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The Mediating Role of Lean Engagement on Lean Practices and Business Excellence in Malaysia Electrical and Electronics Companies

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Abstract

The objective of this study is to investigate the effect of Lean engagement on relationship between lean practices and business excellence of Malaysian Electrical and Electronics (E&E) companies. The study will focus on deployment within lean operation and lean supply chain in the lean deployment. Based on the literature review, the author has established a linkage that effect of lean practices is likely to contribute positively to the business excellence of the company. Besides, the author would like to ascertain the potential of lean engagement whether it has full or partial mediating effects on the model. The theoretical framework is guided by innovation diffusion technology (IDT). The gap in the literature also warrants the need for a contextual study of the Malaysian E&E industry. The limitation suggests a gap for a future research by validating its effectiveness with others industry. Practical adoption of lean practices may improve infrastructural decision areas of manufacturing strategy such as benchmarking, best practices, quality practices and human resource policies. Therefore, it has implication on activities concerning lean engagement, lean effectiveness and business excellence.

Keywords: Lean Manufacturing, Employee Engagement, Business Excellence, E&E, IDT.

Introduction

The concept of business excellence is a topic under much discussion today. It is considered as a path to being the best manufacturer or being the best-in-class performer. It has the implication of being the best in the world in terms of manufacturing capabilities. In the era of globalization with major players from all over the world, the term ‘‘world-class’’ is appropriate (Sharma & Kodali, 2008). It implies the ability to be able to compete in globally competitive markets. A review of the literature shows that different researchers have different views about manufacturing excellence.

After nearly three decades of research development, the topic of business excellence and its theoretical models still deserve the attention of the research community. First, the very definition of ‘business excellence’ has continuously been modified to accommodate the context of rapid changes in the global business environment ((Dahlgaard-Park & Dahlgaard,

2010). Secondly, there is a growing need to harmonize the heterogeneous measures promoted by practitioners and the literature. Thirdly, we contend that there is real and valid need to close the gaps in the failure of firms when pursuing business excellence, which has not been fully recognized to date. This paper is intended to target these key issues.
Research on business excellence has discussed the evolution of its concepts – past, present and future (Dahlgaard-Park & Dahlgaard, 2010) has led to the question: "How do excellent companies stay excellent (Brown, 2013a)?" Business excellence is an important contribution which is about adopting a holistic approach to strengthen its management systems and processes in an organization to stimulate growth and improvements in productivity.
One fundamental question in the field of business performance is how can firms achieve and sustain its competitive advantages and pursue its business excellence (Lu, Betts & Croom, 2011, Dahlgaard & Dahlgaard-Park, 2006). The quest in processing excellence and achieving business excellence is challenging. As a result, various authors have proposed step-by-step road maps as a guide to achieve excellence (Van Looy, De Backer & Poels, 2011). Thus, in this paper we will discuss the possibility of revitalizing the pursuit for business excellence. The study aims to quantify how well the electrical and electronics (E&E) companies in Malaysia fare with Lean and to define Lean as the practice used and how it has significant effect on the Business Excellence of companies. Furthermore, the authors will analyze the effect of affective Lean Engagement in the relationship between Lean practices and Business Excellence.

This study examines three research questions

1. What are the effects of Lean practices elements such as operations on the achievement business excellence?
2. What are the effects of Lean practices elements such as supply chain on the achievement business excellence?
3. Is there any mediating effect of lean engagement include leadership and employee on the relationship between Lean practices and achievement of business excellence?

What is Business Excellence?

