

# SOFT LEAN PRACTICES FOR SUCCESSFUL LEAN PRODUCTION SYSTEM IMPLEMENTATION IN MALAYSIA AUTOMOTIVE SMES: A PROPOSED FRAMEWORK

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## Abstract

Challenging and competitive business environment has prompted the automotive industry to restructure its manufacturing practices. Nowadays, Lean Manufacturing (LM) has been widely implemented in the automotive industry. LM supported the manufacturing companies, particularly automotive manufacturers in becoming world class manufacturers through various lean practices. However, lean implementation faced various obstacles such as the lack of management commitment and support, the absence of organizational communication, employees' attitude and many more. It is also indicated that lean implementation success factors are not merely due to technical practices but also with the integration of non-technical aspects such as human-related practices. This paper aims to investigate the Soft Lean Practices that are necessary for the successful implementation of the Lean Production System (LPS) in the Malaysian Automotive SMEs. The result of this paper will provide a detailed review of Soft Lean Practices within the LM literature that should be considered by the organizations when implementing lean. A framework was also developed through an extensive review of Soft Lean literature.

*Keywords:* Soft lean practices; lean manufacturing; lean production system; lean implementation; automotive

## Abstrak

Persekitaran perniagaan yang mencabar dan berdaya-saing telah mendorong industri automotif untuk menyusun semula amalan-amalan perkilangan. Pada masakini, sistem pembuatan Lean telah dilaksanakan secara meluas dalam industri automotif. Walaubagaimanapun, pelaksanaan Lean menghadapi pelbagai halangan seperti kekurangan komitmen pengurusan dan sokongan, ketiadaan komunikasi organisasi, dan sikap pekerja. Kajian telah menunjukkan bahawa faktor-faktor kejayaan pelaksanaan Lean bukanlah semata-mata kerana amalan teknikal tetapi juga dengan mengintegrasikan aspek bukan teknikal seperti amalan-amalan berkaitan manusia. Kertas kerja ini bertujuan untuk mengenalpasti amalan bukan teknikal yang diperlukan bagi kejayaan pelaksanaan pembuatan lean dalam SME automotif di Malaysia. Hasil daripada kajian ini akan menyediakan kajian secara terperinci amalan-amalan lean lembut dalam literatur pembuatan Lean yang perlu dipertimbangkan oleh organisasi apabila melaksanakannya. Melalui kertas kerja ini, satu kerangka kerja telah dibangunkan melalui sorotan menyeluruh literatur lean lembut.

*Kata kunci:* Amalan bukan teknikal; pembuatan lean; sistem pengeluaran lean; pelaksanaan lean; automotif

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## 1.0 INTRODUCTION

Volatile business environment, limited resources and fluctuation in demand are the major challenges of the automotive industry worldwide [1- 3]. According to Taj and Morosan [4], the challenges faced have made it necessary for the automotive manufacturers to improve its manufacturing and business performance. Automotive manufacturers must focus on producing superior products, incurring the lowest cost of production, with shorter product life cycle and being flexible to gain competitive advantage [5–8]. Sim and Chiang [9] discovered that for future survival, manufacturers need to re-evaluate the existing manufacturing and business practices and the best way is by adopting the Lean Manufacturing (LM) philosophy. Today, LM is widely accepted as part of companies' strategy to achieve superior performance [10 -11] and assist the company in improving business performance and competitiveness [12].

Previous empirical studies discovered that some companies have succeeded but some are facing difficulties during the LM implementation process [13 - 15]. Various researchers and scholars reported that companies faced many challenges during LM implementation [16-18]. These challenges will hinder the successful implementation of LM and it may lead towards a failure or the implementation become stagnant after a while. In the meantime, many firms have been concentrated on implementing lean tools and techniques (i.e., hard practices), however, limited study has looked at human-related practices (i.e., soft practices) [19–21]. Successful LM implementation is not only because of the hard LM elements but it also must be supported by soft practices to achieve superior performance [21–24].

Farris *et al.* [25] acknowledged the research need on the soft factors of LM but it is only recently that an associated stream of investigation has emerged although it was primarily theoretical. So far, however, little attention has been paid on the contribution of soft practices towards successful lean transformation success and also in sustaining LM overtime. At present, the interest among the LM scholars towards the significance of soft lean during its lean implementation is emerging. Several scholars make an attempt to study the soft practices of lean and its effect on successful lean manufacturing transformation in various manufacturing setting and countries [22], [26–28]. In addition, to the best of authors' knowledge, there is no related study focusing on soft lean practices conducted in developing countries especially in Malaysia's SMEs' automotive companies.

