



Research Journal of
**Business
Management**

ISSN 1819-1932



Academic
Journals Inc.

www.academicjournals.com



Research Article

Effect of Productivity and Perceived Quality on Organizational Performance from Lean Management Practice Perspective

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Abstract

Background and Objective: The diversity in management practices are viewed as both opportunity and threat for production sector exploring all available strategies to gain competitive advantage through increased organizational performance. This study focused on one of such practices to measure organizational performance of multinational electronic manufacturing company based in Malaysia. **Materials and Methods:** Lean management practices was applied to measure organizational performance through productivity and perceived quality of line staff directly engaged in production activities at the factory floor. Data were collected through simple random sampling from 120 factory workers who could evaluate the effect of management policy on productivity and service quality. Pearson correlation and multiple regression analyses using SPSS version 22 was used to analyzed the data. **Results:** The result of statistical analysis shown standardized coefficient of 0.443 for productivity and 0.303 for perceived quality with R-square of over 60% which confirmed positive relationship between productivity, service quality and organizational performance. **Conclusion:** The conclusion is based on this result, encouraged management of the company is to focus just in time (JIT) policy in all fronts. The flexibility of situational factors should also be encouraged. The theoretical contribution in terms of variables used and the findings will improve the debate in management literatures. The limitations and direction for future study were explained in this study.

Key words: Lean management practice, productivity, service quality, organizational performance, JIT, management strategy

Citation: Harada Yoshifumi, Sivanadan Sammogram and Ndanusa Mohammed Manzuma-Ndaaba, 2018. Effect of productivity and perceived quality on organizational performance from lean management practice perspective . Res. J. Business Manage., 12: 1-9.

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

In today's dynamic and rapidly changing workplace and globalized economy, development of organizational performance is associated with the development of personal performance, skills, knowledge and experience that could minimize conflict of interest in an organization¹⁻³. However, the ability to achieve and maintain high performance and productivity in organizations is a key challenge facing management today. In current situation, management need to give higher attention towards understanding individual differences, needs and behaviors as well as their criticality to enable them to understand and manage organizational complexity. Such understanding is considered important in helping individuals develop effective learning styles that is aligned with organizational objectives and needs.

Intel Malaysia Sdn. Berhad engaged in manufacturing and sale of semiconductor chips and development of integrated digital technology platforms for the computing and communications industries. It offers microprocessor products including dual-core microprocessors, quad-core microprocessors, 32-bit architecture microprocessors and 64-bit architecture microprocessors, which are used in computer systems as well as in embedded designs, such as industrial equipment, point-of-sale systems, panel PCs, automotive information/entertainment systems and medical equipment.

The company also offers chipset products that send data between the microprocessor and the input, display and storage devices, such as keyboards, mouse, monitors, hard drives and CD or DVD drives and motherboards for use in the desktop, server and workstation platforms. In addition, it provides flash memory products, such as wireless memory for mobile phone designs, set-top boxes, networking products, DVD players and DSL and cable modems flash memory products primarily for memory cards, digital audio players and cellular phones and wired and wireless connectivity products that are used to translate and transmit data in packets across networks as well as for the traditional LAN, wireless LAN, metropolitan area network, networked storage market and mobile and fixed networks.

Organizational practitioners continue to be bedeviled by a lot of management problems that have their roots in the culture of a society and those that impede progress toward achieving high performance. The main challenge is how to relate organizations more closely to their cultural settings in order to enhance optimal performance. Hofstede⁴ lamented

that "it is becoming widely accepted among social scientists, especially managers and organizational theorists that the patterns of management and employee behavior in the work place are largely culture-bound. Hofstede⁴ argued further that there is indeed a growing body of literature concerning questions of cultural influences on organizational behavior and performance but that much of it is of poor quality consisting of anecdotes, prescriptions based on Western experience and fantasies. However, Boyer⁵ observed that factory keep closing down year to year due to drastic drop in their organizational performances.

On 22nd Jan, 2009, the Star newspaper Malaysia⁶ reported that Intel Corporation will shut down two plants in Penang. The reason was given that the company decision to relocate the two plants to the Kulim Hi-tech Park to minimize cost and enjoy economy of scale in production instead of the true reason of drastic drop in organizational performances. Intel has seen the demand for its processors slow in the last quarter of 2008 as profits plunged by 90%⁶. This proves that the productivity of the firm has reduced drastically as their demand for processors are in down trend which force them to shut down two plants in Penang.