Business excellence (BE) can be defined as "excellence in strategies, business practices, and stakeholder-related performance results that have been validated by assessments using proven business excellence models (BEMs)" (Adebanjo & Mann, 2008). The BEMs have been developed or supported by national bodies as a basis for award programmes and for the widespread adaption of the principles and methods of TQM and more than 80 national and state/regional awards which based their frameworks upon the Malcolm Baldrige National Quality Award (MBNQA) criteria or the European Foundation for Quality Management (EFQM)/European Excellence Award criteria (Mann, Adebanjo & Tickle, 2011; Dahlgaard et al., 2013).
Excellence within manufacturing is widely presented as providing significant benefits, but there is no clear consensus regarding the exact nature of excellence within manufacturing, or approaches for its implementation. To date, many implementations have followed a trial-and-error approach. To achieve the potential benefits of excellence within manufacturing, practitioners require practical and detailed guidance (Sharma & Kodali, 2008). The models themselves are developed from a set of core values and principles that are considered to be essential for long-term organizational success (these are called "Fundamental Concepts" in

the EFQM Excellence Model and "Core Values and Concepts" in the Baldrige Criteria for Performance Excellence. Essentially awards and assessment tools measure the level of deployment of BE within an organization (Mann, Adebanjo & Tickle, 2010).
Taj and Morosan (2011) stated that 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 positive impact on business as well as operations performance which included quality, cost, fast response, and flexibility.

The Manufacturing Context

Twenty-first century manufacturing is characterized by customized products. This has led to the complex production planning and control systems making mass production of goods challenging. Many organizations, particularly automotive organizations, struggled in the new customer driven and globally competitive markets. Hence, a big challenge to organizations to look for new tools and methods to continue moving up the ladder in the changed market scenario. While some organizations continued to grow on the basis of economic constancy, others have to struggle because of their lack of understanding of the changing customer's mind-sets and cost practices. To overcome this situation and to become more profitable, many manufacturers turned to "Lean". The goal of Lean is to be highly responsive to customer's demand by reducing waste. The ultimate goal is aims at producing products and services at the lowest cost and as fast as required by the customer (Bhamu, J. & Sangwan, K. S., 2014).
Lean concept originated in Japan after the second world when Japanese manufacturers realized that they could not afford the massive investment required to rebuild devastated facilities. The modern concept of LM/management can be traced to the Toyota Production System (TPS), pioneered by Japanese engineers Taiichi Ohno and Shigeo Shingo. Alukal (2003) said lean is a "manufacturing philosophy" that eliminate of all forms of waste.
According to Kennedy, Plunkett and Haider (2013), though lean is a powerful means to create value through reduction of waste, application of lean tools has received more attention in traditional manufacturing industries only and it needs to be explored in other sectors, particular to service industries. In the past ten years, even the manufacturers located in the developing countries such as China and India are working to transform their manufacturing base from traditional low-cost, labor-intensive "Fordist" production to higher value, more flexible and more productive "lean" manufacturing systems (Jadhav, Mantha & Rane, 2014). In recent research, Hans, Doevendans, Nigel. and Jane (2015) explored Lean deployment in New Zealand apple pack-houses. The findings is Lean can contribute significantly to general horticultural pack house performance even through little research has been done before this. In Malaysia, the electrical and electronics (E&E) industry is the leading manufacturing sector, contributing significantly to the country's manufacturing output (24.5%), exports (33.4%) and employment (23.7.5%) (MIDA, 2014). Therefore, this study attempts to bridge the understanding on how Malaysian electrical and electronics firms deploy Lean practices pertaining to business excellence.

Lean Practices

The lean concept originated in Japan after the second world war when Japanese manufacturers realized that they could not afford the massive investment required to rebuild the devastated facilities. Toyota produced automobiles with lesser inventory, human effort,

investment, and defects and introduced a greater and ever growing variety of products. LM gives the manufacturers a competitive edge by reducing cost and improving productivity and quality. Various authors have documented quantitative benefits of lean implementation such as improvement in production lead time, processing time, cycle time, set up time, inventory, defects and scrap, and overall equipment effectiveness. The various qualitative benefits include improved employee morale, effective communication, job satisfaction, standardized housekeeping, team decision making, etc. (Bhamu & Sangwan, 2014).

Lean is a management philosophy focus on identifying and eliminating waste throughout a product's entire value stream (Narasimhan et al., 2006; Shah & Ward, 2007). Indeed, customers pay only for value adding activities and hence time, money and energy spent on non-value adding activities were considered a waste which either had to be eliminated or minimized.

