Production System. Cambridge. *MA: Productivity Press.*

Power D, Sohal AS (2000). Human resource management strategies and practices in just-in-time environments: Australian case study evidence. *Technovation 20(7):373-387.*

Pettersen, J. (2009). Defining Lean Production: Some Conceptual and Practical Issues. *The TQM Journal, 21(2), 127-142.*

Rao, P., D. Holt. (2005). Do green supply chains lead to competitiveness and economic performance?. *International Journal of Operations & Production Management 25(9):898-916.*

Rouhollah Mojtahedzadeh, V. C. Arumugam, A. Fallah, A. A. H. Mehrizi., (2012). The Relationship between Lean Manufacturing Management and Financial Performance. *6th International Quality Conference, 343-348.*

R. Ashley Rawlins TD. DL (2008). Total Quality Management (TQM). *Author House, 3, 1-5.*

Rappaport, A. (1987). Stock market signals to managers. *Harvard Business Review 65(6): 63-76.*

Rothstein, J.S. (2004). Creating lean industrial relations: general motors in Silao, Mexico. *Competition and Change, Vol. 8 No. 3, 203-221.*

Sekaran, Uma. (2003). Research Method for Business: A Skill-building Approach. *NY: John Wiley and Sons. New York.*

Sundar R, Balaji AN, Satheesh Kumar RM (2014). A review on lean manufacturing Implementation techniques. *Procedia Eng 97:1875-1885.*

Singh S. Garg D (2001). JIT system: concepts, benefits and motivations in Indian industries. *Int J Manage Bus Stud 1(1):26-30.*

Sim, K.L. & Rogers, J.W. (2009). Implementing Lean Production Systems Barriers to Change. *Management Research News, 32(1), 37-49.*

Shah, R., and Ward, P.T. (2007). Defining and developing measures of lean Production. *Journal of Operations Management Vol. 25 No. 4, 785-805.*

Singh S. Garg D (2001). JIT system: concepts, benefits and motivations in Indian industries. *Int J Manage Bus Stud 1(1):26-30*

Steven Frederic Rasch. (1998). Lean manufacturing practices: Do they work in American companies?. *University of Michigan.*

Shah, R., & Ward, P. (2003). Lean manufacturing: Context, practice bundles, and performance. *Journal of Operations Management, 21, 129-149.*

Singh, R. (1998). Lean manufacturing: changing paradigms in product manufacturing, design &supply. *The Third International Conference on Quality Management, retrieved 23 December 2016 from http:// www.qmconf.com/Docs/singh98.pdf.*

Storch, R.L. and Lim, S. (1999). Improving flow to achieve lean manufacturing in shipbuilding. *Production Planning & Control, Vol. 10 No. 2, 127-137.*

Schonberger, R. J. (2007). Japanese production management: An evolution - with mixed success. *Journal of Operations Management, 25, 403-419.*

Simpson, D.F. and Power, D.J. (2005). Use the supply relationship to develop lean and green suppliers-Supply Chain Management. *International Journal, Vol. 10 No. 1, 60-68.*

Seth, D. and Gupta, V. (2005). Application of value stream mapping for lean operations and cycle time reduction: an Indian case study. *Production Planning & Control, Vol. 16 No. 1, 44-59.*

Tom Bonine. (2014). *Facing Down the Biggest Challenges in Manufacturing Today.* Retrieved 23 December 2016 from http://www.manufacturing.net/article /2014/03/facing-down-biggest-challenges-manufacturing-today.

Taj, S. and Morosan, C. (2011). The impact of lean operations on the Chinese manufacturing performance. *Journal of Manufacturing Technology Management, Vol. 22 No. 2, 223-240.*

Tu, Q., Vonderembse, M.A., Ragu-Nathan, T.S., Sharkey, T.W., (2006). Absorptive capacity: enhancing the assimilation of time-based manufacturing practices. *Journal of Operations Management 24 (5), 692-710.*

Taj, S. and Berro, L. (2006). Application of constrained management and lean manufacturing in developing best practice for productivity improvement in an auto-assembly plant. *International Journal of Productivity and Performance Management, Vol. 55 No. 4, 332-345.*

Todd, P. (2000). Lean Manufacturing: Building the Lean Machine. *Journal of Advanced Manufacturing.*

Wayhan, V. B., and Balderson, E. L. (2007). TQM and financial performance: What has empirical research discovered?. *Total Quality Management & Business Excellence, Vol. 18 No. 4, 403-12.*

