

**IMPACT OF LEAN MANUFACTURING PRACTICES ON
JOB SATISFACTION AMONG EMPLOYEES IN LEAN
MANUFACTURING COMPANIES; MODERATED BY
LEAN CULTURE AND MEDIATED BY JOB
CHARACTERISTICS**

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*Research Report in partial fulfillment of the requirements for the degree of
Online MBA*

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DECLARATION

I hereby declare that the project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at USM or any other institutions.

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ABSTRAK

Objektif kajian ini adalah untuk menyiasat kesan amalan pembuatan *lean* terhadap kepuasan kerja di kalangan kakitangan syarikat-syarikat pembuatan *lean*, ditapis oleh budaya *lean* dan berperantaraan dengan ciri kerja. Satu kajian yang telah dijalankan melalui soal selidik yang dihantar dan dipungut daripada pekerja-pekerja di 10 syarikat pembuatan *lean* terpilih. Sebanyak 500 soal selidik telah dihantar dan kira-kira 21% kadar respons diperolehi. Statistik deskriptif dibentangkan, diikuti dengan analisis faktor, analisis kebolehpercayaan, ujian korelasi Pearson dan ujian hipotesis dengan analisis regresi. Keputusan kajian ini dapat menyokong objektif kajian. Dapatan kajian menunjukkan bahawa amalan pembuatan *lean* mempunyai kesan positif separa signifikan ke atas ciri kerja dan kepuasan kerja. Ciri kerja mempunyai kesan positif yang signifikan terhadap kepuasan kerja. Ciri kerja pula separa signifikan menyokong terhadap hubungan antara amalan pembuatan *lean* dengan kepuasan kerja. Budaya *lean* mempunyai kesan pemoderatan yang separa ke atas hubungan antara amalan pembuatan *lean* dan kepuasan kerja. Keputusan ini bernilai kepada pembaca dari bahagian operasi dan sumber manusia, serta pengurusan dan pelaksanaan *lean* dan amalan yang berkaitan. Kekurangan kajian ini adalah di mana kajian *cross sectional* tertakluk kepada perbezaan kaedah yang lazim digunakan; replikasi kajian dengan yang menggunakan kajian *longitudinal* disyorkan. Kajian tambahan boleh dilaksanakan dengan pensampelan yang lebih luas, termasuk Perusahaan Kecil dan Sederhana atau negara tertentu. Secara ringkasnya, kajian ini menyumbang kepada pengetahuan yang sedia ada mengenai hubungan antara amalan pembuatan *lean* dan kepuasan kerja pekerja.

ABSTRACT

The objective of this study is to investigate the impact of lean manufacturing practices on job satisfaction among employees in lean manufacturing companies, moderated by lean culture and mediated by job characteristics. A survey has been conducted via questionnaire dropped off and collected from employees in selected ten lean manufacturing companies. A total of 500 questionnaires were sent and approximately 21% response rate obtained. Descriptive statistics were tabulated, followed by factor analysis, reliability analysis, Pearson correlation and hypotheses testing using regression analysis. The finding of this study is able to support the research objective. This study established that lean manufacturing practices have partial positive effect on job characteristics and job satisfaction. Job characteristics have significant positive effects on job satisfaction. Job characteristics have partially mediated the relationship between lean manufacturing practices and job satisfaction. Lean culture has partial moderating effects on the relationship between lean manufacturing practices and job satisfaction. The results will be of value to readers with interests in operations and human resources, as well as the management and implementation of lean and its associated practices. The limitations of this research are published where cross sectional studies by their nature are subject to common method variances; further refinement of the instrument and a replication of the study using a longitudinal approach are recommended. Additional studies should be supplemented to include a wider sampling to include Small and Medium Scale Enterprises or country specific. In summary, this study contributes to the existing pool of knowledge on the relationships between lean manufacturing practices and employee job satisfaction.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

Organizations have been facing an increasingly competitive and global environment, which calls for enhanced firm capability to achieve competitive advantage through identifying new opportunities and sustaining superior performance. Elimination of operational inefficiencies and improvement of revenue by increasing the number of customers and their satisfaction, through innovation and improvement are among the strategies used by companies to avoid competitive disadvantages (de Koning et al., 2008a). It is evident from many studies conducted (Chen, Lindeke & Wyrlik, 2010; Achanga, Shehab, Roy & Nelder, 2006; Antony, Antony & Kumar, 2007a) that lean practice is aggressively pursued for profit in all sectors such as manufacturing and services. However, the well being of the employees is only vaguely described in many of these improvement methodologies and the effects on job satisfaction can therefore be questioned. Job satisfaction is important because it is associated with positive organizational outcomes, impacts employee's total well-being and the connections between job satisfaction and stress.