Morita and Flynn (1997) confirmed that adoption of technique based best practice approaches, such as TQM, Just-in-time (JIT), and continuous improvement (CI), statistical process control, as well as socio-institutional traits such as commitment and motivation, have all been shown to have an impact in driving superior performance. However, what they might not have specifically realized is that TQM and CI as management philosophies (not just the technical-based practice) do not only have impact on driving superior performance, but more importantly have also changed the way how managers understand business excellence and, consequently, have driven a never-ending course of paradigm shift (Lu, Betts & Croom, 2011).

Lean has its origin in the private sector generally and the manufacturing sector particularly (Barry, Chandler & Clark, 2001; Douglas, Antony & Douglas, 2015). Fok-Yew (2015) has proposed that the lean operations and lean supply chain to predict business excellence in Malaysia multinational manufacturing companies. One of the goals of lean operations is to use fewer resources to generate the same outcome. In contrast, lean supply chain strategically focuses on building a close, long term relationships with high levels of information transparency with suppliers for the purposes of reducing cost and improving quality (Lamming, 1993).

Bhamu and Sangwan (2014) highlighted that effective customer-supplier relationship is widely recognized as crucial to the success of implementing of LM principles in order to achieve a high level of efficiency and effectiveness in the system. On-time delivery by suppliers allows a firm to keep low inventories and shorten response time to customers. Lean supply is associated with level scheduling and optimization to improve quality, service, and lead time. In the present research, the lean operation is solely referred to internally-focused operation whereby the lean supply chain is connecting to external factors such as supplier performance.

Lean Practices and Business Excellence

Lean can, inter alia, improve quality, simplify, accelerate and improve processes, increase customer satisfaction and reduce costs (Douglas, et al., 2015).

P_1: The deployment of lean manufacturing leads to achievement of business excellence.

P_{1a}: The deployment of lean operations leads to achievement of business excellence.

P_{1b}: The deployment of lean supply chain leads to achievement of business excellence.

Lean Engagement in Lean Deployment And Business Excellence

Lean is characterized as a people-oriented production system and "Employee involvement" is one of the most critical elements to make a lean transformation programme a success story.

Ironically, the common barriers that hinder lean transformation are always the issues surrounding at "shop floor employees" such as "lacking of skill or technical knowhow" in practicing lean among the shop floor employees (including supervisory staff); or companies have failed to engage shop floor associates into lean activities (Chay et al., 2015).
Research agrees that all lean implementation changes the activities on the shop-floor. Many studies have focused on visual elements of lean operations (for instance 5-S cleanup activities (e.g. Cooke et al., 2010)). The broader changes in workforce treatment are a result of larger strategic organizational changes in the company. The specific activities provide a small improvement in operational efficiency but are primarily important for engaging the workforce in change – to increase their motivation for the larger changes required (Piercy & Rich, 2015). Research has previously identified a positive correlation between worker engagement or involvement and company performance (Piercy & Rich, 2015). Lean is tool set for continuous improvement and employee engagement is important for the organization to solve problems (Fok-Yew, 2015). Balle, Jones and Orzen (2015) suggested that employees had to be engaged and involved in daily continuous improvement to learn how to deal with big changes (model changes) by practicing daily small changes (kaizen). They had to be part of stable teams. Therefore, it is agreed that the employee involvement in lean implementation is crucial in achieving business excellence. Hence, the following proposition captures the relationship between employee engagement and business excellence:
P_2: Lean engagement in deployment of lean practices will lead to achievement of business excellence.

The Mediatating Role of Lean Engagement

In the journey of excellence, the most important facilitator is the people working in the organization. In this study, we propose that lean engagement mediates the link between lean practices and business excellence. In other words, the effect of lean practices on excellence depends, at least in part, on its effect on lean engagement. Figure 1 depicts this framework. The mediational framework proposes that lean engagement including leadership engagement and employee engagement should be present in work environment to achieve business excellence (Jadhav, et al., 2014). Moreover, the leadership not only requires intellectual support but also physical engagement in the programme.