The main objective of this paper is to determine the soft lean practices through an extensive review of LM literature. The detailed review of soft lean practices will be presented as a proposed conceptual framework which is necessary for successful Lean Production System (LPS) implementation, particularly for Malaysian automotive SMEs. Apart from that, this study

will establish itself as the platform for future research, especially in developing an appropriate strategy for a successful lean implementation and also in sustaining lean practices in the future.

## 2.0 LITERATURE REVIEW

### 2.1 Lean Manufacturing (LM)

The lean concept began after a group of researchers from Massachusetts Institute of Technology (MIT) formed a programme called International Motor Vehicle Programme (MIVP), 1990 [29]. The programme carried an extensive investigation upon the Japanese manufacturing management practice in early 1980s. Prior to that, American automobile manufacturers suffered severe losses due to inefficient production systems and the collapse of the mass production in the late 1970s [30]. At the same time, a Japanese well known car manufacturer, Toyota was very successful in its domestic market and international market as well. The thriving business of Toyota is extraordinary and has attracted the attention of the western automobile manufacturers in America and all over the world. The secret of success in Toyota Corporation lies in its management system known as Toyota Production System (TPS) [31-32]. The benefits of LM implementation to organizations were undeniable whereby a wide range of benefits were obtained by organizations across the industries both in the manufacturing and service sectors. Lean manufacturing assists an organization to improve its operational performance [33-34]; manufacturing performance [4], [35]; business performance [36-37] and quality performance [38-39].

### 2.2 Lean Manufacturing in Malaysia Automotive Industry

Automotive industry worldwide had faced deteriorating demand, due to the global financial crisis which occurred in late 2000s [40]. This scenario has also affected the Malaysian automotive industry which leads to the decline of the production caused by lower demand. Global automotive manufacturers strive to survive in a competitive market environment. The automotive industry is vital to the Malaysian economy. The industry consists of four manufacturers (national projects) and nine assemblers in the motor vehicle sector [41], and Malaysia is the third largest automotive market after Indonesia and Thailand in the passenger car segment in ASEAN [42] countries.

Malaysia took the initiatives to reap the benefits of LM and started the programme in 2006 under Malaysian-Japan Automotive Cooperation (MAJAICO) [43]. The programme is aimed at upgrading the local automotive parts and components manufacturers to move up to high value-added products and to enhance the capacity and competitiveness through the Lean Production System

(LPS). Since its commencement in November 2006 until 2011, a total of 87 companies had participated, with 220 improvement projects were completed where these companies were guided and monitored by Japanese industrial experts with vast experience in the automotive industry [44]. At present, Malaysia Automotive Institute (MAI) is taking the responsibility to continue and spread the lean manufacturing practices to the local automotive manufacturers through its program namely Lean Production Systems (LPS) [45].

In Malaysia, before the presence of the LM concept and practices, the automotive industry has actually practiced the JIT philosophy in 1980s. JIT is one of the pillars in the lean concept whereby its main objective is to achieve operational excellence by reducing waste in manufacturing activities [46]. One of the earliest studies on JIT in Malaysia was by Abdul et al. [47] which discovered that the JIT technique has been practiced and implemented among the Malaysian automotive manufacturers and its suppliers. However, it has been implemented with modification to fit with the existing business environment. In addition to that, there are several factors that have hindered the successful implementation of JIT due to the lack of understanding on the concept, buyer-supplier relationship and employees' attitude. A similar study performed by Simpson *et al.* [48] on Malaysian national automobile manufacturers, found that although the JIT philosophy has been implemented, the earlier problems associated with JIT had still remain unsolved. Agus and Hajinoor [38] concluded that lean implementation in Malaysia's manufacturing companies is just above an average based on the Malaysian Lean Production Index (MLPI). They suggested that Malaysian manufacturers should expedite their effort for LM implementation progress. In the meantime, Roslin *et al.* [17], Salimi [49], Rose *et al.* [50] revealed that LM implementation in Malaysia is still considered at an infancy stage and progressing slowly despite the benefits received through lean.

LPS implementation in Malaysia faced several challenges mainly due to human elements such as the lack of understanding and knowledge, employee attitude, communication problems and many more. Among the main challenges being indicated by the LM researchers in Malaysia are shown in Table 1.

