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Importance of Employee Participation in Lean Thinking and Their Competency Towards Employee Innovative Behaviour

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Importance of Employee Participation in Lean Thinking and Their Competency towards Employee Innovative Behaviour

Importance
of Employee
Participation in
Lean Thinking

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Abstract

Research Aims - The process of innovation is complex and involved various stage which required employees to have an innovative behaviour. Underpinned by social exchange theory, this study examines how employee participation in Lean Thinking influence the employees' innovative behaviour. We also examine the possibility that competency moderates this relationship.

Design/Methodology/Approach - Measurements from previous studies were adapted in developing the questionnaire and data were analysed using the Partial Least Squares (PLS) approach.

Research Findings - The results showed that there is a positive relationship between employee participation in Lean Thinking and employee innovative behaviour, and a positive relationship between employee competency and employee innovative behaviour. However, employee competency does not moderate the relationship between employee participation in Lean Thinking and employee innovative behaviour.

Theoretical Contribution/Originality - This study enhanced the social exchange theory by proving that employees are motivated to perform more than their duties and results into innovative behaviour when they are encouraging to participate in Lean Thinking.

Managerial Implications in the Southeast Asian Context - Managers should keep encouraging employee to participate in Lean Thinking and give empowerment for decision making which could engender employee innovative behaviour.

Research Limitations and Implications - The main limitation is the insignificant moderating effect of employee competency. Therefore, we recommend that researchers use psychological variables such as psychological empowerment and psychological ownership.

Keywords - Employee Participation, Employee Competency, Lean Thinking, Employee Innovative Behaviour

INTRODUCTION

In order for organisation to survive in a vitality, uncertainty, complexity and ambiguity (VUCA) environment, they need to innovate continuously. Innovation is a necessary requirement for organisational effectiveness and for seeking new solutions to product, services as well as new and better solutions to the process. Innovation not just emphasizes on generating new ideas, but also transformation of ideas, information and knowledge to improve competitiveness and sustained competitive advantage (Cekmeclioglu & Ozbag, 2016). Innovation is based on the good ideas of employee; therefore, organisations increasingly expect their employee to have the innovative behaviour. Previous researcher disclosed that innovation and innovative behaviour terms are often mixed with each other when describing phenomena.

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However, innovative work behaviour involves employee engaging in behaviour that lead to innovation. Employee innovative behaviour is a process consisting of multiple phase involving a set of behaviours which involve idea creation, as well as support seeking from others and idea realization (Janssen, 2000).

Although there is a significant amount of empirical evidence identifying the antecedents of employee innovative behaviour in organisations, there is still a need for more research on predictors (Hammond, Neff, Farr, Schwall & Zhao, 2011). In recent review by Anderson, Potocnik & Zhou (2014), they called for more research to broaden the understanding of individual innovation in organisations. Prior researches focused on a broad framework of factors contributing to employee innovative behaviour, such as innovation climate, task variety, job characteristics, social support, psychological contracts, work motivation, self-efficacy (Chen, Farh, Campbell-Bush, Wu & Wu, 2013; Thurlings, Evens & Kermeulen, 2014) and knowledge skill (Birdi, Leach & Magsdley, 2014). Addressing this gap in the literature, we would like to examine the effect of employee participation in best practices i.e. Lean Thinking that could motivates individuals to have an innovative behaviour.

Employees are the main resources and anchor for the sustainable success of the Lean Thinking (Balle & Regnier, 2007; Kosuge, Holm, Modig & Ahlstrom, 2009). There will be no quality improvement without ideas, effort and participation from all levels of employee. Therefore, individual employees are encouraged to participate and take responsibility for the implementation of Lean Thinking in terms of carrying out activities, which meet the requirements of their internal and external customers (Julien & Tjahjono, 2009). Previous researchers revealed that employee participation will give a significant impact in most of the outcomes such as wellbeing, satisfaction, work quality and performance. In general, employee participation is the process of participated in decision making throughout the firm (Busck, Khudsen & Lind, 2010), rather than simply acting on orders.

In Lean Thinking, trainings are provided which will enable employee to learn precise skills and knowledge as a means of achieving positive results (Dombrowski, Mielke & Schulze, 2011; Julien & Tjahjono, 2009). The training approach will make employee feel a greater sense of autonomy, value, and confidence within their work (Wong, 2005). Drawing on the social exchange theory, we assumed that, with the organisation's effort in fostering employee participation and skills development, employees are enthusiastic to give their best in organisation performance. Therefore, it is expected that the employee participation in Lean Thinking will possibly contribute to employee innovative behaviour. However, the success will not only depend on the employees' participation but must have the right match of competency to accomplish the task (Kavitha, Vasugi & Murugadoss, 2010). As such, in this paper we intend to propose and empirically validate a framework that examines the employee participation in Lean Thinking and their competency on employee innovative behaviour. In addition, we also would like to examine the employee competency as a moderator to the relationship between employee participation in Lean Thinking and employee innovative behaviour.