Besides that, the global economic tsunami has reached their shores. Regionally, the numbers look dismal. For example, Singapore is experiencing its worst downturn in post-war years, Korea down by over 5% of GDP, Japan exports down by 35%, China economic growth also down by 6.8%. And now Intel is shutting "two existing assembly test facilities in Penang". The two plants in Penang are among four Intel facilities worldwide that have been targeted for closure in 2009. The closures could shed atleast 5.000 jobs globally within the firm, which employs 83,000 worldwide⁶. This show, the organizational performances is in down trend.

Performance is a multidimensional construct^{7,8} and has been variously conceptualized. Dyer and Reeves⁹ noticed different types of performance measures that are most appropriate for research and came up with proposed four effectiveness measures (1) Human resource outcomes such as absenteeism, turnover and individual or group performance, (2) Organizational outcomes such as productivity, quality and service, (3) Financial or accounting outcomes such as profitability, return on assets and return on invested capitals and (4) Stock market performance (stock value or shareholder return). Delaney and Huselid¹⁰ reported that subjective market performance measure as the organizational performance indicator cannot holistically measure performance. This subjective market performance measure

includes sales, profitability and marketing¹¹. Although, there are concerns about the use of subjective measures, such as increased measurement errors and the potential for common method biases, there are still some compelling reasons for using such measures^{12,10,13}.

Besides that, Gupta and colleagues^{14,15} noted that objective financial performance data on individual units that reveal their organizational identities are very difficult, indeed virtually impossible to obtain but Wall *et al.*¹⁶ demonstrated convergent, discriminant and construct validities of subjective performance measures judged against objective performance measures in research findings relating to management practices and performance, suggesting that self-reported measures are useful in studies where objective ones are not available. Furthermore, Brush and Chaganti¹⁷ examined 34 different studies in the entrepreneurship literature that explicitly used firm performance as the dependent variable. They found that 34 different measures of performance were used in those studies indicating that researchers perceived many different dimensions of performance and that there was no agreement on what measures actually represent overall organizational performance. The most frequently used measures of performance were changes in productivity, organizational survival, changes in number of employees and profitability.

Furthermore, management research in general and strategic management research more specifically, has taken a much more limited empirical view, emphasizing the central role of accounting, financial and stock-market outcomes. To simplify this discussion and keep some consistency with the usage in the literature, the authors distinguish between the domains of organizational effectiveness and organizational performance. Organizational performance encompasses three specific areas of firm outcomes:

- Financial performance (profits, return on assets, return on investment, etc.)
- Market performance (sales, market share, etc.)
- Shareholder return (total shareholder return, economic value added, etc.)

Theory application: Lean management practice: Lean was developed over the last century, starting with Taylor's work about scientific management (1911/1998). Chiola *et al.*¹⁸ stated that Taylor who can be considered as the originator of lean practices and industrial-engineering discipline which had a significant impact on early modernistic manufacturing perspectives and focused on productivity improvements. A lean organization understands customer value and focuses its

key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste.

Interestingly, Nordin *et al.*¹⁹ wrote one of the first credible scholarly articles about just in time (JIT) manufacturing¹. They criticized that nobody until 1994 had developed "a reliable and valid measurement instrument for empirical research in just in time (JIT)". These authors conducted firstly a literature review and then performed a quantitative survey of 41 plants from three industries in the United States. They used Cronbach's alpha to verify the reliability of their 16 just in time (JIT) scales, 12 of them had a value of more than 0.6 and were further used for their validity analysis. All 12 scales passed validity testing and combined the 12 scales into three constructs, management of people and schedules in a just in time (JIT) system simplified physical flow and supplier management. Further, Nordin *et al.*¹⁹ proposed a well-thought-through theoretical framework for just in time (JIT), they presented a set of reliable and validated scales to measure JIT. On the other hand, these researchers surveyed companies in the United States, who had or wanted to implement just in time (JIT) discerning management's opinions to define how lean production (LP) works. A comparable just in time (JIT) study from different Toyota plants would be a more valid measure but this was probably not an option for these researchers.

Another critical aspect is the expressed notion by these researchers that small lot sizes are the goal of just in time (JIT). Ohno²⁰ described small lot sizes as just what the customer needs. That small lot sizes is a goal of lean production (LP) or just in time (JIT) is one of the misconceptions of many researchers, because they do not refer back to the seminal work of Ohno²⁰. Because this is a common misperception in many research articles²¹⁻²³, this researcher will exclude small lot size as a key lean practice in the planned survey for lean practices.

