

Investigation of Factors Impacting Lean Implementation in the Indonesian Fast-Moving Consumer Goods Industry

Rio Kharisma Tanudiharjo

Coventry University, Singapore Campus

E-mail: Riok58@gmail.com

Florence Ng Jia Yun

Ridge View Residential College,

National University of Singapore, Singapore

E-mail: Florence.ng@nus.edu.sg (*Corresponding Author*)

John Heng Aik Joo

PSB Academy Pte Ltd

E-mail: john.heng@psb-academy.edu.sg

Ivan C. Arokiam

Coventry University, UK

E-mail: aa3141@coventry.ac.uk

ABSTRACT

The fast-moving consumer goods (FMCG) industry is promising in Indonesia, with recorded sales of more than USD 10 billion, which represents more than 18% of Indonesia's gross domestic product in 2016. Despite the lucrative market, FMCG companies face challenges due to intense competition and increasing operational costs. Consequently, Indonesian companies have begun to explore lean implementation to decrease their costs and improve efficiency, but with minimal success. This study investigates the critical success factors of lean implementation in the Indonesian FMCG industry, as such implementation cannot optimally occur if the implementing company does not successfully manage the important factors that affect lean implementation. This study tested various factors—namely, organizational culture, personnel capability, communication, and leadership and management involvement—that impact lean implementation and organizational performance in Indonesia's FMCG industry. It was also found that leadership and management involvement are the most important factors. Based on the obtained results, this research proposes recommendations regarding the best lean implementation practices in Indonesian FMCG companies.

Keywords: *lean production; lean manufacturing; lean enterprise; lean implementation; fast-moving consumer goods*

1. INTRODUCTION

1.1 Indonesia's Fast-Moving Consumer Goods Industry

The manufacturing industry has been crucial to Indonesia's economy, and particularly to its gross domestic product (GDP). Specifically, this industry contributed 23.7%

of Indonesia's GDP in 2013 and became one of the highest contributors of its GDP. Indonesia has also stated its long-term vision in terms of an industrial sector, in which the country plans to be “a strong industrial nation in the world” (Ministry of Industry Republic of Indonesia, 2014).

While Indonesia's economy includes many different types of industries, one of the most popular industries involves fast-moving consumer goods (FMCG). Such goods can be rapidly sold to customers at relatively inexpensive prices (Malhotra, 2014). Products categorized as FMCG include food, beverages, and household appliances (Aljunaidi and Ankrak, 2014). These goods are sold in several places in Indonesia, ranging from various types of markets—including hypermarkets, supermarkets, minimarkets, and traditional markets—to street vendors. Indonesia has several big FMCG companies, such as Mayora and Indofood, which are local companies; and Nestle and Unilever, which are multinational corporations. Overall, this sector has contributed to 18.5% of Indonesia's 2016 GDP, and is forecast to increase to 30% by 2030 (HSBC Bank, 2017).

Given FMCG's prospects in Indonesia, competition has intensified and companies face the possibility of raw material price increases in the years ahead. Therefore, high-level efficiency and satisfactory organizational performance are needed to maintain companies' competitiveness. As such, many companies in the FMCG industry have begun to use lean implementation processes to increase their efficiency and organizational performance. Such improvements in performance also result in the ability to operate with fewer employees and less inventory, but substantial increases in productivity.

1.2 Lean Implementation in Indonesia's FMCG Industry

Research on lean implementation in the FMCG industry is not new (Wambui, 2015; Aljunaidi and Ankrak, 2014). For example, Wambui (2015) discovered that lean implementation benefitted FMCG companies in Kenya. Furthermore, after several types of waste have been eliminated, the duration shortens from the time when the order is received to the time when products are delivered, leaving customers more satisfied. Past research studies have also demonstrated mixed results of the effects from lean implementation. While some studies have demonstrated positive results from lean implementation, others have revealed mixed or negative results. For example, Bondeson and Liss (2016) found that lean processes can be arduous to implement in the FMCG industry due to the production levels required in FMCG companies. Unlike the automotive industry, FMCG companies require extended setup and change-over times during production, which creates challenges during the lean implementation process (Bondeson and Liss, 2016).

Given the mixed results of lean implementation from past research studies, the key to effectively unlocking the potential in lean implementation could involve an understanding of the specific industry- and country-specific factors affecting its success. Further, while past studies have indicated that lean implementation is both applicable and beneficial in many different countries' FMCG industries (Aljunaidi and Ankrak, 2014), limited studies have specifically focused on Indonesia's FMCG industry (Bhamu and Sangwan, 2014). This study contributes to such literature by narrowing this current gap and providing insights on the factors affecting lean implementation in FMCG industry, as Indonesian companies in particular are rarely examined. This research will be useful for FMCG companies currently implementing or attempting to implement lean processes in Indonesia.