**Table 1** LPS Challenges in Malaysia

Challenges	References
Lack of know-how to implement LPS	[17], [51–53]
Lack of employee commitment	[17], [18], [44], [51]
Lack of communication	[17], [18], [44], [52]
Lack of employee involvement	[17], [18], [54], [55]
Lack of customer focus and unstable schedule	[17], [18], [53]
Employee resistance to change	[18], [53], [56]
Lack of understanding on LPS	[53][57][47]

### 2.3 Lean Critical Success Factors (CSFs)

Successful LM transformation is depending upon various factors. Thus, it is important to identify factors or conditions that are "critical" which enable an organization to successfully implement certain managerial practices such as LM. According to American Society for Quality, the Critical Success Factors (CSF) allow an organization to assess the success of a project, selection process, or other activities with stated goals". Based on LM literature, there are quite a number of CSF for LM transformation to be successful, all of which are specified in Table 2.

It is observed that the lean CSFs are highly dependent on the soft elements or human elements such as leadership, management support and commitment, organizational culture, communication, employee involvement, training and education and skill workforce. Besides that, companies must have adequate financial support during the LM implementation. LM implementation should also be in line with the company's business strategies and the lean programmed should be managed properly through effective project management. The success of LM is also determined by having a close relationship with the suppliers and at the same time focusing on customer requirements and demand. However, from various lean tools and techniques available, it is found that only JIT and SPC are the technical elements of lean that support the LM success.

**Table 2** Lean Manufacturing Critical Success Factors (CSFs)

Lean CSFs	References
Leadership	[50], [58–60]
Management support	[50], [58], [61–66]
Financial capabilities	[58], [59], [67]
Organizational culture	[50], [58], [59], [61], [65], [67], [68]
Skill workforce & experts	[58], [59], [67]
Teams development	[64], [69], [70]
Communication	[50], [62], [66], [70], [71]
Employee involvement	[60–62], [72]
Training and education	[50], [60–62], [65], [71]
Supplier relationship	[61], [72]
Customer focus	[50], [61], [72]
Strategic alignment	[65]
Project management	[65], [67]
Continuous improvement	[50]
Just in-Time (JIT)	[72]
Statistical Process Control (SPC)	[72]
Quality Management	[50]

Based on the table above, it is observed that the lean CSFs are highly dependent on the soft elements or human elements such as leadership, management support and commitment, organizational culture, communication, employee involvement, training and education and skill workforce. Besides that, companies must have adequate financial support during the LM implementation. LM implementation should also be in line with the company's business

strategies and the lean programmed should be managed properly through effective project management. The success of LM is also determined by having a close relationship with the suppliers and at the same time focusing on customer requirements and demand. However, from various lean tools and techniques available, it is found that only JIT and SPC are the two technical elements of lean that support the LM success.

## 2.4 Soft Lean Practices

Most of the studies in the field of LM only focus on hard lean elements such as lean tools and techniques [22]. However, based on the widely established and accepted LM definition by Shah and Ward [73], "Lean production is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability". Based on this definition, LM is comprised of both socio and technical systems. The socio aspect is referred to the people while the technical system is the process components. Successful implementation of LM is not merely due to hard LM elements but it must be supported by soft practices to achieve superior performance [24]. Soft practices concern with social aspect that is human and relations, whereas hard practices refer to LM technical tools [22]. Furthermore, soft practices are necessary and equally important in sustaining the lean culture in the long run [21], [74].

Empirical evidence exhibited that successful lean companies that give more attention and implemented soft lean more extensively compared to unsuccessful lean companies [22]. In addition, soft practices also allow the companies to gain competitive advantage over competitors by utilizing the resources available within the organization especially human resources [20], [73], [75].

## 2.5 Small and Medium Enterprises (SMEs) in Malaysia

In the Malaysian economy, the role of SMEs is considered as the backbone of the economy [76]. Small and Medium Enterprises (SMEs) are vital for economic growth in the emerging economies [77]. According to Zulkifli *et al.* [78], competitive and resilient SMEs are important in the growth and development process of the Malaysian economy which includes the adoption of appropriate strategies. SMEs are the big contributor to the GDP and employment in every country [79]. Malaysia SMEs have a major contribution to the Malaysian economy, where it represents 57% of the total employment in the labour market and contributes 32% of the GDP and 19% of the total export value of the SMEs' [80].

### 2.5.1 SMEs Definition in Malaysia

There is no single uniform definition of SMEs across the globe. Different countries are employing diverse definitions based on several demographic aspects

and criteria including location, size, age, structure, sales volume, number of employees, ownership through innovation and technology [81]. In 2014, due to economic developments and the shift in business trends, the new criteria of SMEs were announced. Table 4 shows the new classification of SMEs in Malaysia.