Weber, E. J. (2008). A short history of derivative security markets. *Crawley, W.A: University of Western Australia, Business School, Economics Program.*

Worley, J. (2004).The role of socio-cultural factors in a lean manufacturing implementation. Master thesis, *Oregon State University, Corvallis, OH.*

White RE. Prybutok V (2001). The relationship between JIT practices and type Of Production system .*Omega 29(2):113-124.*

Ward, P., Zhou, H., (2006). Impact of information technology integration and lean/just-in-time practices on lead-time performance. *Decision Sciences 37 (2), 177-203*

Wood J. L. (2012). Disadvantages of Lean Manufacturing. Retrieved 20 December 2016 from http://www.ehow.com/list_6025715_disadvantages-lean manufacturing. html#ixzz1nf9nyHmv.

Womack, J.P., Jones, D.T., and Roos, D. (1990). The Machine that Changed the World New York: Rawson Associates. *Free Press, 352.*

Womack, J.P. and D.T. Jones, (1996). Lean Thinking: Banish Waste and Create Wealth in Your Corporation. *Simon & Schuster, New York.*

York, K.M., and Miree, C.E. (2004). Causation or covariation: an empirical re-examination of the link between TQM and financial performance. *Journal of Operations Management, Vol. 22 No. 3, 291-311.*

Yang, M.G., Hong, P., and Modi, S.B. (2011). Impact of lean manufacturing and environmental management on business performance: An empirical study of manufacturing firms. *International Journal of Production Economics, Volume 129, Issue 2, 251-261.*

Yasin MM, Small MH, Wafa MA (2003). Organizational modifications to support JIT implementation in manufacturing and service operations. *Omega 31(3):213-226.*

APPENDICES

Appendix 1: Sample of Questionnaire

Dear respected respondent,

Thanks you for sparing your time responding to this questionnaire. You are invited to participate in this research on study entitled "***The effect of lean manufacturing on business performance".*** As a participant in a scientific investigation, you have the right for:

Confidentiality of responses

Your answers will be treated as anonymous and your identity will be protected. Once you return the questionnaire, there is no way in which to identify any study participant. Additionally, all data from the study will be reported in numerical from using aggregated categories.

Please respond to every item in this questionnaire following the instruction in every section. Your participation is voluntary and there is no right or wrong answers. Therefore, please answer as honestly as possible.

We realize that you are busy and thus, we have designed this questionnaire so that it should not take you longer than fifteen minutes to answer.

Once again, thank you very much for your time and consideration.

Sincerely,

Nor Rifhan Hashim (813332)

(MSc. Management)

Universiti Utara Malaysia

SECTION A: DEMOGRAFIC

Please fill and tick **(/)** in the following information:

1. Gender :

   ( ) Male
   ( ) Female

2. Race :

   ( ) Malay
   ( ) Chinese
   ( ) Indian
   ( ) Others

3. Age

   ( ) Between 25 and 35 years
   ( ) Between 36 and 45 years
   ( ) Between 46 and 55 years

4. Qualifications :

   ( ) School certificate/SPM and STPM
   ( ) Diploma
   ( ) Degree
   ( ) Master
   ( ) Others

5. Your position/level:

   ( ) Non-executive
   ( ) New entry/Fresh
   ( ) Junior Executive
   ( ) Senior executive
   ( ) Manager
   ( ) Senior Manager
   ( ) Others

6. Number or years working experience:

   ( ) Less than 5 years
   ( ) Between 5 and 10 years
   ( ) Between 10 and 20 years
   ( ) Above 20 years

SECTION B: COMPANY PROFILE

Please fill and ticks **(/)** the most appropriate represent your organization:

1. Ownership of company in percentage:

   ( ) % Foreign (US, Japan, Britain, France, Germany and etc.). Please specify_____
   ( ) % Malaysian

2. Average sales per year for the last 3 years.

   ( ) Between RM100, 000 – RM500, 000
   ( ) Between RM 501,000 – RM 1 million
   ( ) Between RM 1.1 million – RM 5 million
   ( ) Between RM 5.1 million – RM 10 million
   ( ) Above RM10 million

3. Average profit per year for the last 3 years.

   ( ) Between RM100, 000 – RM500, 000
   ( ) Between RM 501,000 – RM 1 million
   ( ) Between RM 1.1 million – RM 5 million
   ( ) Between RM 5.1 million – RM 10 million
   ( ) Above RM10 million