The manufacturing sector is highly dependent on lean. In fact it was one of the pioneers of lean manufacturing starting from Toyota's lean production in 1940s. Normally, manufacturing is defined as the large scale transformation of raw materials into finished goods or commonly referred to as industrial production. Hence, manufacturing consists of many intermediate processes required for the production

and integration to become a product. From Industry Week (June 2011), examples of top manufacturing companies in the North America include Apple Inc, Texas Instruments Inc and General Electric. According to Deloitte (2008), examples in Europe include Volkswagen Group, Nokia and Fiat. Deloitte also stated examples in Asia include Toyota, Samsung, and Bridgestone while in Malaysia include Proton, Perodua and Malayawata Steel. There are a number of benefits to manufacturing, including the creation of jobs and development of new technologies. According to the Business Council of New York State (2003), manufacturers in the U.S. are responsible for almost two-thirds of private-sector research and development, totaling more than \$120 million in 2002.

According to the Manufacturing Journal (2006), a University of Michigan study shows for each job in manufacturing, more than six "spin-off" jobs are created. According to the National Association of Manufacturers (2009), the manufacturing industry's leading trade group, the United States remains the world's largest manufacturer, producing 22 percent of all products and employing almost 12 million Americans, approximately 10 percent of the total workforce. Also, in 2008, the average U.S. manufacturing worker earned \$14,000 more annually in pay and benefits than the average non-manufacturing worker (Source: www.eHow.com).

In the Malaysian context, the manufacturing sector contributed 31.6% of Malaysia's GDP in 2004 (30.8% in 2003), is the fastest growing sector with value added expanded at 9.8% in 2004 (8.3% in 2003). In 2004, the manufacturing exports which accounted for 78.4% of total exports, increased by 19.2% to RM376.8 billion. The top export earner, Electrical and Electronic (E&E) products contributed 50.2% or RM241.5 billion of total export revenue. The electronics industry is the largest in the region. Other products with more than RM10 billion export value include: chemicals

& chemical products; machinery; appliances & parts; wood products; optical disc & scientific equipment. Manufacturing Sales expanded by 19.7% to RM408 billion while employment in this sector increased by 3.1% to 2.92 million persons (Danavaindran, 2005). Malaysia is an emerging multi-sector country with strong growth that exclusively driven by export orientated manufacturing sector, particularly electrical and electronics (Source: CIA, 2004; Austrade, 2004). Figure 1.0 showed the contributions of manufacturing sector to Malaysia's GDP has increased year to year.

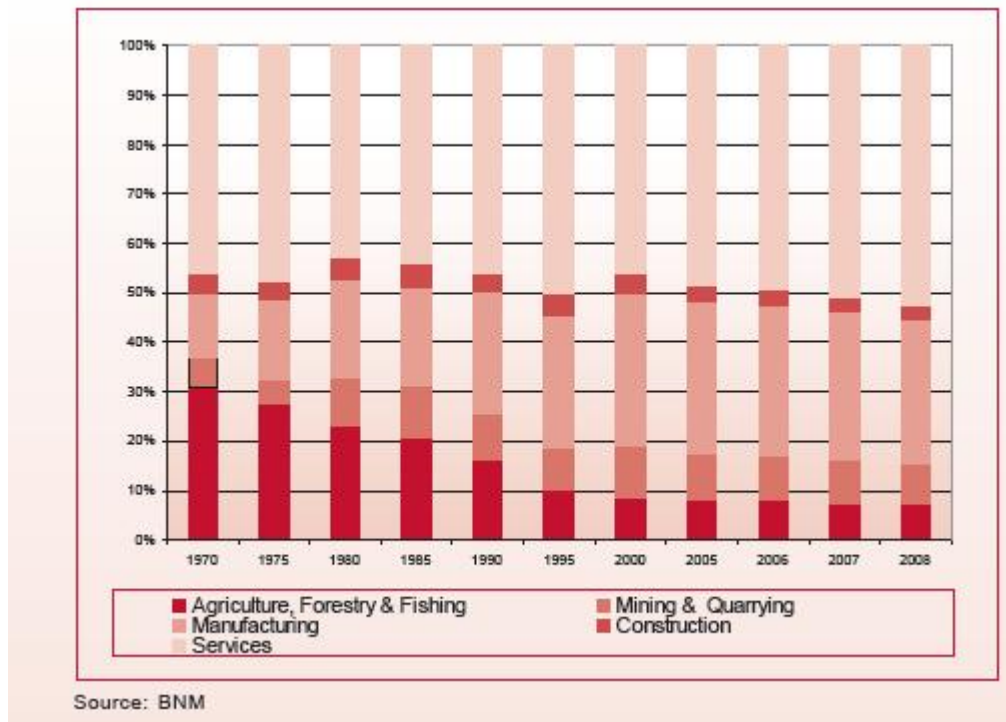


Figure 1.0: Sector contribution to GDP (%)