It is worth noting that every researcher has identified a set of different practices to define lean. Some studies explained the multi-dimensionality of lean production by providing a comprehensive list of management practices²⁴. These practices depending on their function were then categorized into one of four bundles, just in time (JIT), total quality management (TQM), total productivity management (TPM), and human resource management (HRM). Li *et al.*²⁴ defined lean based only on the JIT and TQM bundles. Bums²⁵ corroborate the findings of other scholars arguing that lean production is a multi-dimensional concept and to achieve the true benefits of lean production, organizations must implement appropriate practices from all four bundles.

Productivity and relationship with organizational

Performance: Keitany and Riwo-Abudho²⁶ defined productivity as an economic measure of output per unit of input. Inputs include labor and capital, while output is typically measured in revenues and other components such as business inventories. Productivity measures may be examined collectively (across the whole economy) or viewed industry by industry to examine trends in labor growth, wage levels and technological improvement. Besides that, Tikkala²⁷ defined productivity as ability of an organization to utilize its available resources in order to produce profitable goods or services as desired by customers or clients. It is the productivity that measures the performance of an organization and it can also be used for companies themselves in order to assess their own progress. Productivity increases the overall efficiency of an organization. When the efficiency of the organization increases, the production capacity of the company is utilized to the optimum level. Thus, all resources are used in an effective and efficient manner to get the best possible results. Waste reduction is one of the main purposes in lean management practices in manufacturing²⁶. The challenge in waste reduction is determining the methodology of identifying the waste. The productivity of an organization can be improved by proper waste management²⁵. Waste is generally known to be generated from range of human and animal activities, production processes to consumption stage and the management of waste has been a major problem in developing countries where generation of waste per unit of output is much higher than that in the developed countries because of inefficiency in manufacturing processes²⁸. In addition to the aforementioned factors, what actually becomes wasted depends on which items are being purchased and consumed. Or in other words culture, climate, religious and ethnic background as well as economic abilities affect what becomes waste. Hence, waste quantities and composition vary widely, both geographically (regionally, locally) and over time²⁹.

On the other hand, Garrett and Lee³⁰ found that waste elimination should start from the design stage. In order to eliminate the waste in the construction process, types of wastes should be identified. The 8 types of wastes were introduced in the literature as follows³⁰:

- Overproduction
- Waiting
- Transportation

- Unnecessary processes
- Inventory
- Unneeded movement
- Defects
- Underutilized people

The several wastes within the production process which prevent the study from flowing smoothly as shown in Fig. 1. The aforesaid types of wastes can be eliminated or reduced by considering the relevant lean techniques. Some of which are, housekeeping, just-in-time (JIT) delivery, information technology and prefabrication³¹. Nevertheless, Keitany and Riwo-Abudho²⁶ focused on the notion of process transparency which leads eventually to waste reduction as visualization helps to reduce uncertainties.

Perceived quality and relationship with organizational performance:

Perceived quality can be defined as the customer's perception of the overall quality or superiority of a product or service with respect to its intended purpose, relative to alternatives³². Perceived quality is a first perception by customers. It thus differs from several related concept, such as:

- Actual or objective quality: The extent to which the product or service delivers superior service
- Product-based quality: The nature and quantity of ingredients, features or services included
- Manufacturing quality: Conformance to specification, the "zero defects" goal

On the other hand, Czabke³³ explains that, Perceived quality is an intangible, overall feeling about a brand. However, it usually will be based on underlying dimensions which include characteristics of the products to which the brand is attached such as reliability and performance. To understand perceived quality, the identification and measurement of the underlying dimensions will be useful but the perceived quality itself is a summary, global construct.

In manufacturing world, quality is the expectations of customers to grow day by day, it is very important for a business to continually improve the quality of the products and services it has to offer³⁴. High standards do not just happen by chance. It evolves over some time as a result of experience. Organizations can improve and secure their future by engaging in a process of continual improvement and

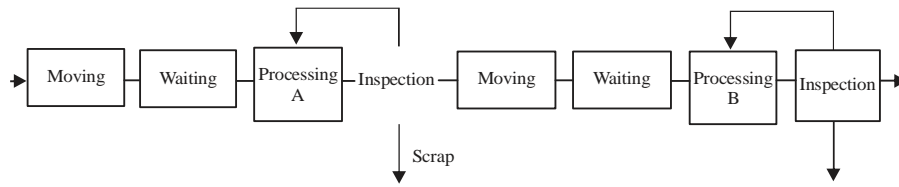


Fig. 1: Production as a flow process and the shaded boxes are the non-value adding activities

adopting new processes of conformity assessment³³. The implementation of quality management systems such as ISO 9000 and ISO 9001 in industries have been beneficial at a greater extent despite its draw backs observed by some companies. Heras *et al.*³⁴ presented in their empirical survey paper, a summary of the benefits and effects of implementing quality management systems such as ISO 9000. It was observed that certified companies stand higher chances of increasing their productivity, profitability, product quality and competitiveness, increasing market share as well as increasing customer satisfaction. However, the effects include long installation periods and uncertain time to achieve return on investment^{35,36}.