LITERATURE REVIEW AND HYPOTHESES

Employee Innovative Behaviour

Innovation has been acknowledged as a key driver of organisation growth and competitive advantage. (Amabile, 1988; Korzilius, Bucker & Beerlage, 2017; McGuirk, Lenihan & Hart, 2015). Employees have been recognized as the important sources of innovation in most organisations; therefore, their innovative behaviours are crucial to organisational innovation (Agarwal, 2014; De Spiegelaere, Van Gyes & Van Hootegeem, 2016). In other words, if the employee is contributing significantly in developing new ideas related to product, services, and the process, the employee is seen as an innovator and possess innovative behaviour. Thus, top management have to put full effort to encourage innovative behaviour of employees (Abdullah, Omar & Panatik, 2016).

Innovative behaviour is the result of a comprehensive set of behaviours associated with idea creation, idea support and idea implementation (Janssen, 2000). The employee innovative behaviour can be defined as their ability to generate new ideas and implementation of these ideas on job-related tasks which benefit the organisation performance (Akram, Lei, Haider & Hussain, 2018; Scott & Bruce, 1994). Employee innovative behaviour is a process containing three steps - the first step is the identification of a problem and solving that problem through an existent solution, an adopted one or a completely new solution. In the second step, the employee seeks support and sponsorship for their innovative idea within or outside the organisation. Final step is the implementation stage, in which employee prototypes the idea that can be put into production (Scott & Bruce, 1994, pp. 581).

The number of determinants which are included into the field of analysis in relation to employee innovative behaviour has been constantly increasing and continues to arouse the scholars' interest. Both the organisational (Janssen, 2000) and individual determinants have been undergoing empirical verification. According to Wang & Zhu (2018), the main factors affecting employee's innovative behaviour include individual factors, leadership factors, organisational factors, job characteristics factors, team factors and human-environment interaction factors. However, not many studies have tackled innovation from an individual perspective (Perez-Penalver, Aznar-Mas & Montero-Fleta, 2018). Individual factors mainly focused from the aspects of cognitive abilities, personality, motivation, knowledge and psychological factors (Batra & Vohra, 2016; Wang & Zhu, 2018).

Recently, many studies have tackled innovation from individual perspective. There is a lot of talent among employees (Marin-Garcia, Aznar-Mas, & Gonzalez-Ladron, 2011), some of the employees are able to think outside the box and openness, some may have a critical and creative thinking with a positive mood towards innovative behaviour, and in contrast some of them are averse to taking risks (Parzefall, Seeck & Lappanen, 2008), Therefore, the important task for the top management is to manage them because the success of many organisations may be in the hands of those innovators. According to Nieves and Quintana (2018), employees with high levels of knowledge, abilities and experience are a source of new ideas for organisa-

tion. These types of employees have a greater flexibility in acquiring new knowledge and combining with their existing knowledge to produce new ideas.

Some insight into the impact of training and employee participation which may enhance the individual aspects such as knowledge, experience, abilities and motivation. The training designed by organisation might involve creativity requirements (Fischer, Oget, & Cavallucci, 2015) which will encourage employees toward innovative behaviour. Training provided by the organisation basically have two folds, which benefited the organisation as it will provide a skilled workforce as well as for employee career development (Wong, 2005) that inspire them to be more innovative. Moreover, employee innovative behaviour is more motivated when they are given opportunity to participate in organisation practices (Bhatnagar, 2012). Employee participation will create employees' dedication and absorption to work (Bhatnagar, 2012), thus may positively influence employee innovative behaviour. Besides, employee felt the work is very interesting when they are being involved. Employee participation are given more autonomy and have more control in the decision-making process which will leads to more innovative behaviour (Li & Hsu, 2016). Furthermore, the discretion given will makes employee feel a sense of trust from the organisation and develop more confidence in finding creative approaches and stimulating employee innovative behaviour (Dorenbosch, Van-Engen & Verhagen, 2005).

Employee Participation in Lean Thinking

Lean Thinking is a set of principles associated to the reduction of waste within the flow of internal organisational operations. The purpose of Lean Thinking is to create a value-added operation in product and service as defined by the customer (Womack & Jones, 2013). It provides a way to do 'more and more with less and less', that is less equipment, less time, less space while coming closer and closer in providing what customers exactly want (Womack & Jones, 2003). There are five principles in Lean Thinking. First, is the Value - value is not just the end product, but also the chain of processes that take place in order for an end product to be delivered to the customer; second principle is Value Stream - value is identified through value stream mapping, the processes that are driven with customer expectations in mind and designed to be efficient and to eliminate waste; the third principle is Flow - the efficiency of the process that transforms raw material into an end product. The goal is to provide a continuous flow with *Muda* (the Japanese word for "waste") minimized; fourth, Pull - the "pull" concept states that nothing should be built until a customer "pulls" the product or service down the value stream; and the fifth principle is Perfection - in this perfect state, the true benefits are recognized and realized (Womack & Jones, 2003).