Source: Bank Negara Malaysia (2010)

According to the New Economic Model for Malaysia (2010), Malaysia has established a world-class manufacturing base. Manufacturing has been the fastest growing sector of the economy over the past as stated by the National Economic Advisory Council (2011). Manufacturing was primarily focused on the E and E sector

by attracting large inward investment by multinational firms around the world. The E and E sector spawned the growth of other sectors in supply, logistics and services. Malaysia has become a major exporter of consumer and industrial electronic products. It is now poised to make the next technological leap to more innovative and higher value added, cutting-edge technology industries. (Source: Malaysia Productivity Corporation (2010)). It is evident that the manufacturing sector plays an important role in any country's economic development, not only Malaysia. It provides economic growth by providing employment, business opportunities and revenue to the country.

As mentioned in earlier, manufacturing sector is important for the GDP of a country. Manufacturing companies are practicing lean for the multiple benefits especially for profit generation. In the pursuit of lean manufacturing, the impact towards employee is another important factor to consider.

1.1 Background of the Study

The implementation and development of lean technology and methodology in mass manufacturing organizations has significantly increased over the past few years. In the literature there are many examples quoted where the application of this methodology has led to large-scale improvements in defect rates and productivity (Pande et al., 2000; Reichfield & Sasser, 1990). However, most of the literature is in the "how to" and "applications" categories. Antony and Banuelas's (2002) study on critical success factors concludes that both process and people aspects must be present in any study. Considering that many organizations are currently investing heavily in lean and that it significantly affects employees and working practices, hence it is critical that a more thorough study is required now to gain understanding in the people aspects which is still lacking.

Lean methodology is a management system which is designed to be responsive to the needs of humans in business and deliver better outcomes for key stakeholders such as associates, suppliers, customers, investors, and communities. It is rooted in key principles and supported by simple processes and tools that are designed to help people improve productivity and consistently deliver the value that customers seek in the products and services they buy. The overarching lean principles are continuous improvement, respect for people and two key objectives are eliminate waste and create value for end-use customers (Ohno, 1988; Womack and Jones, 1996, Toyota, 2001). Some of the key processes and tools that are used in the lean management system to help people eliminate waste and create value for end-use customers are Five Ss, Just-in-time, Kaizen, Quality function deployment, Standard work chart, root cause analysis, total productive maintenance, value stream maps visual controls etc (Imai, 1997; Rother and Shook, 1999; Emiliani et al., 2003). The intent of these processes and tools is to simplify work and the workplace, improve quality, reduce lead-times, and focus people on value-creating activities. Importantly, they also help people realize their full potential and actualize their innate desire to make positive contributions to the workplace, which enables a more consistent stream of successful outcomes.

1.1.1 Employee Retrenchment and Labor Productivity

In Malaysian context, Economic Planning Unit and Ministry of Human Resource shown there are 1,058,980 of vacancies that are available in 2008. It also stated that 327,798 of the job opportunities came from the manufacturing sector. Jabatan Tenaga Kerja Semenanjung Malaysia has reported that there are 11,957 employees have been leaving from the organization voluntarily from October of 2008 until March of 2010.

Manufacturing sector is a sector that contributes the highest number of the employee turnover. Retrenchment Monitoring Report in 2009 has shown that there are 36,392 of employees in the manufacturing sector is involved in the job turnover from October of 2008 until March of 2009. The report also stated that this represents of 75 percent of the turnover rate from all sectors in Malaysia. It is evident that manufacturing section aggressively pursued lean practices, so could lean manufacturing contribute to this high job turnover rates?

Table 1.0

Statistic on Employee Retrenchment from October 2008 till March 2010.

Turnover	Employers	Local Employees	Foreign Employees	Total
Involuntary Turnover	1,372	28,268	8,360	36,628
Voluntary Turnover	304	11,175	782	11,957
Total	1,676	39,443	9,142	48,585

Source: Retrenchment Monitoring Report 2010 by Jabatan Tenaga Kerja Semenanjung Malaysia, Kementerian Sumber Manusia.

A study conducted by Todd and Peetz (2001) showed that much of Malaysia's industrial development emanated from the growth of the electrical and electronics industry, this sector accounts for 37 per cent of manufacturing output and is the largest export sector. Three of the companies were studied – Micro, Drive and Elecomp and Nippon Electronics (NE). These companies practiced lean manufacturing. The findings showed that all these four companies had reduced its workforce by averagely 30% earlier in the year through voluntary separation to

become leaner organizations which is partly enabled by the lean manufacturing implementation.