The remainder of this paper is structured as follows: Section 2 reviews pertinent literature and summarizes the studies on the factors impacting lean implementation and organizational performance. Section 3 then discusses the method used to collect and analyze the data. Section 4 presents the study's findings. Section 5 concludes with a discussion of the results, including the study's limitations, managerial implications, and suggested directions for future research.

2. LITERATURE REVIEW

2.1 Lean Implementation

Literature loosely defines the lean concept, with different authors presenting various definitions. Wilson (2010) defined "lean" tools and methods as those that aim to decrease or even eradicate wastes. Meanwhile, the lean concept can also be interpreted as a production management approach, used to increase companies' competitiveness by removing non-value-added activities (Garza-Reyes *et al.*, 2018). According to Lawal *et al.* (2014), the lean philosophy helps organizations to add value by reducing waste. The lean concept focuses on customers' requirements, employee engagement, and continuous improvement (Lawal *et al.*, 2014). Despite its varied definitions, the concept is meant to

have the same goal: to eliminate waste. In this context, waste is considered as anything that does not enhance a product's value (Alves *et al.*, 2012).

When successful, lean implementation can be used to increase efficiency by decreasing operating costs. Such costs can be reduced by decreasing cycle time and increasing productivity. (Wilson, 2010). Cycle times can be reduced by decreasing the waiting time between processes, while productivity can be increased, by maximizing workers' efforts and eliminating unnecessary movements (Kumar and Kumar, 2012). Waste elimination is also perceived as a benefit of lean implementation (Kumar and Kumar, 2012; Wambui, 2015). It enables companies to reduce all types of waste, such as defects, overproduction, wait times, and transport costs (Kumar and Kumar, 2012). Further, Wambui (2015) found that the duration shortens, from the time an order is received until the time at which products are delivered, once several types of waste have been eliminated. This leads to increased customer satisfaction. Another benefit of lean implementation is that it decreases inventory levels (Wilson, 2010; Kumar and Kumar, 2012). Implementing lean operations, enables companies to decrease all types of inventory, especially those involving works in progress. The smaller the inventory, the lower the necessary working capital (Kumar and Kumar, 2012).

While some studies have demonstrated positive results from lean implementation, others have shown negative results. Bondeson and Liss (2016) found that production conditions that are specific to the FMCG companies, such as extended setup and change-over times during production creates challenges for companies to minimize inventory (waste), which is a key condition for lean implementation process to be implemented successfully. Further, customer demand in this industry can also vary by season; in order to maximize profitability and meet customer demand, production in FMCG industry tends to occur in larger batches and involve larger quantities of inventory (Aljunaidi and Ankrak, 2014; Bondeson and Liss, 2016), which can lead to waste resulting from over production (Bondeson and Liss, 2016).

Given the mixed results of lean implementation reported in past studies, it is important to discover the factors that significantly and positively impact lean implementation so they can be properly managed. Moreover, FMCG companies must understand the critical factors that lead to a successful lean implementation to reap its benefits and ensure a smooth implementation process. This research aims to understand the factors affecting successful lean implementation, its effects on organizational performance, and best practices toward lean implementation in Indonesia's FMCG industry. This is crucial, as such implementation cannot optimally occur if companies cannot well manage its important factors. This research will be useful for FMCG companies currently implementing or attempting to implement lean processes in Indonesia.

2.2. Factors Affecting Lean Implementation

The primary reason for the lack of success in lean manufacturing, is the lack of understanding of the factors affecting lean implementation in a particular industry (Sharma *et al.*, 2014). A thorough understanding of these key success factors would enable firms to make optimal

decisions—whether in resource allocations, management, or training—and attain better lean implementation results (Wieteska, 2020; Zhang *et al.*, 2017). According to Zhang *et al.* (2017), the factors that impact lean implementation can be grouped by characteristics, into the following 10 broad areas: organizational culture, knowledge, management, conflict, resources, technology, finance, employees, customers, and past experience. In contrast, an earlier study by Jadhav *et al.* (2014), identified 24 factors affecting lean implementation. **Table 1** presents the significant factors

impacting lean implementation as discovered by various scholars. These studies were conducted on a range of industries and countries, including the FMCG industry in Saudi Arabia, the United Kingdom, and the United States (Aljunaidi and Ankrak, 2014); the logistics industry in Thailand (Punnakitikashem and Chen, 2013); French companies (Alhuraish and Robledo, 2014); the Vietnamese manufacturing industry (Dat Minh, 2018); healthcare industry (Chakraborty and Gonzalez, 2018) and IT support services (Kundu and Manohar, 2012).

Table 1 Factors Impacting Lean Implementation from Various Scholars

Critical Success Factors	Aljunaidi and Ankrak (2014)	Punnakitikashem and Chen (2013)	Alhuraish <i>et al.</i> (2016)	Dat Minh (2018)	Kundu and Manohar (2012)
Leadership		Yes			Yes
Management involvement	Yes	Yes	Yes	Yes	Yes
Organizational culture		Yes	Yes	Yes	Yes
Communication			Yes		Yes
Personnel capability			Yes	Yes	Yes
Technology utilization	Yes				
Performance evaluation			Yes		
Resource allocations				Yes	
Financial capability					Yes
Process management	Yes				

This study selected five factors to research, based on those most frequently cited and addressed in literature: organizational culture, personnel capability, communication, and leadership and management involvement. These will be further discussed in the following sections.