The most important aspect for a solid foundation of every steps in Lean Thinking is the need for a highly skilled employee that is able to learn advanced techniques and to build a more creative thinking (Kosuge et al., 2009). Therefore, employee participation is one of the critical success factor of Lean Thinking implementation (Balle & Regnier, 2007; Kosuge et al., 2009) and their active participation is required for

fulfilling organisation continuous improvement (Jorgensen, Boer & Gertsen, 2004). In Lean Thinking, employees are considered as a resource that is needed to be developed through training in order to be able to meet the criteria of the five principles in Lean Thinking (Balle & Regneir, 2007). Paradigm shift must take place in the mind of employees because this quality practices involves more systematic way of thinking (Bagley & Lewis, 2008). Lean Thinking principles require employees to think creatively in order to identify the value of customers and make appropriate improvement counter measures to reduce waste in a process workflow (Womack & Jones, 2003).

Japanese often consider employees as the asset of the organisation as they are the ones who execute the process every day, and know the weaknesses and improvement opportunities at first hand. According to George (2003), “...no one knows the job better than those who do it”, which means that employees who have experienced in their work may have a better understanding of their work compared to others. Employee participation is a process that allows the employee to exercise some control over their work and the conditions under which they work (Strauss, 2006). Employees are given the opportunity to discuss issues relating to their work which will influence managerial decisions (Sofijanovna & Chatleska, 2013). They are encouraged to participate in the process of making decisions, which have a direct impact on the success of Lean Thinking (Dombrowski et al., 2011).

Employee Participation in Lean Thinking and Employee Innovative Behaviour

Previous research has shown that employee participation plays a positive role not just in practices related to quality but to other aspect such as organisational efficiency (Knudsen, Busck & Lind, 2011) and organisational commitment (Bhatti, Nawab & Akbar, 2011). Besides, a study by Kalleberg, Nesheim & Olsen (2009) suggests that employee participation is associated with more good than bad outcomes for employees such as promotes workers’ health (Knudsen et al., 2011), increases performance of work (Gallie, 2013), reduces job-related stress and correlates with skill development positively (Kalleberg et al., 2011).

Thus, employee participation may have dual positive impacts that is on the organisational outcome and employee well-being. Employee participation can influence either organisational outcome or employee well-being directly; or can influence one of the variables through the other variable (Franca & Pahor, 2014). In this study, we examine the impact of employee participation on their self-development through Lean Thinking. We expected that by providing appropriate training and knowledge sharing of Lean Thinking will increase employees’ thinking skill in their work process. With the continuous development of employees, it may provide a valuable contribution to the organisation. Besides developing multi-skilled employees, training will provide a creative environment where employees are always ready to make continuous improvements (Boyer, 1996).

Even though, the effects of Lean Thinking on employees were rarely discussed or measured systematically, but there were some indications of positive effects on

employees (Holden, 2011). Underpinned by Social Exchange Theory, we assumed that there is a social interaction behaviour when employees are encouraged to participate in Lean Thinking and as a reciprocal to the opportunity given, they are motivated to be more innovative. Nevertheless, when employees participate in Lean Thinking, they are actually improving their thinking process and leading them to be more creative. In addition, participating in decision making related to Lean Thinking may also create enhancement towards job experience (Han, Chiang & Chang, 2010) which can satisfy human growth needs and increase motivation towards positive attitudes (Kalleberg et al., 2011).

Furthermore, employee participation in decision making and problem solving will increase autonomy in work processes and empowerment of employees to use their input towards achieving higher performance (Sofijanovska & Chatleska, 2013). Therefore, employee participation enhances empowerment and empowerment in turn enhances employee innovative behaviour (Rhee, Seog, Bozorov & Dedahanov, 2017; Sibert, Wang & Courtright, 2011). Similarly, Amabile (1988) indicated that as the result of empowerment, employees feel that they have autonomy and will be more creative. Therefore, we assumed that in the case of employees having higher level of control over their task, they become enthusiastic (Sibert, Wang & Courtright, 2011) to generate new ideas that indicated a higher level of innovative behaviour.

Hypothesis 1: There is a positive relationship between employee participation in Lean Thinking and employee innovative behaviour.

Employee Competency and Employee Innovative Behaviour

According to Spencer and Spencer (1993, pg. 9) competency can be defined as “...an underlying characteristic of an individual that is causally related to criterion-referenced effective and superior performance in a job”. In other words, competency is a person required characteristic in performing a given task and it could be a capability, knowledge, skills as well as personal qualities (Cardy & Selvarajan, 2006). Employee must know what skills are defined for the tasks given and be able to match with the competencies they owned. In relation to innovation, employee competence is a key factor in the development of new products and in adapting to market changes (Marsh & Stock, 2006).

Hypothesis 2: There is a positive relationship between employee competency and employee innovative behaviour

Recent studies extend the existing knowledge in employee participation by examining the moderating effect on the relationship between employee participation and outcome variables (Rafiei & Pourreza, 2013). The moderation perspective specifies the varying effects of the independent variable on the dependent variable. Thus, moderators are used when a predictor is more strongly related to an outcome (Baron & Kenny, 1986). Although there are conceptual and empirical reasons to expect that employee participation in Lean Thinking will be positively related to the em-

ployee innovative behaviour, we assumed that the strength of this relationship will be determined by the level of competency that the employees owned. Furthermore, according to Houtzagers (1999), employee competency is among the internal tools that support employee participation and empowerment. Hence, when considering the moderating effect of employee participation in Lean Thinking, it is assumed that the high level of employee competencies will result in a stronger relationship between employee participation in Lean Thinking and employee innovative behaviour than when there is a lower level of employee competency.