**Table 3** New classification of SMEs by size and operation

Category	Small	Medium
<b>Manufacturing</b>	Sales turnover from RM300,000 to less than RM15mil OR full-time employees from 5 to less than 75	Sales turnover from RM15mil not exceeding RM50mil OR full-time employees from 75 to not exceeding 200
<b>Services and other sectors</b>	Sales turnover from RM300,000 to less than RM3mil OR full-time employees from 5 to less than 30	Sales turnover from RM3 mil to not exceeding RM20 mil OR full-time employees from 30 to not exceeding 75

Source: [82]

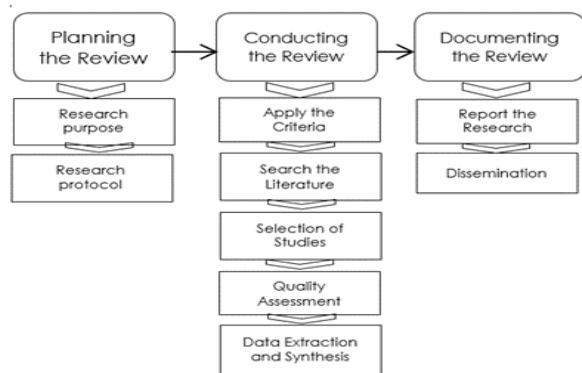
## 3.0 METHODOLOGY

This study is performed based on the principles and the framework of a systematic literature review as promoted for the management science field by Tranfield *et al.* [83]. In the past, a systematic review has been used extensively in the medical field in search of improved evidence for guiding the future policy and practice. It is utilized because of the rigorous and transparent form of literature review. Systematic reviews involve identifying, synthesising and assessing all available evidence, quantitative and/or qualitative, in order to generate a robust, empirically derived answer to some focused research questions [84]. The review procedure undertaken is adopted from Albliwi *et al.* [13] and presented in Figure 1. The procedure is further explained below.

### 3.1 Systematic Review Procedure

This study follows the comprehensive stages for the systematic review developed by Tranfield *et al.* [83]. The stages include the following:

- Stage I : Planning the review;
- Stage II : Conducting the review; and
- Stage III : Reporting and disseminating information.



**Figure 1** Systematic review procedure

The scope of the review is limited to journal articles published within the period of the publications of the lean production book by Womack *et al.* [29]. The book regarding lean production plays a critical role towards spreading the lean production concept to the world. Journal articles are searched using online databases such as Taylor & Francis, Science Direct, Elsevier, Emerald, Springer and Google Scholar. The criteria used for the inclusion of literature are as follows:

- Literature published on lean, lean six sigma and Toyota Production System (TPS) specifically in the manufacturing sector;
- Literature published from 1991 to 2015;
- Articles published in referred scholarly journals, conference proceedings, working papers;
- Search terms used: Lean principles, lean practices, soft lean practices, human issues in lean social elements and human factors.

## 4.0 RESULTS AND DISCUSSION

During the introduction phase of LM, it is found that most of the research articles related to lean did not characterize the practices into hard or soft lean in the LM literature. Moreover, during the introduction of LM, organizations greatly emphasized the lean techniques and tools rather than the soft aspects or human elements. After a while, when lean implementation encountered many obstacles, barriers and challenges, the researchers and scholars acknowledged that it is mostly associated with human factors or the soft practices of lean. Moreover, recent studies on the failure of lean implementation in a particular organization revealed that it is mostly because of human factors i.e. the lack of top management commitment, communication, inadequate training and many more [13], [15]. In order to classify whether the lean practices fall into soft practices, the authors followed the recommendation of the latest research article pertaining to soft lean practices by Bortolott *et al.* [22]. The study referred to the literature in a well-established discipline which is Total Quality Management (TQM) to indicate whether or not the

lean practices should be classified as soft lean practices. TQM literature has extensively discussed the hard and soft TQM elements and practices as compared to LM. In most of the TQM definitions, two significant aspects have been recognized, which include the “soft” (or “philosophical”) and the “hard” (or “technical”) TQM elements [75], [85]–[88].