2.2.1 Organizational Culture

The success of lean implementation is highly determined by organizational culture (Merwe *et al.*, 2014; Pakdil and Leonard, 2015). Furthermore, Zarbo (2012) defined organizational culture as “the way employees perform their daily jobs, or how the company directs its employees’ behavior”. Organizational culture is used as a foundation for how employees interact and perform every activity (Bhamu and Sangwan, 2014).

Several scholars asserted that organizational culture positively impacts organizations’ lean implementation processes (Bhamu and Sangwan, 2014; Punnakitikashem and Chen, 2013). For example, Taherimashhadi and Ribas (2018), propose six dimensions of culture that promote lean implementation: the allocation of power, belongingness in the company, the willingness to change, performance orientation, time orientation, and the work environment. The allocation of power refers to the company’s decision-making processes, while belongingness involves employees’ emotional bond to the company. The willingness to change indicates employees’ readiness to change their regular ways of working. The performance orientation refers to the company’s perspective on success and how to assess performance improvements. The time orientation is the time needed to reach the intended results. Finally, the work environment refers to the company atmosphere, such as the friendliness among employees (Taherimashhadi and Ribas, 2018).

An ideal lean culture presents conditions in which all personnel can bolster themselves to pursue higher product quality targets by continuously improving processes (Zarbo, 2012). Other studies tested the role of culture in lean

implementation and discovered similar results (Bhamu and Sangwan, 2014) in Thailand (Punnakitikashem and Chen, 2013) as well as in the United States, the United Kingdom, and Saudi Arabia (Aljunaidi and Ankrak, 2014). Despite extensive testing in literature, less is known about the role of culture in lean implementation among Indonesia’s FMCG companies. Given the previously noted investigations, we present the following hypothesis:

H1: Organizational culture impacts lean implementation

2.2.2 Personnel Capability

A company’s personnel are vital in terms of providing desired outcomes to customers. Therefore, skillful personnel are needed when the company wants to achieve its desired results (Jeyaraman and Teo, 2010). In this study, the capability of personnel involves the skills and knowledge required to execute lean processes.

Several authors have examined various industries to posit that personnel capability affects the success of lean implementation, as it requires such necessary skills as problem-solving, project management, communication, and teamwork. Therefore, training should be provided in these areas, to develop employees’ skills. According to Puvanasvaran *et al.* (2009), skillful, trained personnel are needed to implement lean company processes, and such personnel need the capability to drive their companies toward continuous improvement.

Aside from the necessary skills, knowledge is also needed for lean implementation (Lodgaard *et al.*, 2016; Moradlou and Perera, 2017). Knowledge provides personnel with insights not only into the concept and tenet of, and the tools used in lean implementation, but also of the skills required to perform it. Lean knowledge should be understood throughout the company (Lodgaard *et al.*, 2016). Sharing knowledge within an organization is important to drive employee’s involvement in lean implementation (Moradlou

and Perera, 2017). In accordance with the previously analyzed studies, this work provides the following hypothesis:

H2: Personnel capability impacts lean implementation

2.2.3 Communication

Effective communication embraces two principles: clarity and conciseness. Furthermore, effective communication is two-fold to ensure that the recipients comprehend the purpose of the information, as well as its content. Ineffective communications can inhibit a company's desired improvements (Gifu and Teodorescu, 2014).

Puvasvaran *et al.* (2009) claimed that communication positively affects the success of lean implementation, while Jeyaraman and Teo (2010) stated that lean implementation requires frequent communication to create improvements. Alpenberg and Scarbrough (2016) found that communication is crucial as a catalyst of the manager-employee relationship in lean implementation. Staats *et al.* (2011) claimed that lean implementation requires streamlined communication to deliver information smoothly and clearly. Puvasvaran *et al.* (2009) stated that effective communication is required at all organizational levels. Communication plays a substantial role in lean implementation, due to the need for all personnel to understand the lean concept. Therefore, management must emphasize the importance of such communication (Puvasvaran *et al.*, 2009). For example, Toyota has become a successful lean company because its leaders emphasize the importance of communication (Alpenberg and Scarbrough, 2016). To support its communication practices, Toyota uses *Andon* for one worker to signal to another in asking for help (Staats *et al.*, 2011). While some authors have claimed that communication positively impacts lean implementation (Jeyaraman and Teo, 2010; Staats *et al.*, 2011; Puvasvaran *et al.*, 2009; Alpenberg and Scarbrough, 2016), Punnakitikashem and Chen (2013) argue that communication has no significant impact. This study will reveal whether communication positively and significantly impacts lean implementation in the Indonesian FMCG industry. In accordance with the previously discussed research, this study presents the following hypothesis:

H3: Communication impacts lean implementation

2.2.4 Leadership

Various authors have claimed that leadership and engagement from top management positively impact lean implementation (Simoes, 2008; Punnakitikashem and Chen, 2013; Alhuraish and Robledo, 2014). Similarly, Jeyaraman and Teo (2010) insist that lean will fail if management performs poorly. Thus, lean implementation requires both involvement and commitment from management (Punnakitikashem and Chen, 2013).