Hypothesis 3: Employee competency will moderate the relationship between employee participation in Lean Thinking and employee innovative behaviour such that the relationship is stronger for high employee competency than for low employee competency.

RESEARCH METHOD

Sample and procedure

Data were collected using convenience sampling that were distributed to employees from public and private service organisations in Selangor. Three hundred self-response questionnaires were used for data gathering. The questionnaires were personally distributed to the Human Resource Department and were collected after 2 weeks. A total of 214 questionnaires were returned and used for the analysis; equivalent to about 71.3% response rate. In terms of demography, majority of the respondents were female (68%), married (55%), and Malay (61%). The average age was 30-40 years old and average organisation tenure was 5-10 years. About 88% of the respondents were full-time employees and well educated with 70% had their Bachelor Degree.

Measurement

A structured questionnaire was developed to the three main variables in this study, i.e. employee participation in Lean Thinking, employee competencies and employee innovative behaviour. Participants responded to all questionnaire items for these measures using a rating scale ranging from 1 (disagree/ never) to 5 (agree/ always). Employee participation in Lean Thinking was measured using questions adapted from the principles of Lean by Womack and Jones (2003) and blended with employee participation questions from study done by Gallie (2013). Respondents have to indicate the frequency with which their participation in the Lean Thinking process described in each item using 5-point scale: (1) never to (5) always. “Your

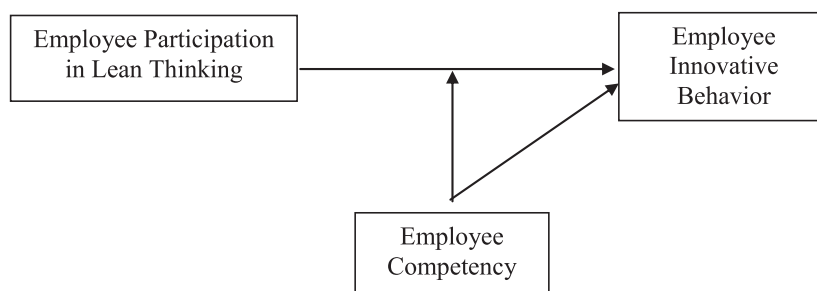


Figure 1
Research Framework

participation in understanding value from the perspective of customers” and “Your participation in decision making related to continuous improvement” are representative items.

Employee competency was measured using the 17-item scale from study done by Ryan, Spencer and Bernhard (2012). The response scale ranged from (1) never to (5) always. “Achievement orientation” and “Interpersonal understanding” are representative items. Meanwhile, the employee Innovative behaviour consisted of four items completed by each of the employees (self-rated). This measurement was adapted from Scott and Bruce (1994). Employees rated the degree to which they 1) searched out new technologies, processes, techniques, and/or product ideas; 2) generated creative ideas; 3) promoted and championed ideas to others; and 4) were innovative in general. Cronbach’s alpha for this scale was .86 and .84 respectively.

Data analysis

Data were analysed using 214 cases obtained from the survey. Of these numbers, only 209 cases were usable for further analyses. 5 cases were removed due to the presence of univariate and multivariate outliers. Results of preliminary analyses show that no further issues at data screening process were found except the distribution of employee competencies construct was skewed ($z = 4.577$).

To test the model and the hypotheses, partial least squares structural equation modelling (PLS-SEM) approach was used with the aid of SmartPLS 3 (Ringle, Wende & Becker, 2015). This soft-modelling approach was used because one of the variables used in this study has skewed distribution. According to Henseler, Ringle and Sinkovics (2009), PLS-SEM is a suitable statistical data analysis technique to be used when data exhibit non-normal distribution. In addition, this study was intended to test a moderating¹ hypothesis, which is done by creating an interaction effect using a continuous moderating variable. Unlike covariance-based structural equation modelling, PLS-SEM allows one to test the continuous moderation without losing information (Hair, Hult, Ringle & Sarstedt, 2014). Hence, PLS-SEM is an optimal data analysis approach for our study.

PLS-SEM involves two stages of assessment, which are measurement model assessment and structural model assessment. The assessment criteria for measurement model depend on the type of constructs used in the study; either reflective constructs or formative constructs (Hair et al., 2014). In this study, all constructs were modelled as reflective constructs. Therefore, four assessment criteria were used following Hair et al.’s (2014) suggestion. Specifically, we first examined the indicator reliability as Hair et al. (2014) suggested an indicator loading of 0.708 or higher as the cut-off value so that a reliability of 0.50 is obtained when the indicator loading is squared. Next, we identified the internal consistency reliability by examining the composite reliability and the Cronbach’s alpha value. The suggested cut-

¹ Although the distinction between interaction effect and moderating effect is debatable, the two terms were used synonymously in our study. See Preacher (2015) at <http://quantpsy.org/interact/interactions.htm> for details.

off value for internal consistency reliability is 0.70 for both approaches. To examine the model's convergent validity, we assessed the average variance extracted (AVE). The suggested cut-off value is 0.50, which indicates that at least 50% of the variance in an indicator's variance is explained by the construct to which it is assigned.