### 4.1 Elements of Soft Lean Practices

Based on the analysis of the systematic literature review, the elements of soft lean practices have been identified as shown in Table 4. The table exhibits various soft practices from LM literature. The lean practices that are considered “soft practices” are:

1. Top management commitment
2. Human resources management
3. Employee commitment
4. Employee involvement and empowerment
5. Supplier management
6. Customer focus
7. Training
8. Teamwork
9. Reward and recognition
10. Communication
11. Continuous improvement

Top management commitment and support are vital for the lean implementation to be successful. Therefore, the management should be involved and supported in terms of learning and understanding the principles of LM. Management commitment enables employees to understand the new project of Lean implementation [89]. Change programmes such as LM, demand high levels of commitment and support from the management. The failure to do so might contribute towards the difficulties in sustaining lean implementation and leads to the failure of lean initiatives. Human resource is recognized as the most frequent soft lean practices that are utilized during the implementation of lean. The role of the HRM in enhancing the effectiveness of lean practices and their synergistic interactions is undeniable [90-92]. Also, LM depends very much on employees’ participation and commitment in lean activities, which are created by providing them with more empowerment, adequate training, information and new forms of reward [93- 94]. During the implementation of any new initiative, it is necessary to provide some level of training to the employees. Alagaraja and Egan [95] proposed that the lean implementation efforts should be integrated with the organization of the Human Resource Development (HRD) systems, practices, and policies. The role and value of HRD initiatives would heighten the probability of success in Lean implementation.

The relationship with external parties, or specifically both suppliers and customers are important during the lean implementation. Companies should provide consistent feedback to suppliers about their

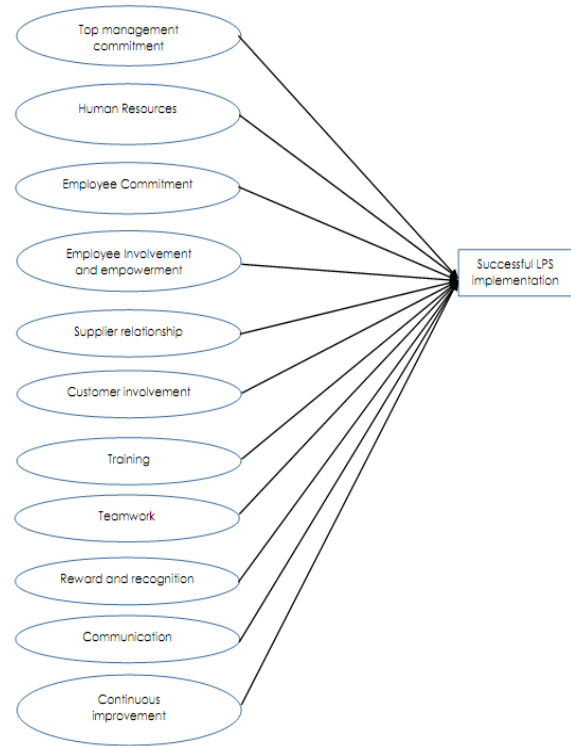
performance and focus on customer demand. Increased communication with shop floor employees is also found to assist smooth transition of the lean manufacturing initiative. Lean implementation should be regarded as a continuous effort with the efforts to increase company performance through various hard lean practices.

**Table 4** Soft Lean Practices

Practices	References
Top management commitment	[22], [35], [58], [96–98], [89]
Human Resources Management	[26], [35], [62], [70], [91], [99–104]
Employee commitment	[105–106]
Employee involvement	[93], [107–111]
Supplier management	[38], [52], [73], [112]
Customer focus	[22], [52], [73]
Training	[22], [26], [69], [91], [95], [106], [109], [113]
Teamwork	[114–116]
Reward and recognition	[26], [117], [118]
Communication	[26], [97], [106], [113], [119]
Continuous improvement	[22], [26]

### 5.0 CONCLUSION

In conclusion, based on the extensive study in the LM literature, the role and contributions of soft lean practices are extremely influential to the success and survival of lean. The thought behind successful lean implementation is entirely due to the fact that lean should be eroded. Organizations must consider and be rational to integrate hard lean and soft lean. This is consistent with the lean definition by Shah and Ward [73] which included the socio technical aspect. As a result, this study proposed a conceptual framework for successful lean implementation as depicted in Figure 2.



**Figure 2** Proposed conceptual framework

The proposed conceptual framework was developed to identify the soft lean practices that are deemed necessary towards successful implementation of LPS in the Malaysian automotive industry especially for the small and medium size companies. Previous studies on soft practices investigated its relationship with firm performance instead of operational performance. Based on the review, future studies will be performed to answer the following research questions:

1. Which soft lean practices do have a significant impact towards successful LPS implementation?
2. What is the relationship of soft lean practices on the organizations' operational performance?

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