Leadership is important in achieving successful lean implementation, as proper leaders have the responsibility to

teach their employees about lean concepts and principles (Alhuraish and Robledo, 2014). Moreover, management has a duty to establish their vision and a strategic plan to drive participation and innovation from all personnel in the organization. Engagement from top management is crucial to allocate resources, make necessary decisions, resolve issues, and guide all personnel in the same direction (Simoes, 2008). Additionally, management should provide training to ensure that all personnel understand all lean methods and tools (Alhuraish and Robledo, 2014).

A lack of top management support can lead to failed lean implementation (Aljunaidi and Ankrak, 2014). Furthermore, top management has a central role in other factors, such as organizational culture. Barratt-Pugh *et al.* (2013) asserted that a company's top management and human resource department have a duty to shape and distribute lean culture throughout the organization. Management also has the responsibility to establish a culture that allows employees to make mistakes as a part of the learning process (Moradlou and Perera, 2017). This is an important aspect in successful lean implementation. In accordance with the researched outlined above, this study provides the following hypothesis:

H4: Leadership impacts lean implementation

2.2.5 Organizational Performance

Organizational performance is defined as the actual performance of the organization compared to its desired goals and performance (Almatrooshi *et al.*, 2016). This can be measured using either financial or non-financial indexes (Jenatabadi, 2015). A successful lean implementation can influence organizational performance in terms of reducing costs, improving employees' morale, enhancing customer satisfaction, increasing profits, and improving the company's branding or reputation.

Lean implementation in FMCG companies can be categorized as successful if it can improve organizational performance. This can occur either financially, by reducing costs and increasing profit, or non-financially, by increasing customer satisfaction and improving employee morale. Lean processes can also support organizational performance in terms of the company's branding. For instance, lean implementation can allow products to be delivered quicker to customers and maintain the company's reputation (Alicke and Löscher, 2010). Hence, it is crucial to discover whether lean implementation positively impacts organizational performance, and we present the following hypothesis:

H5: Lean implementation impacts organizational performance

2.3 Conceptual Framework

Figure 1 presents the conceptual framework that shows the relationships between variables that were formulated in the form of five hypotheses.

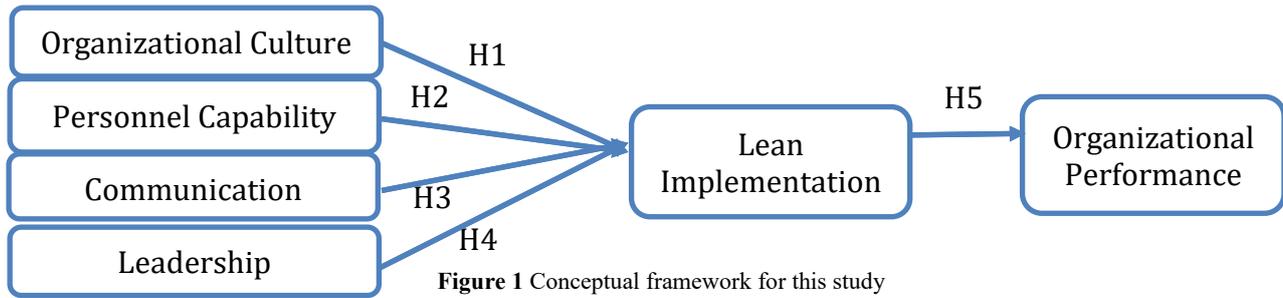


Figure 1 Conceptual framework for this study

3. METHODOLOGY

We utilize a quantitative research design to test our hypotheses. The measures used in this study were adapted from prior studies (Zarbo, 2012; Bhamu and Sangwan, 2014; Pakdil and Leonard, 2015; Puvanavaran *et al.*, 2009; Simoes, 2008; Punnakitikashem and Chen, 2013; Keitany and Riwo-Abudho, 2014; Aljunaidi and Ankrak, 2014) and modified to fit our research context. The survey consisted of 33 items that were classified under 6 constructs: organizational culture, personnel capability, communication, leadership and management involvement, lean implementation, and organizational performance. The questionnaire used a five-point Likert scale, ranging from one or “strongly disagree” to five or “strongly agree.” The questions were provided using an English and Indonesian language version, with the former primarily provided for academic purposes. The latter was provided to ensure that respondents provided the most accurate answers, as all respondents are Indonesian. Prior to distribution, the questionnaire was pre-tested by three directors from Indonesian FMCG companies who are lean operations experts. This step was conducted to assure that the questions are clear and easy to understand. The directors’ comments were incorporated into the final questionnaire’s design.