The last criterion used in assessing our reflective measurement model is discriminant validity. This criterion is assessed at two levels. At the indicator level, we examined the cross-loadings. An indicator should load highly on its respective construct to which it is assigned to than on any other constructs in the model; hence, indicating discriminant validity at the item level (Henseler et al., 2009). At the construct level, we used the Fornell-larcker criterion to compare the square root of a construct's AVE against its correlations with other constructs. Results should indicate that the square root of AVE is higher than the construct's correlations with other constructs in the model; thus, establishing discriminant validity at the construct level (Hair et al., 2014). These common approaches, however, do not reliably establish discriminant validity in a reflective measurement model (Henseler, Ringle & Sarstedt, 2015). As such, we also examined the heterotrait-monotrait ratio of correlations, or HTMT criterion, as suggested by Henseler et al. (2015), in establishing discriminant validity.

Once a reliable and valid measurement model is established, one should proceed with assessing the structural model. There are five assessment criteria of a structural model, which include determining the size and significance of path coefficients, assessing coefficient of determination (R^2), assessing predictive relevance (Q^2), identifying f^2 effect size, and identifying q^2 effect size. Bootstrapping procedure with 5,000 resamples was used in our study to identify significance of the paths. The blindfolding procedure, on the other hand, was used to determine model's predictive relevance. If the result shows a value above zero, then predictive relevance of the model is established (Hair et al., 2014).

RESULTS AND DISCUSSION

Three constructs were used in this study, which are employee participation in Lean Thinking (i.e., independent variable), employee competency (i.e., moderating variable) and employee innovative behaviour (i.e., dependent variable) with 10, 17, and 4 indicators, respectively. Table 1 shows the indicator loadings for each construct before items removal. According to Hair et al. (2014), indicators should load highly on its constructs, at least of 0.708 in value. They further suggest that any value that falls short of this cut-off value but is above 0.40 should be considered for removal only if such removal increases the composite reliability above the cut-off value and it does not affect the content validity. The authors also suggest eliminating any indicator loadings of 0.40 and below because it is too low. Table 2 shows that eight indicators were removed from the measurement model. These indicators had loadings in between 0.40 and 0.70 but the decision to remove them was made on the basis that there is a need to increase the AVE value of the affected constructs above the cut-off value of 0.50.

The summary of PLS algorithm results is shown in Table 3. Whereas 48% of the indicator reliability values are above 0.50, the remaining indicators are below the cut-off value. One indicator, EC_14, has an indicator reliability of 0.363. Although the reliability values of these indicators are low, the outer loadings are relatively high. Furthermore, we decided to retain these indicators because the composite reliability values for the constructs are well above the suggested cut-off value. In addition, these indicators were retained to ensure that the content validity of the constructs is not affected by unnecessary item removal. The internal consistency reliability of the constructs is well above the cut-off value of 0.70. That is, the highest obtained composite reliability is 0.928 for employee competency and the lowest obtained composite reliability is 0.868 for lean thinking. Cronbach's alpha values also show good reliability, ranging from 0.820 to 0.919. All AVE values are above 0.50, with the lowest AVE value of 0.501 for employee competency. Therefore, convergent

Indicators	Lean thinking	Employee competency	Innovative behavior
LT_1	0.737		
LT_2	0.702		
LT_3	0.579		
LT_4	0.646		
LT_5	0.575		
LT_6	0.566		
LT_7	0.697		
LT_8	0.719		
LT_9	0.329		
LT_10	0.754		
EC_1		0.654	
EC_2		0.764	
EC_3		0.657	
EC_4		0.662	
EC_5		0.639	
EC_6		0.696	
EC_7		0.595	
EC_8		0.714	
EC_9		0.511	
EC_10		0.659	
EC_11		0.634	
EC_12		0.804	
EC_13		0.695	
EC_14		0.616	
EC_15		0.678	
EC_16		0.614	
EC_17		0.574	
IB_1			0.851
IB_2			0.854
IB_3			0.836
IB_4			0.838

Table 1
Indicator loadings before items removal

Note. LT = Lean Thinking indicator, EC = employee competency indicator, IB = innovative behavior indicator.

Construct	Category	No. of items before deletion	No. of deleted items	No. of items remain after deletion
Lean thinking	Reflective	10	4 (LT_3, LT_5, LT_6, LT_9)	6
Employee competency	Reflective	17	4 (EC_7, EC_9, EC_16, EC_17)	13
Innovative behavior	Reflective	4	–	4

Table 2
Number of items deleted and number of items remained after deletion

validity is established in this study.

Measurement model results also support the discriminant validity of this study. Table 4 shows the cross-loadings of the measurement model. All indicators load high-

Construct	Code	Outer loadings	Indicator reliability	α	CR	AVE				
Lean thinking	LT_1	0.765	0.585	0.820	0.868	0.524				
	LT_2	0.733	0.537							
	LT_4	0.675	0.455							
	LT_7	0.683	0.466							
	LT_8	0.685	0.469							
	LT_10	0.795	0.632							
Employee competency	EC_1	0.665	0.443	0.919	0.928	0.501				
	EC_2	0.792	0.627							
	EC_3	0.703	0.495							
	EC_4	0.691	0.478							
	EC_5	0.644	0.415							
	EC_6	0.753	0.567							
	EC_8	0.738	0.544							
	EC_10	0.665	0.442							
	EC_11	0.698	0.488							
	EC_12	0.793	0.628							
	EC_13	0.706	0.498							
	EC_14	0.602	0.363							
	EC_15	0.724	0.524							
	Innovative behavior	IB_1	0.850				0.722	0.866	0.909	0.714
		IB_2	0.852				0.726			
IB_3		0.839	0.704							
IB_4		0.838	0.702							

Note. LT = Lean Thinking indicator, EC = employee competency indicator, IB = innovative behavior indicator.