Furthermore, lean is becoming more important especially in the pursuit of New Economic Model (NEM) for Malaysia launched in 2010. Under the NEM, production costs and productivity in Malaysia is being emphasized in order to keep pace with those abroad, else exports are likely to lose ground with negative effects on national employment and income. Productivity is growing but far too slowly. Before the Asian financial crisis, Malaysia was leading the region in labor productivity growth. It has since lost the pole position, as shown in Table 1.1. Hence, it is important to take immediate action to revive the position. Lean practices can be considered as one major catalyst for productivity growth and cost reduction.

Table 1.1

Labor Productivity growth of selected Asian countries, annual average changes (1987-2007; %)

	Pre-Crisis (1987-1997)	Post Crisis (1998-2007)
China	4.5	9.2
India	3.5	4.4
Asian NIEs	4.8	3.4
Malaysia	5.5	2.8
Thailand	5.2	3.1
Indonesia	3.1	3.0
Singapore	4.5	2.4
Philippines	-0.7	2.3

Source: EPU, World Bank

On the other hand, as stated in the NEM Strategic policy directions, doing business in Malaysia is still too difficult. Cumbersome and lengthy bureaucratic procedures have affected both the cost of investing, and the potential returns on

investment. Malaysia's place within the Global Competitiveness Index dropped to 24th in the 2010 report from 21st previously, indicating that the country is losing its attractiveness as an investment destination. Public sector reform programs will continue to improve and speed up decision making by a lean, consultative and delivery focused government. So besides lean in manufacturing sector, the government is embarking on lean practices as well. The government should become leaner, delivery-focused and more consultative. Work in this area has started with the launch of the Government Transformation Program (GTP). Cumbersome regulations, processes and procedures must be simplified to improve their effectiveness. This showed the importance of lean, not only for manufacturing sector but Malaysian government as well. However, the objectives of this study will focus on the former since manufacturing sector has been at the center of Malaysia's growth and transformation story since 1970s.

1.1.2 Lean Manufacturing

A review of the relevant literature has found that lean manufacturing has an effect on job satisfaction. Job satisfaction definition by Locke (1969) was used, "The pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating the achievement of one's job values." According to Locke (1969), job satisfaction depends on the perceived relationship between what one wants from the job and what one experiences that the job offers or entails. It is defined in the related work by Lofquist and Dawis (1969) as "fulfillment of the requirements of an individual by the work environment". Job Descriptive Index (JDI) developed by Smith, Kendall, and Hulin (1969) characterized job satisfaction as type of work, opportunities for promotion, satisfaction with supervision, co-workers and pay. Schon

et al. (2010) categorized job satisfaction as comfort, influence, cooperation and fellowship and personal development. Lean manufacturing is defined by the National Institute of Science and Technology (NIST) Manufacturing Extension Partnership (MEP)(1998) as "... a systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection". Lean manufacturing is considered as a multi dimensional approach made up of organizational practices (Yang, Hong, & Modi, 2010). For this study, the independent variable was assessed in terms of lean practices in different areas of manufacturing organization. Lean practices consist of practices that critical for the success of lean implementation. Value stream mapping, just in time (JIT), total preventive maintenance (TPM), mistake proofing (poka-yoke), cycle time reductions and many others are some of the most commonly used by manufacturing industry in the various areas of organization such as process and equipment, manufacturing planning and control, human resource, product design, supplier relationship and customer relationship (Panizzolo, 1998).

From the literature review, there are many variables that have a strong contingent effect on the independent variable-dependent variable relationship. Among them are lean culture, organizational culture and geographical culture. In the book *Organizational Behavior* by Kreitner and Kinicki (2007), the culture of an organization is defined as the set of shared assumptions that determine how a group perceives, thinks about, and reacts to its various environments. With respect to this definition, an organization's culture is characterized by its observable artifacts, espoused values, and basic assumptions. These continually shape the organization's design and reward systems in a dynamic, evolving manner. In a domino-like way, the

latter two factors develop certain group and social processes, such as decision making, working relationships, group dynamics, communication, and leadership.

According to Antony and Banuelas (2002), a successful enabling and implementation of lean requires modifications to the culture of the organization and a change in the attitudes of its employees. Lean initiatives require the right mindset and attitude of all levels of people working within the organization. The people within the organization must be made aware of the needs for change so that they can embrace it. Sohal and Egglestone (1994) also stated that the success of an organization in both the local and international markets depends heavily on the culture of the specific organization. As a consequence of a true cultural revolution in an organization; two basic fears on an individual level may arise: fear of change and fear of not achieving the new standards. To embrace change in any industrial environment, the people involved must understand the need for change.