In this study, the population could be described as employees, including management who has at least 2 years of experience of working for a Indonesian FMCG company. At least 2 years of experience is needed in order for respondents to be able to understand the situation in the company and hence be able to answer all questions in the questionnaire. Background of the respondents can vary from manager, team leader, supervisor, to operator. The selected respondents should understand lean implementation in their company and capable to fill the questionnaires. Therefore, respondents are expected to come from production department, quality department, and operation department. The sampling frame include respondents working in a company within the FMCG industry who understand their company’s lean implementation and can complete the questionnaires. Responses are collected from the production, quality assurance, and operations departments within the company.

This study uses snowball sampling as the researchers were connected to only a few employees in the Indonesian FMCG industry. Saunders *et al.* (2009) observe that the primary cause for using the snowball method is limited knowledge of members of a population, and thus, it can be useful for the researcher with limited knowledge of such a population. First, the researchers’ connections were invited to complete the questionnaire via email. Subsequently, respondents were asked to suggest other members who fit the

research criteria and could complete the questionnaire. This process continued until a sufficient sample size was obtained. According to Bhasin (2012) and Salem *et al.* (2016), who researched a similar topic, we find that a sample size of 68 to 330 respondents is appropriate for this type of research. With this as a guide, we sent out the survey invitation to 150 potential respondents and obtained a total of 80 responses as our sample size for this study. This resulted in a response rate of approximately 53%, which is considered appropriate and adequate for email surveys.

We then analyzed the 80 responses using SPSS (version 26), a software program used for statistical analysis to test the questionnaire’s reliability and analyze the data, and then tested the proposed hypotheses through regression analyses (Pallant, 2005).

4. DATA ANALYSIS AND RESULTS

4.1 Reliability and Validity Analysis

We used SPSS (version 26) to perform a Cronbach’s alpha test to ensure reliability (Tavakol and Dennick, 2011). The following Table 2 indicates that all variables exhibited Cronbach’s alpha values of 0.70 or greater, indicating high internal consistency; therefore, we consider the questionnaire reliable. Measurement items used for each dimension, including mean and standard deviation is listed in Appendix A.

Table 2 Measurement Items’ Reliability

Dimension	Cronbach’s Alpha	No. of Items
Organizational Culture (H1)	0.85	6
Personnel Capability (H3)	0.77	6
Communication (H4)	0.71	4
Leadership (H5)	0.82	7
Total		
Dependent Variable: Lean Implementation (H6)	0.80	5
Dependent Variable: Organizational Performance	0.77	5

4.2 Collinearity

A multiple regression analysis is selected to test the hypotheses. Multicollinearity in the model’s independent variables was tested prior to this analysis to ensure that the assumption used in the linear regression analysis was not violated. Tolerance and variance inflation factor (VIF) values for variables are within an acceptable range (tolerance > 0.10; VIF < 10), indicating no minimal multicollinearity issues in

the regressors (Pallant, 2005). Hence, it is reasonable to conduct a multiple regression analysis.

4.3 Pearson Correlation Analysis

We propose that four factors impact lean implementation: organizational culture, personnel capability, communication, and leadership. Of these, leadership ($r = 0.93$, $p < 0.001$) has the highest correlation with the dependent variable, or lean implementation followed by organizational culture ($r = 0.90$, $p < 0.001$) and communication ($r = 0.86$, $p < 0.001$).

4.4 Hypotheses Testing

We test our hypotheses using a regression analysis with SPSS software (version 26). **Table 3** presents the results of the regression analysis. All three variables exhibit a significant relationship with failed lean implementation (Hypotheses H1 to H5), with p -values less than 0.01.

Hypothesis H1 examined organizational culture’s impact on lean implementation. This is supported ($\beta = 0.28$; $p > 0.001$, which is significant). Hypothesis H2 examined the personnel capability’s influence on lean implementation, and is also supported ($\beta = 0.19$; $p > 0.01$). Hypothesis H3 examined communication’s influence on lean implementation, and is supported ($\beta = 0.18$; $p > 0.01$). Hypothesis H4 examined leadership’s impact on lean implementation, and is supported ($\beta = 0.39$; $p > 0.001$). The beta values (β) reveal that out of all four independent variables, leadership ($\beta = 0.39$) has the greatest effect on lean implementation (dependent variable). Hypothesis H5 examined lean implementation’s effect on organizational performance and is found to be supported ($\beta = 0.87$; $p > 0.001$).

Table 3 Regression Analysis Results

Independent Variable	B	Beta	t-value
Organizational Culture (H1)	.27	.28	4.23***
Personnel Capability (H2)	.20	.19	2.80**
Communication (H3)	.19	.18	3.00**
Leadership (H4)	.40	.39	5.22***

Dependent Variable: Lean Implementation

Note: *** $p < 0.001$; ** $p < 0.01$.