Indicators	Lean Thinking	Employee competency	Innovative behavior
LT_1	0.765	0.297	0.536
LT_2	0.733	0.266	0.515
LT_4	0.675	0.246	0.495
LT_7	0.683	0.297	0.331
LT_8	0.685	0.307	0.381
LT_10	0.795	0.205	0.535
EC_1	0.139	0.665	0.128
EC_2	0.232	0.792	0.352
EC_3	0.101	0.703	0.214
EC_4	0.218	0.691	0.329
EC_5	0.011	0.644	0.158
EC_6	0.331	0.753	0.221
EC_8	0.490	0.738	0.363
EC_10	0.230	0.665	0.149
EC_11	0.214	0.698	0.105
EC_12	0.325	0.793	0.314
EC_13	0.237	0.706	0.170
EC_14	0.293	0.602	0.348
EC_15	0.232	0.724	0.161
IB_1	0.561	0.302	0.850
IB_2	0.534	0.308	0.852
IB_3	0.536	0.316	0.839
IB_4	0.589	0.344	0.838

Note. LT = Lean Thinking indicator, EC = employee competency indicator, IB = innovative behavior indicator.

Table 3
Constructs, items, indicator loadings, internal consistency reliability, and average variance extracted

Table 4
Cross-loadings

ly on their respective constructs than on other constructs, indicating an evidence of discriminant validity at the item level. Table 5 shows the results of Fornell-Larcker criterion. The square root of AVE for each construct is higher than the construct's correlations with other constructs. Hence, it indicates that discriminant validity at the construct level is established. Following the suggestion made by Henseler et al. (2015), we also examined the HTMT criterion in establishing discriminant validity for PLS-SEM measurement model. Results presented in Table 6 show sufficient support for $HTMT_{.85}$, whereby all values are below than 0.85. This indicates that there is no issue of lack of discriminant validity in the measurement model. The $HTMT_{inference}$ criterion further suggests that the constructs are empirically distinct.

Having established a valid and reliable measurement model, we continued with structural model assessment. Three procedures were used to obtain results for structural model assessment, which are the PLS algorithm procedure, the bootstrapping procedure (with 5,000 resamples), and the blindfolding procedure. Figure 2 shows the results of structural model without the interaction effect (Figure 2a) and the results of structural model with interaction effect (Figure 2b).

In Figure 2a, the coefficient of determination, R^2 , for the model is 0.455, which indicates that 45.5% of the variance in employee innovative behaviour construct is explained by the predictors of the model. Both paths are significant with the path linking employee participation in Lean Thinking to employee innovative behaviour having a larger size and is more significant than the path linking employee competency and innovative behaviour. By adding an interaction effect, the coefficient of determination, R^2 , increases to 0.512 as shown in Figure 2b. Results, however, show that only employee participation in Lean Thinking is a significant predictor of employee innovative behaviour. Neither employee competency nor the interaction between employee participation Lean Thinking and employee competency is significant.

In PLS-SEM, one has to assess a model's predictive relevance using Stone-Geisser's Q^2 (Hair et al., 2014). By using blindfolding procedure with an omission distance of 7, we evaluated how accurately PLS-SEM model predicts the data points of indicator in a reflective endogenous construct (i.e., innovative behaviour). Results show that the Q^2 value for a model without the interaction effect is 0.319 and the Q^2

Table 5
Square root of average variance extracted and correlations among constructs

Constructs	Lean Thinking	Employee competency	Innovative behavior
1 Lean Thinking	0.724	–	–
2 Employee competency	0.365	0.708	–
3 Innovative behavior	0.658	0.376	0.845

Note. Values in diagonal show the square root of average variance extracted.

Table 6
HTMT results

	Participation in Lean Thinking	Employee Competency	Employee Innovative Behavior
Participation in Lean Thinking	–	–	–
Employee competency	0.390 CI ₉₀₀ [0.224,0.550]	–	–
Innovative behavior	0.760 CI ₉₀₀ [0.667,0.848]	0.364 CI ₉₀₀ [0.226,0.491]	–

value for a model with the interaction effect is 0.353. Because these Q^2 values are greater than zero, both models exhibit good predictive relevance.