Van Iwaarden et al. (2008), Antony and Banuelas (2002) and Delgado (2010), proposes that job satisfaction and employee's acceptance of lean integration depended on organizational culture and geographical culture. Geographical culture means cultural differences of the population between countries. The term culture was first used in this way by the pioneer English Anthropologist Tylor (1871) in his book, *Primitive Culture*. Tylor (1871) said that culture is "that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society" (Source: <http://anthro.palomar.edu>). Geographical culture is excluded due to the scope of the study since the sample of study comprises of companies in Malaysia, where only one country being used for this research.

The definition of a lean culture probably varies by company and is dependent upon how they define lean. Some companies view lean in terms of waste elimination, in terms of improvements in customer perceived value of products and services, in terms of cost reductions, etc., or in terms of any improvements in any process, with the end goal of helping the company to achieve its profitable revenue growth . A lean culture can be explained as the beliefs and behaviors characteristics of employees that understand their company's goals and objectives, the importance of such goals, comprehend the purposes of lean improvements, equipped with the necessary lean tools and techniques training to effect improvements, and are then given the autonomy to do so on an ongoing basis.

“Culture in a work organization can be defined as the sum of its individuals’ work habits,” according to sociologist Mann (2005) in “Creating a Lean Culture”. Mann (2005) also defined a culture is an “idea arising from experience.” A company must first practice lean management in order to declare that it has a lean culture, where the culture of the company undergo fundamental change in values, priorities, norms of behavior and employees attitude. Employees must first believe that management is committed to it so that they can accept lean culture. The elements of this variable are adopted based on factors from management practices mentioned in Bergmiller (2006) - rewards, performance orientation, management involvement, employee training, continuous improvement, senior management leadership

For the purpose of this study, lean culture is identified as the predictor variable as organizational culture is too broad to define. This is in alignment with the nature of manufacturing sector which comprise of Multi-National Companies, Small and Medium Enterprises, across several manufacturing industries. The impacts of lean manufacturing on job satisfaction are mediated by job characteristics. Job

characteristics theory proposes that in order to achieve employee morale, work motivation and performance, job characteristics such as job autonomy and skill variety should be present in jobs (Hackman & Oldham, 1976). Hence, since it is expected that lean manufacturing practice will systematically affect important job characteristics, hence, the job characteristics theory provides a framework for understanding the effects of lean manufacturing. The key job characteristics used in this study are based on Job Characteristics Model (JCM) by Hackman and Oldham (1976), which is widely used as a framework to study how particular job characteristics impact on job outcomes, including job satisfaction. The model explains that there are five core job characteristics (skill variety, task identity, task significance, autonomy, and feedback) which impact three critical psychological states (experienced meaningfulness, experienced responsibility for outcomes, and knowledge of the actual results), in turn influencing work outcomes (job satisfaction, absenteeism, work motivation, etc.).

1.2 Problem Statement

It is evident from many studies conducted that lean is aggressively pursued for profit in all sectors such as manufacturing and services. Lean is often used as a cost reduction mechanism (Achanga, 2006; Bicheno, 2004; Zhu & Sarkis, 2004; Snee, 2010; Claycomb et al., 1999; Sohal & Egglestore, 1994, Motwani, 2003). Lean manufacturing practices support economic sustainability of manufacturing with increasing efficiency, reducing costs, improving customer response time and improve quality and greater profitability. Lean manufacturing plays an important role in economic efficiency of the companies by emphasizing on JIT, producing what has been ordered only and maintain minimum inventory. Inventory reduction, eliminating

waste by identifying value stream has direct economic efficiency of paying less per product (Rashid et al., 2008). Economic outcome is mainly the financial benefits, consist of increase in market share, profitability and productivity improvement and revenue growth, all in all by reducing production cost and increasing customer satisfaction (Rao, 2002; Rao & Holt, 2005; Schaltegger & Synnestvedt, 2002; Stock, Speh, & Shear, 2006; Zhu & Sarkis, 2004; Zhu, Sarkis, & Lai, 2007).

Waste can be found in all activities in the value stream, regardless of locations (Womack & Jones, 1994). Taj and Berro (2005) claim that many manufacturing companies waste over 70 percent of their resources while Jones et al. (1997) claim that as much as 60 percent do not add any value at all or less than 10 percent of activities often are value adding for most organizations. Similarly, Bhasin and Burcher (2006) claim that there could be a waste reduction by 40 percent by implementing lean.