Table 4 Regression Analysis Results

Independent Variable	B	Beta	t-value
Lean Implementation (H5)	.81	.87	15.54***

Dependent Variable: Organizational Performance

Note: *** $p < 0.001$.

4.5 An Integrated Model for Lean Implementation

The multiple regression analysis results indicate that all four independent variables: organizational culture, personnel capability, communication, and leadership impact lean implementation. The R-squared value of 93% indicates that 93% of the lean implementation’s variance can be explained by these four variables ($F = 238.30$, $p < 0.001$). The regression equation is presented:

Lean Implementation

$$\begin{aligned}
 &= -0.26 \\
 &+ 0.27 \text{ (Organizational Culture)} \\
 &+ 0.2 \text{ (Personal Capability)} \\
 &+ 0.19 \text{ (Communication)} \\
 &+ 0.4 \text{ (Leadership)}
 \end{aligned} \tag{1}$$

Tables 5A and **5B** display the results of the regression analysis regarding lean implementation’s effect on organizational performance. The R-squared value of 76% indicates that 76% of organizational performance’s variance can be explained by lean implementation ($F = 241.41$, $p < 0.001$).

Table 5A Regression Analysis Results

R	.87
R-Square	.76
Adjusted R-Square	.75

Dependent Variable: Organizational Performance

Table 5B Regression Analysis Results

	Sum of Squares	df	Mean Square	F
Regression	11.50	1	11.50	241.41
Residual	3.72	78	.05	
Total	15.22	79		

Dependent Variable: Organizational Performance

5. DISCUSSION

This study aimed to identify the critical success factors for lean implementation, with a focus on the Indonesian FMCG industry. Lean processes involve the tools and methods, management approach, and philosophy to reduce waste, and is used to increase companies’ competitiveness by removing non-value-added activities. As competition intensifies in Indonesia’s FMCG industry, many companies have begun to use lean implementation to increase their efficiency and organizational performance. While past studies have demonstrated that lean processes are applicable and beneficial in many different countries’ FMCG industries (Aljunaidi and Ankrak, 2014), studies have rarely focused on Indonesia’s FMCG industry (Bhamu and Sangwan, 2014). This study provides insights on the factors affecting lean implementation in the FMCG industry in an Indonesian context. This is crucial, as lean processes cannot be implemented optimally if companies do not adequately manage all important implementation factors.

This study’s findings reveal that all four tested factors positively and significantly impact lean implementation in Indonesia’s FMCG industry. Of these, leadership is the most crucial factor, followed by organizational culture. These results indicate that appropriate steps can be taken to increase the probability of successful lean implementation in the industry. Our findings also demonstrate that all four factors investigated in this study—or specifically, organizational culture, personnel capability, communication, and leadership—are vital for lean implementation to succeed in Indonesia’s FMCG industry. The following subsections will discuss the results from each of these factors in detail.

5.1 Organizational Culture

Organizational culture is found to be the second-most critical lean implementation factor, as a lean culture must be formed to ensure successful implementation of lean processes. Zarbo (2012) and Bhamu and Sangwan (2014) claim that lean culture highly emphasizes both quality and continuous improvement. This coincides with findings from Punnakitikashem and Chen (2013), Zarbo (2012), Bhamu and Sangwan (2014), and Pakdil and Leonard (2015), who posit that organizational culture positively impacts lean implementation. A failure to change the organizational culture may lead to a failed lean implementation (Simoes, 2008). Further, Zarbo (2012) noted that a lean organization should exhibit a primary culture that allows its personnel to standardize their work. Such standardization not only identifies and minimizes errors within the work process, but also reduces waste.

5.2 Personnel Capability

Our findings indicate that personnel capability positively impacts lean implementation in Indonesia's FMCG industry. This confirms the results from other authors, including Puvanasvaran *et al.* (2009), Alhuraish and Robledo (2014), Lodgaard *et al.* (2016), and Moradlou and Perera (2017). Our six measurement items used to examine the personnel capability factor revealed that employees' ability to properly use lean tools has the highest mean value, compared to other measurement items used to measure this construct. Therefore, most of the employees in the FMCG companies involved in this research, understand how to properly use lean tools. This finding parallels statements from Lodgaard *et al.* (2016), in that employees should gain insights regarding how to use lean tools. Simultaneously, this finding refutes Punnakitikashem and Chen's (2013) results, which indicated that personnel capability is not a crucial factor in lean implementation.

5.3 Communication

Our findings demonstrate that communication positively and significantly impacts lean implementation in Indonesia's FMCG industry. This finding confirms results from Jeyaraman and Teo (2010), Staats *et al.* (2011), Puvanasvaran *et al.* (2009), and Alpenberg and Scarbrough (2016). Furthermore, Puvanasvaran *et al.* (2009) claimed that effective communication is critical in lean implementation, as all employees should properly comprehend the lean philosophy. This finding also refutes results from Punnakitikashem and Chen (2013), who asserted that the communication factor does not impact lean implementation.