Furthermore, Eriksson³² argued that continuous improvement is the second fundamental principle of lean practices, after the principle of elimination of waste. Continuous improvement is positively translated to quality improvement in an organization³⁶. Waste is the main subject of continuous improvement³⁷. Continuous improvement focuses on two directions, first to eliminate waste in-order to reduce cost and second to improve products and processes in-order to increase customer satisfaction³⁸. The practice behind the principle of continuous improvement is that employees at every level of organization are looking and experimenting to improve their own study³⁹.

The aim is to constantly improve the whole system in a never ending process. Therefore, continuous improvement should not be seen as a state but as a direction³⁹. Some researchers mentioned that there are huge benefits coupled with the principle of continuous improvement. According to Proctor *et al.*⁴⁰ it is the principle of continuous improvement that assisted Toyota for many years to produce cars in one third of the time in comparison to car manufacturers in Western countries. One element of continuous improvement is to improve the process, which is further explained under the heading of perfection in the principles of lean thinking.

Gyasi⁴¹ founds that, the concept of zero defects is another important component of lean practices. In order to maintain a continuous flow of production process all products have to be defect free and remain so throughout the process at the production line, so that the line remain running⁴². The flow of

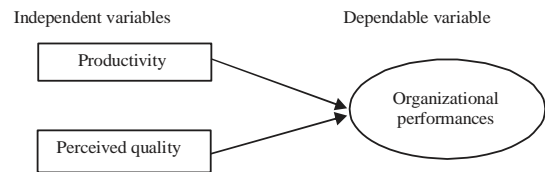


Fig. 2: Research framework

production line determine the productivity of organization, in order to attain high productivity it is essential that all parts and products are fault free from the very beginning³⁹. In order to maintain both quality and productivity, all units are inspected using inexpensive means like poka yoke to ensure zero defects. The intention is that errors should be prevented before they occur, the underlying objective with such inspection is not to find defects but to preventing them⁴³. This study focused on one of such practices to measure organizational performance of multinational electronic manufacturing company based in Malaysia.

MATERIALS AND METHODS

In this research, the dependent variable is the organizational performance whereas, the independent variables can be considered to be organizational productivity and perceived quality. The research intends to identify the corresponding relationship between independent variables and dependent variables to understand the effect between productivity and perceived quality towards organizational performance. The research framework and the relationship intended to be deduced in this research study is described in Fig. 2.

In this research, based on research objective and question, the main scope of this project was to understand the effect of productivity and perceived quality on organizational performances through lean management practices. Based on literature reviewed, only two hypotheses of this research are formulated below:

H1: Productivity has a positive relationship with organizational performances

H2: Perceived quality has a positive relationship with organizational performances

Statistical analysis: Upon the completion of data collection, the researcher entered all the data into the database and used SPSS software package 22 to analyze the data. All missing and incomplete data from incomplete questionnaires were removed from the analysis. This was followed by data sweeping and testing the normality using Skewness and Kurtosis which is used to refer to something that is out of line or distorted on one side. Next step of data analysis include applying the box plot by identifying the median position of the box. Whereby, if the median is closer to the top the distribution is negatively skewed and if the median is closer to the bottom is positively skewed.

Among the statistical techniques used includes reliability analysis, descriptive statistics used to determine the characteristics of the respondents, correlation analysis which is used to analyze the relationship between variables and hierarchical regression analysis which is used to test the impact of independent variables on dependent variables.

The result of the reliability analysis shows that Cronbach alpha is good and range from 0.812-0.831.

RESULTS

Descriptive statistic analysis: The minimum, maximum score and mean of these studies variables which includes productivity, perceived quality and organizational performances are shown in Table 1. The number of respondents stated at column labeled N. Information about the range of the variables represented in the maximum and

minimum columns. Based on the results obtained, it can be concluded that the respondent are generally agree with the questions in the questionnaire.

Pearson correlation analysis: The relationships between the independent variables productivity, perceived quality and dependent variable organizational performance are shown in Table 2. The first correlation between Productivity and Organizational Performance, the finding shows that the value is 0.624 or 62.4% and it is representing a strong relationship. For the second correlation between independent variables, perceived quality and dependent variables organizational performance, the result shows that the value is 0.59 or 59% at 99% confident interval and it is representing strong relationship.