Leadership

Albliwi, Antony, Lim and Wiele (2014) conducted a systematic literature review of 56 papers that were published on Lean, Six Sigma and LSS in well-known academic database from 1995 to 2013. Lack of top management attitude, commitment and involvement have been identified as the most CFF of LSS in their research as it appeared in 20 of the papers found. This factor has been found to be a factor detrimental in all industries in different countries and different organizational sizes. Indeed, the role of top management is to ensure that all the pertinent resources are available and without hindrance during lean deployment.
Al-Balushi et al. (2014) proposed that senior managers be responsible for actualizing meaningful involvement of employees in the changing process and facilitating the necessary resources to facilitate implementation. In terms of resources necessary for lean implementation, such as time for employee training, and involvement in lean activities must be provided (Alange & Steiber, 2009). Particularly, if the new way of working requires new knowledge and skill, members must be provided with the appropriate knowledge and skill

either formal or informal for improvements. Many LM initiatives have failed due to lack of its understanding by managers and employees (Wong & Wong, 2009).
According to Wong and Wong (2009), it is pertinent for top management to understand and to give adequate support to sustain the lean concept. Lack of commitment may lead to a host of other issues, including limited access to resources, lengthy decision-making processes and communication breakdowns. Lean needs dynamic managers with forward-thinking vision and laxity to give staff lee-way to experiment. Management must remove restraining force by motivating people to get involved in lean implementation and encouraging them to make decisions without having to follow the normal decision-making procedures (Jadhav, et al., 2014).

Employee

The key challenges in the area of lean deployment are managerial and employee engagement. Getting buy in and involvement and ensuring managerial and employee commit time and balance between routine tasks and improvement is an ongoing challenge. This was mentioned as an issue by most organizations and it had dealt with in a variety of ways (Brown, 2012). Taylor and Wright (2003) conducted a longitudinal study of the success with TQM in a sample of predominantly small firms and found one of the key success factor to be senior managers taking charge of TQM and ensuring that a majority of employees are involved in its implementation. Therefore, people at all levels are important to ensure lean engagement in the organization. The senior managers/leaders would drive the organization in continuous improvement whereby the workers/employees would commit and act accord to changes in manufacturing process. We need leaders at the time of change. If there was no change, then perhaps all we need would be the manager and the workers (Mayfield, 2014).
Vora (2013) emphasized that the key to employee engagement is participation, motivation and development. The participation mentioned includes effective teamwork (Lencioni, 2002), meeting management (Lencioni, 2004), mentoring, and orientation. In contrast, motivation involves recognition, employee suggestions, and the Theory of Strength. The development covers effective education and training, performance management, employee satisfaction, and coaching. Vora (2013) argued that hard skills are easy to acquire, however, the soft skills are hard to build.
Cheng et al. (2015) explained that Lean tools and techniques such as SIPOC, Value Stream Mapping (VSM), SWOT and PESTLE analysis can be used to elicit and capture data from the frontline workforce. Furthermore, the validity of the VSM can be reinforced with Gemba walk as well as providing an additional opportunity to engage with the workforce and strengthen buy-in. The goal of Gemba walk is to understand the value stream and its problem where the work is happening. A gemba walk
Based on this argument, we expect to see greater effect of employee engagement on the relationship between lean initiatives and business excellence. Thus, we assume that employee engagement mediates the relationship between lean initiatives and business excellence. From these reviews, our proposition reflects the mediating effect of employee engagement on the relationship between lean initiatives and business excellence which are derived as follows:
P_3: Lean engagement mediates the relationship between lean manufacturing and business excellence.

Theoretical Framework and Theoritical Underpinnings

Four hypotheses were proposed based on the previous literature. The relationship among the various factors discussed in this literature is depicted in a framework showh in Figure 1 below. Based on the literatured syntheses, the author develops a linkage that the lean initiatives are likely to have an impact on business excellence of the organization only in situations where Lean engagement is present.