Other important criteria to be evaluated in PLS-SEM model are the effect sizes, f^2 and q^2 . The effect size, f^2 , is calculated to assess the relative impact of a predictor on the outcome variable, and the effect size, q^2 , is calculated to assess the relative impact of predictive relevance (Hair et al., 2014). The equations used to calculate both effect sizes are shown below

$$f^2_{\text{predictor} \rightarrow \text{outcome}} = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}} \quad (1)$$

where R^2_{included} is the coefficient of determination obtained by including all predictors into the model and R^2_{excluded} is the coefficient of determination obtained by excluding a predictor, which its impact is being assessed.

$$q^2_{\text{predictor} \rightarrow \text{outcome}} = \frac{Q^2_{\text{included}} - Q^2_{\text{excluded}}}{1 - Q^2_{\text{included}}} \quad (2)$$

where Q^2_{included} is the predictive relevance value obtained by including all predictors into the model and Q^2_{excluded} is the predictive relevance value obtained by excluding a predictor, which its impact is being assessed.

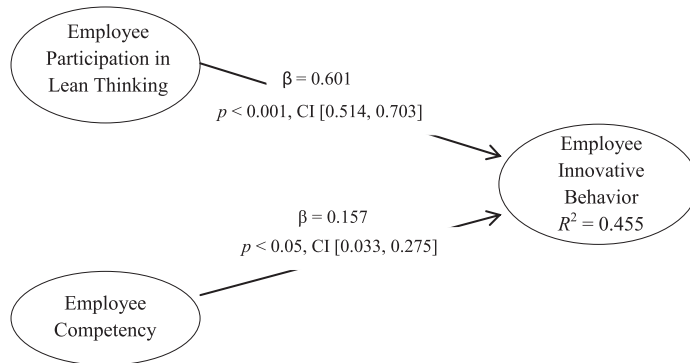


Figure 2a
Structural model without
interaction effect

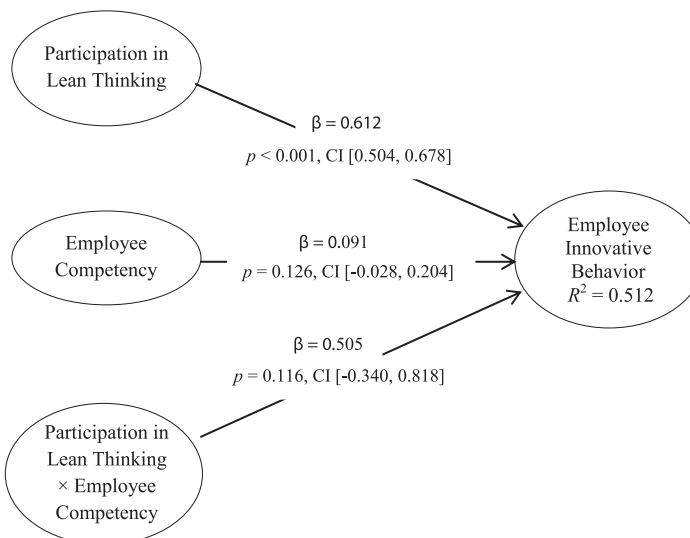


Figure 2b
Structural model with
interaction effect

According to Hair et al. (2014), results of the effect size could be large (i.e., 0.35), medium (i.e., 0.15) or small (i.e., 0.02). Table 7 shows the results of the effect sizes, f^2 and q^2 , with and without the interaction construct in the model. The f^2 effect size for Lean Thinking is large in both models because the effect size values are greater than 0.35. Employee competency, however, has a medium f^2 effect size in both models. Similarly, the interaction construct has medium effect size, f^2 , of 0.117. Hence, Lean Thinking has more impact on innovative behaviour than other constructs in both models. In terms of q^2 effect size, only Lean Thinking in the model with interaction has a large effect size. In the model without interaction, Lean Thinking has a medium q^2 effect size of 0.326. Similarly, employee competency construct and the interaction construct in the model with interaction have medium q^2 effect sizes. Only employee competency construct in the model without interaction has a small q^2 effect size of 0.019.

There are three hypotheses in our study; whereby two of the hypotheses were intended to be assessed as main effects and only one hypothesis was intended to be assessed as a moderating effect. Following the suggestion made by Hair et al. (2014), we executed a PLS-SEM analysis without the moderating effect and then another round of PLS-SEM analysis with the moderating effect. These executions resulted in two models as shown in Figure 2. Therefore, we concluded that hypotheses 1 and 2 were supported based on Figure 2a. That is, there is a positive relationship between employee participation in Lean Thinking and employee innovative behaviour, and there is a positive relationship between employee competency and employee innovative behaviour. The moderating hypothesis, H₃, however, was not supported as shown in Figure 2b. Specifically, employee competency does not moderate the relationship between employee participation in Lean Thinking and employee innovative behaviour. Therefore, we did not proceed with simple slope analysis to further explain the moderating relationship.

MANAGERIAL IMPLICATIONS IN THE SOUTH EAST ASIAN CONTEXT

Our study enlarges the benefits of quality best practices that not just improvising the organisation's operations, but at the same time will enhance the level of employees' innovative behaviour. Managers in public or private sectors in the world including the South East Asian context, should keep in mind that encouraging employee to participating in Lean Thinking and given empowerment for decision making could engender employee innovative behaviour. Thus, manager should express confidence in employees' competence, provide them with training and career development, and encourage them to decide how to carry out their tasks in which will make them feel their importance and meaningful role in contributing to the organisation innovation.