5.4 Leadership

As the most important factor, critical aspects of leadership should be carefully considered. Our findings reflect results from Simoes (2008), Punnakitikashem and Chen (2013), Alhuraish and Robledo (2014), and Aljunaidi and Ankrak (2014), as leaders in lean organizations are responsible for teaching lean concepts to all employees (Alhuraish and Robledo, 2014). Management involvement is also vital in several activities, such as the allocation of resources, decision-making, and organizing lean training (Simoes, 2008; Alhuraish and Robledo, 2014). Our findings are also noteworthy, in that of the four measurement items

used to measure leadership, leadership's strong influence in achieving company objectives had the highest mean among all measurement items. Therefore, most of the respondents agreed that leadership style significantly influenced their companies. According to Poksinska *et al.* (2013), a leader exhibiting a transformational style can strongly influence his or her followers to attain desired outcomes. Thus, leaders of lean organizations should embrace a transformational leadership style (Poksinska *et al.*, 2013).

Our regression analysis results also demonstrated that the leadership variable had the greatest effect among all variables. Subsequently, the success of lean implementations in Indonesia's FMCG industry is largely determined by company leadership. This result is similar to findings from Alhuraish *et al.* (2016) and Dat Minh (2018), who observed that management involvement was the most crucial factor in lean implementation, although the leadership aspect was not included in their studies. Meanwhile, Punnakitikashem and Chen (2013) noted that leadership and management involvement was the second-most crucial factor in lean implementation after organizational culture.

In contrast, this study found that organizational culture is the second-most crucial factor after leadership and management involvement, with improving customer satisfaction as the highest. Thus, the main benefit of lean implementation as perceived by the Indonesian FMCG industry is the increased customer satisfaction. According to Assen (2018), a lean, customer-oriented philosophy enables the company to meet customer requirements and deliver products on time, which will improve customer satisfaction, then employee morale. This is because using lean processes will decrease the amount of repeated work and inspections while improving teamwork (Keitany and Riwo-Abudho, 2014). Consequently, employees' morale will increase. We recommend that leaders in the Indonesian FMCG industry should escalate their focus on customer requirements as one of their lean leadership principles.

5.5 Organizational Performance

Our study's findings reveal that lean implementation positively and significantly impacts organizational performance in Indonesia's FMCG industry. This attests findings from prior authors, who claimed that lean implementation positively and significantly impacts organizational performance in terms of reducing costs (Ezeagba, 2014; Keitany and Riwo-Abudho, 2014; Aljunaidi and Ankrak, 2014), improving employee morale (Keitany and Riwo-Abudho, 2014; Eakin, 2017), enhancing customer satisfaction (Assen, 2018), increasing profits (Keitany and Riwo-Abudho, 2014), and improving the company's branding or reputation (Alicke and Lösch, 2010).

Moreover, FMCG companies commonly experience difficulty in maintaining production levels as a result of lean implementation (Bondeson and Liss, 2016). We recommend the use of linear programming to conquer this difficulty, which includes simulations, optimization, and forecasting, to manage the production-planning process (Aljunaidi and Ankrak, 2014; Bondeson and Liss, 2016). Furthermore, FMCG companies generally encounter varied demand throughout the year (Bondeson and Liss, 2016), and production tends to occur in large batches, which contradicts the lean concept. This may create large amounts of inventory

(Aljunaidi and Ankrak, 2014; Bondeson and Liss, 2016). A pricing strategy can be used to address this difficulty, such as lower prices for customers who have placed orders several months in advance (Bondeson and Liss, 2016). This will facilitate the planning of superior production methods.

6. CONCLUSION

Manufacturing industry plays a crucial role in Indonesia's economy, particularly to Indonesia's gross domestic product (GDP). Manufacturing industry contributed 23.7% of Indonesia's GDP in 2013 and became the highest contributor of Indonesia's GDP. While FMCG manufacturing is one of most lucrative industry for Indonesia, accounting for 18.5% of Indonesia's 2016 gross domestic product (GDP), the businesses in this industry faces intense competition and rising material costs (HSBC 2017; Shaaban and Awni 2014; Sujono and Novie 2017). To remain competitive, businesses explore ways to strive for maximum efficiency while at the same time minimize wasteful resources. One of the ways to achieve this is through Lean manufacturing. The present study has attempted to validate the factors critical for lean implementation, with a focus on the Indonesian FMCG industry, which was rarely studied in prior studies (Bhamu and Sangwan, 2014). This study is not without limitations. This study used a sample size of 80, which may be insufficient to represent the Indonesia FMCG industry as a whole, hence future studies could replicate this work using a larger sample size from multiple FMCG businesses across Indonesia. In addition, this study is also limited to the Indonesia context and hence the results cannot be generalized across the global FMCG industry. Future studies could conduct a cross-country comparison of the critical factors for lean implementation. Furthermore, this study focuses on testing four factors, which was insufficient to understand the Indonesia FMCG industry comprehensively. In order to provide broader insights regarding lean implementation in the FMCG industry, future studies could consider testing other factors such as business environment, supplier management, and financial capability. Nevertheless, this study provides insight into the FMCG industry in Indonesia by demonstrating four factors namely, Organizational Culture, Personnel Capability, Communications and Leadership are critical to the success of lean implementation and also provides the industry with information and measures that management can implement to achieve higher success in their lean implementation efforts.