According to the rule of thumb, productivity has the highest correlation value which is 0.624, which shows that it has the highest correlation with organizational performance. This is also correlated with the main aim of lean management practices in an organization which is to increase productivity.

Multiple regression analysis: The standardized coefficient is 0.443 for productivity improvement and 0.303 for perceived quality are shown in Table 3. R-square on the other hand is the proposition of variance in dependent variables which could be predicted from the independent variables which is 60.5%. Besides that, the adjusted R-square indicates 60.1 or 0.601% where it tries to yield an honest value to estimate the R-squared for the population. The f-value from the study indicated 51.375. The p-value associated with the f-value is very small less than 0.01, therefore, it could be said that the independent variables reliably can predict the dependent

Table 1: Descriptive analysis results

Variables	N	Minimum	Maximum	Mean
Productivity	150	3.60	5.00	4.3520
Perceived quality	150	3.60	5.00	4.3707
Organizational performances	150	3.80	5.00	4.4013

Table 2: Pearson correlation results

Variables	Productivity improvement	Quality improvement	Lean implementation
Independent variables			
Productivity (IV1)	1		
Perceived quality (IV2)	0.585**	1	
Dependent variable			
Organizational Performances (DV)	0.624**	0.590**	1

**p = 5%

Table 3: Multiple regression results

Independent variables	Dependent variables (organizational performances)
Productivity	0.443**
Perceived quality	0.303**
R ²	0.605
Adjusted R ²	0.601
F change	51.375

**p = 5%

variable. Since the $p < 0.01$, it further indicates that there is a significantly positive relationship between the independent and dependent variables.

The regression analysis further elaborates that the productivity, has the highest value which is 0.443 which depicts a consistent value since it has the highest reliability value, highest correlation with organizational performances which further depicts the regression analysis which shows the highest value.

DISCUSSIONS

The findings of this study confirmed the efficacy of line staff productivity, quality service and improved performance of the organization. The findings of this study are in line with the conclusion of Doolen *et al.*²¹ that traced the epistemology of lean management perspectives^{44,45}. The link between perceived quality and organization performance was in line with the study of Agus and Hajinoor⁴², who find lean production supply chain management as driver towards enhancing product quality and business performance. However, these findings slightly negate the views of Nordin *et al.*¹⁹ that find organizational change management as a framework for lean management implementation. This study also correlates the argument of Sendogdu *et al.*¹¹ on the relationship between human resource management practices and organizational commitment. The findings of this study boost the conclusion of Chuang and Liao¹² that "taking care of business by taking care of employees and customers" is the best human resource management strategy.

Implication of the study: The study carried out with aim to determine the effect of productivity and perceived quality towards organizational performances in American-Based Electronics Organization (Intel Corporation, Kulim). This study also manages to provide managerial suggestions to organization to improve their organizational performances^{46,47}. Whereby, the element of productivity and

perceived quality is tested as management strategy to determine the performance of organization. The study reveals the importance of these variables as organizational profitable strategy required to create better revenue aspects for the organization to expend and further prosper^{20,48,49}.

Similarly, the academic contribution of this research is viewed as an opening knowledge in manufacturing industries, the organization selected in the study which is Intel Corporation an American Based Electronics Organization in Kulim was a typical case at hand in Malaysia that could help researchers to understand the relationship of independent variables selected towards organizational performances using lean management practices. This research opens the door for new researchers to expand research in manufacturing industry considered to be leading part for organization performances⁵⁰. Besides that, understanding the practices of lean production adopted by the organization will be of more concern on their operational performances and to fulfill the requirements and expectations of customer⁵¹. The framework of this study can be a guideline for future research on the similar topic.

CONCLUSION

The research revolves around understanding the relationship between productivity and perceived quality towards organizational performances through lean management practices in American-Based Organization in Intel Corporation Kulim, Malaysia. Base on the result of this research, it can be summarized that there is a significant positive affect relationship between the independent variable which are productivity and perceived quality towards organizational performances which is the dependent variable. Based on the respondents used in the determining the research, the research depicts that the independent variables has a relationship with the dependent variable.

Findings from this research will allow the American-Based Organization (Intel Corporation Kulim) to take into consideration the importance of the independent variables because it has significant relationship towards the organization performances. Therefore, it will allow the organization to be sustained in terms of productivity, revenue and also marketing purposes.

SIGNIFICANCE STATEMENTS

This study discovered the diversity in management practices and recommend lean management theory in view

of the importance of time in the process of production, transportation, storage and marketing of manufactured products. This will help academic community and industry to explore just in time as a strategy for service delivery through innovative capability and modern technology.

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