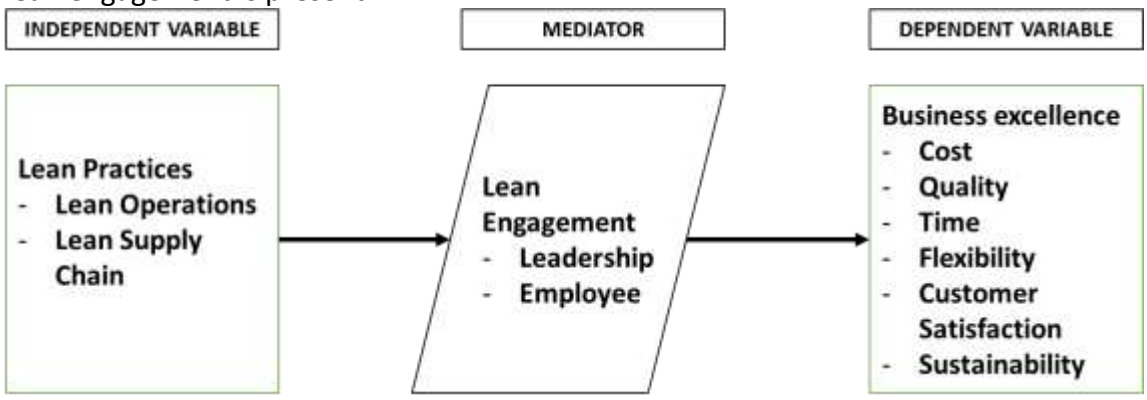

Figure 1: Theoretical Framework

The Integration with Innovation Diffusion Theory **(**IDT) is the dominant theory being adapted and used in the empirical literature on organizations because when organizations feel the pressure in competitive environment and they will be motivated to adopt an innovation to change for the better. Rogers (1995) identified “relative advantage” in IDT as a primary factor affecting the adoption of innovation where measurements such as economic benefit can be used for organization to compare the advantage of new practice with the old.

According to the innovation decision process theorized in the IDT, lean manufacturing has to be used consistently until net benefits can be observed so that decision-makers can be convinced and committed to continue adopting it in the long run (Rogers, 1995). The empirical results demonstrate that IDT can explain lean initiatives as management practice besides technology adoption. An extensive review of underpinning theories that may guide the present research.

Conclusion, Limitation and Future Research

This study is on the relationship between the lean initiatives and business excellence. It also determines the mediating effect of employee engagement on lean and business excellence. The outcome of this study will show that variables are important in explaining the achievement of business excellence. This study utilizes innovation diffusion theory (IDT) in its approach to theory uses.

The conclusion drawn from this present study should be interpreted in a limited way, which would potentially represent opportunities for further research in future. Firstly, this study is a cross sectional study, as it is carried out once and represents the issue at a specific time. Therefore, researchers in future may delve into a longitudinal study in order to expand the findings that are pre-changes and post-changes in the deployment of lean initiatives. Secondly, this study uses the E&E industry not only of its high foreign ownership but also of its many restrictions in response to the study. It is suggested that using Malaysian local owned firms like small-medium enterprise (SME) or small-medium industry (SMI) may add more insight to the study. In addition, any future study in service industry will enhance interest to the area under review. Thirdly, this study shows the importance of lean initiatives although

there are few elements affecting the achievement of business excellence. In contrast, further studies may focus on other elements or dimensions which have been excluded in this study such as lean office. Finally, future study can also investigate lean initiatives that are driven by external environment such as technological factors. Perhaps it will be able to shed a new insight on how firms anticipate the impact of external force and simultaneously improve their business performance.

Based on the proposed framework above, this study is expected to provide several contributions to practice, methodology and theory. In contrast to most previous studies which identified each element separately, this paper will be among the first few studies to examine the lean operations and supply chain to predict business excellence. The findings will show the importance of how lean initiatives elements in ensuring business excellence, are achieved. Management are advised to establish policy, systems and process that integrate all important elements in their planning and strategic direction. This paper also hopes to provide managers with an insight of the framework so that they can identify the appropriate model of business excellence based on organizational needs. As to methodology contribution, this study on sustainability is an add-on performance metrics (non-economic measure) place on top of the conventional performance metrics (economic measure) in a composite performance index by averaging scores across the performance indicators. Since sustainability is a very important aspect in today's business environment (Hubbard, 2009; Muogboh and Salami, 2009), therefore, this methodology can be validated in future research to measure business excellence or operational excellence. From the theoretical perspective, it is found that the originality in terms of the model reflects a growing interest in extending business management paradigms in context to emerging developing countries particularly with the knowledge on the insight of lean initiatives and business excellence.