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APPENDIX A: DESCRIPTIVE STATISTICS

		Mean	Std. Deviation
Organizational Culture			
OC1	Culture in the company emphasizes on the importance of quality	4.48	0.675
OC2	Culture in the company emphasizes on the importance of continuous improvement	4.53	0.616
OC3	Non- blame culture is applied in the company	4.56	0.633
OC4	Employees are given full authority on their job	4.59	0.724
OC5	Employees are allowed to create standardization of their work	4.70	0.624
OC6	Employees are allowed to improve their ways of working	4.55	0.593
Personnel Capability			
PC1	Lean training is provided by the company	4.50	0.616
PC2	Employees have problem solving skill	4.54	0.635
PC3	Employees have project management skill	4.54	0.728
PC4	Employees have solid teamwork	4.56	0.613
PC5	Employees are capable to use lean tools properly	4.59	0.610
PC6	Employees have adequate knowledge about lean concept	4.55	0.549
Communication			
C1	Communication among staffs is carried out routinely and effectively	4.60	0.608
C2	Communication between managers and staffs is conducted consistently	4.58	0.652
C3	Employees clearly understood content of the information delivered	4.59	0.567
C4	The company uses certain tools such as andon as a signal to support communication	4.55	0.571
Leadership			
L1	Management shapes and distributes lean culture throughout the organisation	4.56	0.709
L2	Management supports various investments for the purpose of lean implementation	4.54	0.674
L3	Management establishes vision and strategic plan regarding quality improvement	4.51	0.595
L4	Managers or leaders have a strong influence to their subordinates in achieving desired objectives	4.58	0.652
L5	Management frequently visits production floor to check production processes	4.56	0.672
L6	Management has commitment to develop skills and knowledge of the employees continuously	4.48	0.616
L7	Management focuses on customer's requirements	4.44	0.653
Lean Implementation			
LM1	Lean implementation has reduced number of defective products	4.51	0.616
LM2	Lean implementation has decreased cycle time	4.66	0.550
LM3	Lean implementation has reduced level of inventory	4.64	0.641
LM4	Lean implementation has reduced the number of over production	4.53	0.656
LM5	Lean implementation has increased productivity of the employees	4.53	0.693
Organizational Performance			
OP1	Company's cost has diminish as a result of lean implementation	4.51	0.574
OP2	Employee's morale has improved as a result of lean implementation	4.55	0.614
OP3	Customer satisfaction has enhanced as a result of lean implementation	4.58	0.612
OP4	Company's profit has increased as a result of lean implementation	4.54	0.572
OP5	Branding or reputation of the company has improved as a result of lean implementation	4.54	0.655

Rio Kharisma Tanudiharjo is an industrial engineer who has strong interest in data analysis and research. His research interest include Lean implementation, Automation of Data Processing and Dashboard Design. He had working experience in a multinational tobacco company in Indonesia and had since obtained his MSc in Engineering Business Studies from the University.

Florence Ng Jia Yun (Dr) is a lecturer at Ridge View Residential College, National University of Singapore. She was previously teaching at Coventry University (Singapore Campus) where this work was conducted. She obtained her Ph.D from Monash University, Australia specializing in Business Marketing. She has published several International Journals and presented several papers at International Conferences in South Korea and Australia. Her primary areas of interest include E-commerce, Consumer behavior, Research Methodology and Lean Implementation.

John Heng Aik Joo (Dr) is the Assistant Head of School from the School of Postgraduate Studies and course director in PSB Academy for MSc Engineering Business Management and MBA Global Business for Coventry University. He obtained his Professional Doctorate from Central Queensland University, Australia, specializing in Supply Chain and Logistics Management, Engineering Business Management and Global Business. His primary areas of interest include Understanding of the Artificial Intelligence, Research Methodology, Entrepreneurship, Global Lean and Agile Management, and Continuous Learning and Improvement Initiative.

Ivan C. Arokiam (Dr) is an Assistant Professor and course director for Part Time BSc Engineering students at Coventry University. Ivan's areas of expertise include Agile/Lean manufacturing, Production planning, Manufacturing process and Simulation. He has taught both post and undergraduate students in these areas and also carried out applied research around production optimization. Ivan's applied research has been mainly through ERDF projects and he was also the principal investigator/project director of one of the main grant – Performance Improvement Initiative.