SECTION C: LEAN MANUFACTURING (JUST-IN-TIME FLOW, QUALITY MANAGEMENT AND EMPLOYEE INVOLVEMENT

Please indicate degree of the following action programs undertaken over the last 3 years and ticks **(/)** the scale.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

	Just-In-Time (JIT)	**1**	**2**	**3**	**4**	**5**
1.	Restructuring manufacturing processes and layout to obtain process focus and streamlining (e.g., reorganize plant within-a-plant; cellular layout, etc.)					
2.	Production at stations is "pulled" by the current demand of the next station.					
3.	Production is "pulled" by the shipment of finished goods					
4.	Undertaking actions to implement pull production (e.g., reducing batches, setup time, using kanban systems, etc.)					

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	2	3	4	5

	Quality Management (QM)	1	2	3	4	5
1.	Undertaking programs for quality improvement and control (e.g., TQM programs, 6s projects, quality circles, etc.)					
2.	Undertaking programs for the improvement of your equipment productivity (e.g., total productive maintenance programs)					
3.	The company has a formal quality system and program.					
4.	The company has an up-to-date quality manual that clearly defines the processes, procedures, and resources that assure the quality of products and processes.					
5.	The company has a formal quality assurance program that uses quantitative (statistical) methods, SPC, benchmarking, quality function deployment, etc. to analyze products and processes.					

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	2	3	4	5

	Employee Involvement (EI)	1	2	3	4	5
1.	Implementing actions to increase the level of delegation and knowledge of your workforce (e.g., empowerment, training, autonomous teams, etc.)					
2.	Implementing the Lean Organization Model by, (e.g., reducing the number of levels and broadening the span of control.)					
3.	Shop-floor employees are key to problem solving teams					
4.	Shop-floor employees drive suggestion programs					
5.	Shop-floor employees lead product/process improvement efforts					

SECTION D: FIRM PERFORMANCE

Using the scale of 1 – 5, please indicate and ticks **(/)** the scale your agreement or disagreement with the following statements about your organization performance.

Indicate degree of the following action programs undertaken over the last 3 years.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

	Financial Performance	**1**	**2**	**3**	**4**	**5**
1.	Our company achieves better return on sales (ROs) than the competitor for the last three years.					
2.	Our company achieves better return on investment (ROI) than the competitor for the last three years.					
3.	Our company achieves better asset growth than competitor for the last three years.					
4.	Our company achieves better revenue growth than competitor for the last three years.					
5.	Our company achieves better net profit growth than competitor for the last three years.					

End of question, thank you very much and have a good day.

Appendix 2: Pilot Test Results

Just In Time (JIT):

Reliability Statistics

Cronbach's Alpha	N of Items
.884	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
JIT1	11.3200	3.447	.753	.849
JIT2	11.3400	3.821	.666	.881
JIT3	10.9200	2.851	.865	.803
JIT4	11.0000	3.429	.724	.860

Quality Management (QM):

Reliability Statistics

Cronbach's Alpha	N of Items
.888	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
QM1	15.0600	5.078	.715	.867
QM2	15.0800	5.463	.653	.881
QM3	14.6600	4.229	.876	.828
QM4	14.7400	4.809	.787	.850
QM5	14.8600	5.796	.646	.884

Employee Involvement (EI):

Reliability Statistics

Cronbach's Alpha	N of Items
.858	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EI1	15.4000	4.163	.609	.847
EI2	15.0800	5.463	.437	.881
EI3	15.0000	3.184	.880	.769
EI4	15.0800	3.585	.840	.780
EI5	15.2000	4.490	.687	.829

Firm Performance:

Reliability Statistics

Cronbach's Alpha	N of Items
.925	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FIRM1	13.4000	3.551	.857	.898
FIRM2	13.4200	3.555	.870	.895
FIRM3	13.3600	3.704	.818	.906
FIRM4	13.2800	4.002	.620	.943
FIRM5	13.4200	3.555	.870	.895

Correlations

		Just In Time (JIT)	Quality Management (QM)	Employee Involvement (EI)
Just In Time (JIT)	Pearson Correlation	1	.989**	.958**
	Sig. (2-tailed)		.000	.000
	N	50	50	50
Quality Management (QM)	Pearson Correlation	.989**	1	.980**
	Sig. (2-tailed)	.000		.000
	N	50	50	50
Employee Involvement (EI)	Pearson Correlation	.958**	.980**	1
	Sig. (2-tailed)	.000	.000	
	N	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

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