However, the well being of the employees is only vaguely described in many of these improvement methodologies and the effects on job satisfaction are not clearly understood. Therefore, its implication on job satisfaction is a contentious issue. Several researchers (Babson, 1993; Delbridge et al., 1992; Turnbull, 1988; Delgado, et al., 2010; Parker, 2003) see lean manufacturing as having negative consequences for employees' and their job quality, but others (Jegensen, 2008; Jegensen et al., 2007; Hong et al., 2007; Hoffman, 2001; Richards, 2010; Jacowski, 2006) view lean manufacturing as a way of achieving world-class performance in a humane ways with positive effects on employees. According to Lathin and Mitchell (2001), producers can expect a reduction of 90% in lead time, 90% in inventories, 90% in the cost of quality and 50% increase in labor productivity, as a result of implementing lean manufacturing. In addition, Ferdousi and Ahmed (2009) had highlighted in their

research on lean manufacturing that the productivity had improved from 10%~60%, product lead time was reduced 8%~50% and product quality was improved to 8%~80%. When productivity improves in one area, will it become a burden to others not directly engaged? Are rewards and recognitions fairly distributed? Will the productivity improvement lead to workforce reduction and career growth impact, hence job security concerns? Based on awareness, there are none available studies published to clearly show the impact of lean manufacturing on job satisfaction and what are the moderators or mediators that influence the relationship.

On one side, negative consequences of lean manufacturing have been discussed in detailed case studies (e.g., Fucini & Fucini, 1990; Parker & Slaughter, 1988), large scale surveys (Lewchuk & Robertson, 1996), and comparative or longitudinal studies (e.g., Berggren, 1992; Jackson & Martin, 1996; Kaminski, 1996; Klein, 1991). As tentatively concluded in a review of lean production studies by Landsbergis et al. (1999), lean manufacturing practice is likely to result in increased demands and work pace and in modest or no changes in decision latitude and autonomy. However there were evidences from several studies which showed positive consequences of lean production and related practices (e.g., Adler & Cole, 1993; Mullarkey, Jackson, & Parker, 1995) or a mixture of both positive and negative consequences (Berg, Appelbaum, Bailey, & Kalleberg, 1996; Jackson & Mullarkey, 2000).

Next, the areas of lean practices that impacts job satisfaction will be identified. A research model that conceptualized lean manufacturing with number of its best practices characterizing different areas of the company was developed by Panizzolo (1998). In the study, Panizzolo divided 48 practices into six areas which are process

and equipment, manufacturing planning and control, product design, human resources, customer relationships and supplier relationships.

Improving the bottom line never goes out of style. The financial crisis is encouraging leaders and organizations to view lean as an approach to reduce costs and keep the cash flowing. In fact, nowadays many organizations are integrating lean with Six Sigma or so-called Lean Six Sigma for better results. Thus, it is important to reach a better understanding of how lean manufacturing affects employees in an organization, to devise a better and more precise deployment process, leading to more satisfied employees and a higher success probability of the lean initiative. By understanding employee satisfaction, the business has a much better chance for delivering positive customer experiences, developing and producing innovative products and services, and, of course, achieving a better bottom line. Employees who experience job satisfaction are also more likely to possess a positive self-concept at work and greater self-determination that facilitates higher efficiency and effectiveness (Deci et al., 1989; Gagne & Deci, 2005). Labor productivity and the success of the organization have a significant relationship with employee turnover (Min, 2007). Satisfied employees are more likely to perceive their work more positively (James & Tetrick, 1986). From the organizational perspective, employee turnover can be costly on loss recruitment, training, socialization investments and disruption (Taner & Sezen, 2008). Employee turnover costs companies between 25 percent and 150 percent of that employee's annual compensation, according to the National Institutes of Standards and Technology (NIST). Companies cannot afford to accept turnover as a fact of life.

Zhu and Sarkis (2004) considered lean as double-edged sword that can result to both negative and positive contributions to the environment. Found (2009) stated

that the main focus of lean manufacturing was on economic and some social aspect of sustainability. So this study focus on the contributions of lean practices towards the social aspect i.e. employee well-being which is explained by job characteristics and job satisfaction. Mediation analyses showed that the negative effects of lean manufacturing were at least partly attributable to declines in perceived work characteristics (job autonomy, skill utilization, and participation in decision making). The Job Characteristics Model (JCM) (e.g., Hackman & Oldham, 1976) is a widely studied model of motivational job design that has explained important work outcomes (e.g., satisfaction, tenure) for workers in a wide variety of blue and white-collar jobs. According to the JCM, certain core features of jobs as seen by the worker, impact psychological reactions to the job and the outcomes that follow from those reactions. Bontis and Serenko (2007) claimed that job characteristics also contribute to employee satisfaction, and through that, to organizational efficiency and customer focus. Meta-analyses have shown that these characteristics were significantly related to job satisfaction (Fried & Ferris, 1987; Brown & Peterson, 1993).