References

Adebanjo, D., and Mann, R. (2008). Sustainability of benchmarking networks: A case-based analysis. *Total Quality Management & Business Excellence*, 19(1-2), 107-122.

Alukal, G. (2003). Create a lean, mean machine. *Quality Progress*, 36(4), 29-34.

Al-Balushi, S., Sohal, A. S., Singh, P.J., Hajri, A. A.,Farsi, Y.M.A. and Abri, R. A. (2014). Readiness factors for lean implementation in healthcare settings – a literature review. *Journal of Health Organization and Management*, 28(2), 135-153.

Alange, S. and Steiber, A. (2009). The board's role in sustaining major organizational change: an empirical analysis of three change programs. *International Journal of Quality and Service Sciences*, 1(3), 280-293.

Albliwi, S., Antony, J., Lim, S. A. H., and Wiele, T. V. D. (2014). Critical failure factors of Lean Six Sigma: a systematic literature review. *International Journal of Quality & Reliability Management*, 31(9), 1012-1030.

Balle, M., Jones, D and Orzen, M. (2015). True lean leadership at all levels. *Industry Management*, 26-30.

Barry, J., Chandler, J. and Clark, H. (2001). Between the Ivory tower and the academic assembly line. *Journal of Management Studies*, 38(1), 87-101.

Bhamu, J. and Sangwan, K. S. (2014). Lean manufacturing: literature review and research issues. *International Journal of Operations & Production Management*, 34(7), 876-940.

Brown, A. (2012). Managing challenges in sustaining business excellence. *International Journal of Quality & Reliability Management*, 30(4), 461-475.

Brown, A. (2013a). How do excellent companies stay excellent?. *Total Quality Management & Business Excellence*, 24(2), 108-118.

Chay, TickFei, Xu. YuChun, Tiwari, A. and Chay, FooSoon (2015). Towards lean transformation: the analysis of lean implementation frameworks. *Journal of Manufacturing Technology Management*, 26(7), 1031-1052.

Cheng, S. Y., Bamford, D., Papalexi, M. and Dehe, B. (2015). Improving access to health services – challenges in Lean application. *International Journal of Public Sector Management*, 28(2), 121-135.

Cooke, M.W., Williams, S.J. and Esain, A., (2010). Lean email: applying 5S to emails. *British Medical Journal*, available at: http://careers.bmj.com/careers/advice/view-article.html?id=20000682 (Assessed 2 Jan 2016).

Dahlgaard, J.J., & Dahlgaard-Park, S.M. (2006). Lean production, six sigma quality and company culture. *TQM Magazine*, 18(3), 263-281.

Dahlgaard, J. J., Chenb, Chi-Kuang, Jangb Jiun-Yi, Banegasb, L. A. & Dahlgaard-Park, S. M. (2013). Business excellence models: limitations, reflections and further Development. *Total Quality Management*, 24(5), 519-538,

Dahlgaard-Park, S.M., & Dahlgaard, J.J. (2010). Organizational learnability and innovability: A system for assessing, diagnosing and improving innovations. *International Journal of Quality and Service Science*, 2(2), 153–175.

Douglas, J. A., Antony, J. and Douglas, A. (2015). Waste identification and elimination in HEIs: the role of Lean thinking. *International Journal of Quality & Reliability Management*, 32(9), 970-981.

EFQM. European Foundation for Quality Management. (1999). *The Excellence Model.* EFQM, Brussels.

Fok-Yew, O (2015). Deployment of Lean Initiatives to Achieve Business Excellence in Malaysian Multinational Manufacturing Companies, *International Journal of Management and Social Sciences Research,* 4(11), 14-20.