Table 7
Summary of effect sizes
results

Latent variables / effect size	Innovative behavior			
	Without interaction		With interaction	
	f^2	q^2	f^2	q^2
Lean Thinking	0.574	0.326	0.758	0.396
Employee competency	0.040	0.019	0.162	0.073
Lean Thinking × Employee competency	–	–	0.117	0.053

THEORETICAL IMPLICATIONS

Ultimately, the results of our study suggest that employee participation in Lean Thinking process have a positive impact on employee innovative behaviour although it was not moderated by employee competency. Through these results, our study contributes to a variety of literatures on employee participation in thinking process and the usability of quality best practices, i.e. Lean Thinking. Previous studies have done on the different types of thinking process such as creative thinking and critical thinking on employee innovative behaviour. Thus, in this study, we are focusing on another type of thinking i.e. Lean Thinking. Therefore, the results of our study reveal few interesting implications. Theoretically, our study contributes to the innovation studies that the employee innovative behaviour can be influenced by the employee participation in Lean Thinking process. In addition, the social exchange theory is widely used and most accepted theory in the recent research on employee innovative behaviour (Yu, Mai, Tsai & Dai, 2018). According to social exchange theory, when employees are given values by the organisation, they feel sense of consideration and repay the organisation by showing engaged positive behaviour. Our study enhanced the social exchange theory by proving that when employees are encouraging to participate in Lean Thinking, they are motivated to perform more than their duties and results into innovative behaviour and contributing innovation for organisation (Saks, 2006).

CONCLUSION

Employee innovative behaviour is a must in organisations because it acts as a pre-emptive resource for organisation's innovation and to be ensure their effectiveness and competitive advantage (Zhou & Hoever, 2014). Organisations have to put full effort in developing innovative behaviour of their employees. In this study, we examined the impacts of employee participation in Lean Thinking and employee competency on employee innovative behaviour. We also examined the employee competency as a moderating variable, which may strengthen the relationship between employee participation in Lean Thinking and employee innovative behaviour.

The results revealed that both independent variables, employee participation in Lean Thinking (H1) and employee competency (H2) were supported. Even though there was not much research examine the relationship between employee participation and employee innovation behaviour, but previous studies on empowerment and innovative behaviour are consistent with our findings.

There is a connection between employee participation and empowerment as claimed by Bordin, Bartram & Casimir (2006), that employee participation can increase the empowerment of employees which enable the individual to improve personal capabilities. Empowerment contributes to enhancement of implementation of ideas and consequently enhancing innovation in organisation (Seibert, Wang & Courtright, 2011). Employee with higher level of participation and control over their work task, will become more enthusiastic and beneficial to employee innovative behaviour (Rhee, Seog, Bozorov & Dedahanov, 2017).

In addition, our study provides an empirical evidence that employee participation is not just a critical success factor of quality best practices (Dombrowski et al., 2011; Julien & Tjahjono, 2009), but when employee participate in Lean Thinking, they will develop their innovativeness skill. In Lean Thinking, employee participation is encouraged as a means of achieving positive results in continuous improvement. Furthermore, employee participation in Lean Thinking will enhances employee knowledge, skills, and abilities which will lead to innovative behaviour. Besides, the importance of employee competency in enhancing innovative behaviour was consistent with previous studies. Employees desire a challenge and interesting work which may develop their skill and competency and become motivators to innovative behaviour. According to Bialon (2013), it is also possible to develop employee innovative behaviour through training which will increase and shape employees 'competency. Last but not least, employee competency often contributes to the organisational effectiveness (Potnuru & Sahoo, 2016).

The results of this study do not support the moderating effect of employee competency on the relationship between employee participation in Lean Thinking and employee innovative behaviour (H3). Although employee competency is among the internal tools that support employee participation and empowerment (Houtzagers, 1999), but the strength of employee participation in Lean Thinking is capable to develop their own competency. A possible explanation may be that Lean Thinking is a management system that develops employee into a problem solver (Jones & Mitchell, 2006) where employee will gain skills and knowledge. Therefore, we assumed that employee participation in Lean Thinking can act independently in influencing employee innovative behaviour. However, the results of the non-significant regression analysis did not mean that there was no moderation effect in the study sample. This may be due to insufficient evidence in the data set (Hair, Black, Babin, Anderson & Tatham, 2006). However, the results showed that there was a very small change in R² from 0.455 to 0.512 suggesting that the moderating effect of the study sample was too small to reflect it significantly.

Even though the design of our study reveals several fruitful avenues, this study is not without limitation. Its main limitations result from the insignificant moderating effect of employee competency. In the future, we recommend that researchers used psychological variables such as psychological empowerment and psychological ownership to strengthen the relationship between employee participation in Lean Thinking and employee innovative behaviour. Further, our research examined employee participation in the specific thinking process that is Lean Thinking. While, future research should go further by examining the employee participation in other types of thinking process such as technological thinking and disruptive thinking, which could influence employees' skills, ability and knowledge as well as their innovative behaviour. Also, employee participation in other quality improvement best practices could be focused in future research which may broaden the antecedents of employee innovative behaviour. Finally, this study focused on the effects of employee participation as whole on innovative behaviour, future researcher should consider the difference forms of employee participation that may beneficial the outcome differently.

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