Job characteristic is one of the factors that will be test on this study. Job characteristic has a direct impact on the turnover intention (Harrison et al., 2009). According to Sarminah (2006), a job characteristic is one of the aspects that need to be prioritizing by the management in organization in measuring the employee's turnover intention. Additionally, there is still little concern the impact of job characteristic towards job satisfaction and hence turnover intention in Malaysian perspective. Therefore, additional investigations are essential to find out the contribution and consequence of job characteristics on job satisfaction. Despite the many benefits associated with lean implementation, in reality many companies are unsuccessful where some researches claim that the lack of lean culture is the primary

reason that acts as a roadblock for the companies to achieve the potential outcome resulting from lean implementation. Their studies showed that lean culture has to be there in the first place (Bhasin & Burcher, 2006; Hook & Stehn, 2008; Conti et al., 2006). To find out the contribution of lean practices towards job satisfaction, this study investigates the moderating effect of lean culture on the relationship between lean manufacturing practices and the dimensions of job satisfaction. The results of this study should help alleviate concerns of job satisfaction due to implementation of lean in the manufacturing sector. Hence, this will fill a knowledge gap of influence on lean on job satisfaction and also resolving the concerns on the effects of lean manufacturing on employees' well being and job satisfaction.

1.3 Research Objectives

This study has three specific objectives as follow:

- 1) To determine whether job satisfaction is influenced by the extent of lean manufacturing implementation
- 2) To examine whether job characteristics mediates the relationship between lean manufacturing and job satisfaction
- 3) To examine whether lean culture moderates the relationship between lean manufacturing and job satisfaction

1.4 Research Questions

Based on the research objectives stated above, research questions for this study are formulated as follow:

- 1) What are the relationships between lean manufacturing practices and job satisfaction?

- 2) What is the role of lean culture in the relationship between lean manufacturing and job satisfaction?
- 3) Do job characteristics play a role as mediator to affect the relationship between lean manufacturing and job satisfaction?

1.5 Significance of Study

Despite the vast literature related to Lean, only a few studies, focusing on understanding the influence on the employees and their work environment have been published (Nonthaleerak & Hendry, 2006). Based on the literature review, majority is based on case studies, which is qualitative in nature, whereas the intention for this study is to use different approach - quantitative method. Employee retention is important for any organization as employee turnover can be costly on loss recruitment, training, socialization investments and disruption of business activities. In order to reduce the effects, job satisfaction should be focus of interest as this is one significantly important contributor.

Furthermore, lean was widely piloted by manufacturing industries since the methodology's inception. Manufacturing sector plays an important role in any country's economic development in terms of employment and revenue. Certain countries like Japan and Malaysia highly rely on manufacturing to create jobs for their population. In Malaysia, there are over 2,000 manufacturing and industrial service companies available in all over the country. The manufacturing sector had given the big opportunity to the Malaysian economic based on the well and fast growth. Manufacturing contributes about RM 6.5 billion of the GDP and providing a lot of job opportunities for Malaysian (Economic Report, 2009). Thus, this study hopes to provide further insight into the impact of lean on job satisfaction especially focus on

the manufacturing sector. The positive results would help alleviate concerns of job satisfaction due to implementation of lean manufacturing, whereas any negative results would enable subsequent focus to improve lean implementation to address the related areas of concerns. Therefore, to finding out the impact of lean manufacturing towards job satisfaction, the study investigates the mediating effect of job characteristics and the moderating effect of lean culture on the relationship between lean manufacturing and job satisfaction. The scope of interest is manufacturing sector as this sector aggressively pursues lean in the past, now and in the future. The study was focused on job satisfaction as there is limited study performed to understand the impact of lean manufacturing on job satisfaction.

Most of the studies in Malaysian context were focused on the approaches and key practices of lean manufacturing, approach of adopting lean, the tools and techniques implemented, changes in organizations, problem or barriers encountered as well as lessons learnt (Ali, Wong & Wong, 2009; Wong & Wong, 2010). Nordin, Deros and Wahab (2010) surveyed on the lean manufacturing implementation in the Malaysian automotive industry. The three researchers also studied the relationship between organizational change and lean manufacturing implementation in Malaysian automotive industry. Muslimen, Yusof and Abidin (2011) conducted a case study on lean manufacturing implementation in the Malaysian automotive components manufacturer to find out how to successfully implement lean manufacturing in Malaysia manufacturing industry. A case study was performed by Rashid et al. (2010) on the lean manufacturing assessment in Malaysia Small Medium Enterprise with the focus on value stream mapping, which is one lean practice, and its impact on the company performance. Critical Success Factors of Lean Six Sigma as a case study in the electronics manufacturing industry in Malaysia by Jeyaraman and Teo (2010).