Fok-Yew, O. and Ahmad, H. (2014). The Effect of Change Management on Operational Excellence in Electrical and Electronics Industry: Evidence from Malaysia. *British Journal of Economics, Management & Trade,* 4(8), 1285-1305.

Jadhav, R. J., Mantha, S. S., Rane, S. B. (2014). Exploring barriers in lean implementation. *International Journal of Lean Six Sigma*, 5(2), 122-148.

Hans J.T., Doevendans, Nigel P. G. and Jane G. (2015). Exploring Lean deployment in New Zealand apple packhouses. *Measuring Business Excellence*, 19(1), 46-60.

Hubbard, G. (2009). Measuring Organizational Performance: Beyond the Triple Bottom Line. *Business Strategy and the Environment*, 19, 177-191.

Kennedy, I., Plunkett, A. and Haider, J. (2013). Implementation of lean principles in a food manufacturing company. *Advances in Sustainable and Competitive Manufacturing Systems, Springer International Publishing*, 1579-1590.

Lamming, R. C., (1993). *Beyond Partnership: Strategies for Innovation and Lean Supply*. Hemel Hempstead: Prentice Hall.

Lencioni, P. (2002). *The Five Dysfunctions of a Team*, Jossey-Bass, San Francisco, CA.

Lencioni, P. (2004). *Death by Meeting*, Jossey-Bass, San Francisco, CA.

Lu, D., Betts, A. and Croom, S. (2011). Re-investing business excellence: Values, measures and a framework. *Total Quality Management*, 22(12), 1263-1276.

Narasimhan, R., Swink, M. and Kim, S.W. (2006). Disentangling leanness and agility: an empirical investigation. *Journal of Operations Management*, 24, 440-457.

Mann, R., Adebanjo, D. and Tickle, M. (2011). Deployment of business excellence in Asia: an exploratory study. *International Journal of Quality & Reliability Management,* 28(6), 604-627.

Mayfield, P. (2014). Engaging with stakeholders is critical when leading change. *Industrial and Commercial Training*. 46(2), 68-72.

Muogboh, O. S. & Salami, A. (2009). A New Perspective on the Manufacturing Strategy: Performance Relationship. *International Journal of Business Research*, 9 (3), 114-126.

MIDA (2014), http://www.mida.gov.my/home/electrical-and-electronic/posts/ [Accessed on 31/1/2016].

Morita, M, & Flynn E. J. (1997). The linkage among management systems, practices and behavior in successful manufacturing strategy. *International Journal of Operations & Production Management,* 17 (10), 967-993.

Piercy, N. and Rich, N. (2015). The relationship between lean operations and sustainable operations. *International Journal of Operations & Production Management*, 35(2), 282-315.

Rogers, E.M. (1995). *Diffusion of Innovation*, NY: Free Press.

Shah, R. and Ward, P.T. (2007). Defining and developing measures of lean production. *Journal of Operations Management,* 25(1), 785-805.

Sharma, M. and Kodali, R. (2008). Development of a framework for manufacturing excellence. *Measuring Business Excellence*. 12(4), 50-66,

Taj, S. and Morosan, C. (2011). The impact of lean operations on the Chinese manufacturing performance. *Journal of Manufacturing Technology Management*, 22(2), 223-240.

Taylor, W.A. and Wright, G.H. (2003). A longitudinal study of TQM implementation: factors influencing success and failure. *Omega*, 31(3), 97-111.

Van Looy, A., De Backer, M. and Poels, G. (2011). Defining business process maturity. A journey towards excellence. *Total Quality Management & Business Excellence, 22*(11), 1119-1137.

Vora, M. K. (2013). Business excellence through sustainable change management. *The TQM Journal*, 25(6), 625-640.

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

Womack, J.P., Jones, D.T. and Roos, D. (2007). *The Machine that Changed the World*, Free Press, ew York, NY.

Wong, Y.C., Wong, K.Y. and Ali, A. (2009). A study on lean manufacturing implementation in the Malaysian electrical and electronics industry. *European Journal of Scientific Research*, 38(4), 521-535.