From the literature reviews, indeed there was very limited study on the impact on job satisfaction. There is one study on job satisfaction but the focus is only on Total Quality Management (TQM) practice, empowerment and teamwork (Ahmad & Karia, 2009).

1.5.1 Theoretical and Practical Contributions of Study

The expected theoretical contributions of this study:

The study investigates the extent of lean in the lean manufacturing industry and the moderating effect of lean culture on relationships between lean practices and job satisfaction. This may add knowledge to what actually facilitates this type of relationship basing on Contingency Theory and Job Satisfaction Theory.

The expected practical contributions of this study to manufacturing industries as derived from the significance of study:

- The study identifies the various lean practices in different functional areas in the lean manufacturing companies, whereby can lead to potential areas for improvement. The functional areas assessed are process and equipment, manufacturing planning and control, human resource, supplier relationship and customer relationship. This will provide information for managers to avoid side effects of lean practices and strengthen the advantages of them towards employee job satisfaction improvement.

1.6 Scope of Study

The manufacturing sector was the focus for this study because lean originated from manufacturing sector. The concepts of Lean were widely piloted by Toyota which is a

well known manufacturing based company. Hence, this study will be conducted via a survey on ten selected lean manufacturing companies located in Malaysia.

1.7 Definitions

The definitions of the main variables used in this research are listed as follows:

Job Satisfaction: Job satisfaction definition by Locke (1969) was used “The pleasurable emotional state resulting from the appraisal of one’s job as achieving or facilitating the achievement of one’s job values.”

Lean Manufacturing: the National Institute of Science and Technology (NIST) Manufacturing Extension Partnership (MEP) (1998) defined lean as “... a systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection”. In a manufacturing context, the major lean philosophy focuses on generating just what is needed, when it is needed, in the amount needed with only the required material, labor, equipment and space (Heizer & Render, 1999; Vollmann *et al.*, 1997).

Lean practices: practices for lean implementation. There are various lean practices and the most prevalent include: JIT, kaizen events, Five S events, one piece flow, quick changeovers, mistake proofing, reduced cycle time, value stream mapping, reduction of inventory and so on (Worley, 2004).

Process and equipment: Practices that related to process and equipment functions that ensure the existence of production processes and optimized equipment which can guarantee the regularity and uniformity, and repeatability (Panizzolo, 1998).

Manufacturing planning and control: practices that synchronize production with market demand such as the use of small lot size, pull control and visual control of shop floor and so on (Panizzolo, 1998).

Human resource: in lean manufacturing perspective, this term is defined in two aspects where human capital development is to support lean objectives through creating proper work environment. Human resource management practices refer to company-wide policies that govern the relationship between management and employees (Bergmiller, 2006).

Product design: comprises of practices such as part standardization, product modularization, design for manufacturability and multifunctional design team. These practices aim to enhance product offering and manufacturability and play an important role in cost reduction and utilization of advanced manufacturing methods (Panizzolo, 1998; Wong, et al., 2009b).

Supplier relationship: the extent of interaction with the supplier related to quality concerns in creating long-term relationships, number of suppliers, supplier performance management thru regular feedback, supplier engagement in product design and development processes (Shah & Ward, 2007).

Customer relationship: how company interacts and deals with its customer in order to manage customers complaints, increase customer satisfaction and maintaining long term relationship with them (Li, Rao, & Ragu-Nathan, 2005). The purpose of customer relationship practices is to strive to add more value to its customer.

Lean Culture: culture of an organization is what is experienced there as a result of its management system (Mann, 2005). When a company changes from traditional management to lean management, the culture of the company undergo basic change in values, priorities, norms of behavior and employees attitude.

Job characteristics: Aspects specific to a job, such as knowledge and skills, mental and physical demands, and working conditions that can be recognized, defined and assessed. Job Characteristics Model (JCM) states that there are five core job characteristics (skill variety, task identity, task significance, autonomy and feedback) which affect the motivation, satisfaction and performance of employees (Hackman & Oldham, 1976).

1.8 Organization of the Report

There are five chapters in this thesis. Chapter two covers literature review of to identify and support variables related to this research. Chapter three presents the methodology, research procedures and analytical framework that illustrate the development of survey instrument and data collection. Chapter four discusses results of analysis and interpretation. This chapter consists of tables with the data obtained showing finding on each hypothesis which leads to answering the research questions. The thesis ends with chapter five which presents summary as part of discussion on the

results. In this chapter, the findings of the research are discussed in context of its theoretical and managerial implications, limitation of the study, suggestion for future research and conclusion.