Journal of Economics, Business, & Accountancy Ventura Vol. 25, No. 1, April – July 2022, pages 107 – 122

Complementarity of Management Control Mechanisms in a Lean Organization: The Effect of Consensus

Kevin Hermanto Tupamahu*

Pattimura University, Ambon, Maluku, Indonesia

A R T I C L E I N F O

Article history:
Article received: 20 January 2022
Revised: 27 May 2022
Accepted: 26 July 2022

JEL Classification:
L21, L23

Key words:
Complementarity effect,
Management control mechanisms,
Company performance,
Lean thinking strategy.

DOI:
10.14414/jebav.v25i1.3046.

A B S T R A C T

This study aims to examine the complementarity effect of lean management control mechanisms (lean performance measurement, employee empowerment, visual control, standard operating procedures, and peer pressures) on company performance (operations and financial performance). Besides, this study also tests whether the consensus on lean thinking has affected the relationship between the lean management control mechanisms and the company's performance. The data is collected by survey with 159 managers from manufacturing companies. The data is then analyzed using the AMOS-SEM and shows that lean management control mechanisms work complementary to increase operation and financial performance in lean manufacturing companies. Furthermore, consensus on lean thinking strategies acts as a moderating variable and positively affects the relationship between lean management control mechanisms and financial performance. This study recommends that lean companies should implement control mechanisms that align with lean thinking. These control mechanisms should be used together to complement each other to maximize the performance benefits that can be derived from lean thinking implementation. In addition, to strengthen the benefits derived from the use of lean control mechanisms, companies need to pay attention to the consensus in implementing lean thinking strategies.

A B S T R A K

Tujuan dari penelitian ini adalah untuk menguji efek komplementaritas dari mekanisme pengendalian manajemen lean (pengukuran kinerja lean, pemberdayaan karyawan, pengendalian visual, prosedur operasi standar, dan tekanan rekan kerja) terhadap kinerja perusahaan (kinerja operasi dan keuangan) dan apakah konsensus tentang pemikiran lean mempengaruhi hubungan antara mekanisme pengendalian manajemen lean dan kinerja perusahaan. Pengumpulan data dilakukan melalui survei dengan total 159 manajer dari perusahaan manufaktur yang berpartisipasi. Data tersebut kemudian dianalisis menggunakan metode AMOS-SEM yang menunjukkan bahwa mekanisme pengendlianl manajemen lean bekerja saling melengkapi untuk meningkatkan kinerja operasi dan keuangan di perusahaan lean manufacturing. Selanjutnya, konsensus tentang strategi pemikiran lean bertindak sebagai moderasi dan memiliki dampak positif pada hubungan antara mekanisme pengendalian manajemen lean dan kinerja keuangan. Penelitian ini merekomendasikan bahwa perusahan lean harus mengimplementasikan mekanisme pengendalian yang sejalan dengan pemikiran lean dan mekanisme pengendalian ini harus digunakan secara bersama untuk saling melengkapi agar dapat memaksimalkan manfaat kinerja yang dapat diperoleh dari penerapan pemikiran lean. selain itu juga untuk memperkuat manfaat yang diperoleh dari penggunaan mekanisme pengendalian lean maka perusahaan perlu untuk memperhatikan konsensus di dalam implementasi strategi pemikiran lean.

1. INTRODUCTION

Lean thinking has proven to be a successful business strategy for achieving high performance. Besides its various advantages (Agyabeng-Mensah et al., 2020; Marodin et al., 2018; Marodin et al., 2017; Oliveira et al., 2021), many manufacturing companies have struggled during their operation because they only insulated it at the level of production function

* Corresponding author, email address: kevin_tupamahu@yahoo.com.

(Bhasin, 2012; Schmidt, 2011; Stone, 2012).

As a comprehensive strategy, lean thinking must include a complete change in all company operating activities. Specifically, management control mechanisms must be a part of the lean transformation to achieve performance improvement (Nielsen et al., 2018; Sohal et al., 2022). It is a critical tool to encourage and motivate lean organization members to continuously create improvements and eliminate any waste in operational activities since management control mechanisms provide information for the planning, control, performance measurement, and decision-making processes (Zarzycka et al., 2019).

Lean is recognized as a complementary management philosophy consisting of interdependent practices and proven compatible with management control mechanisms (Knop, 2020; Sohal et al., 2022; Tupamahu et al., 2019; Zarzycka et al., 2019). For example, lean thinking includes statistical process control and visual management techniques that is expected to improve a firm operational processes associated with management control mechanisms.

Researchers argue that to gain and increase the benefits derived from lean thinking transformation, traditional control mechanisms must be modified to suit lean thinking (Tillema & van der Steen, 2015). Evidence suggests that lean should be implemented as integration with management control mechanisms (Güldenpfennig et al., 2021; Nielsen et al., 2018). Given these interrelationships, lean thinking must incorporate management control mechanisms in controlling input, process, and output aspects to improve performance (Sohal et al., 2022). Previous research shows that the combined effect of lean thinking and management control mechanisms can increase organizational efficiency and effectiveness by streamlining operational processes (Bellisario et al., 2015; Fullerton et al., 2014; Kaldırım, 2020; Staedele et al., 2019).

When an organization integrates lean thinking into existing management control mechanisms, the changes required to align new practices may not necessarily work as management expects (Macchia, 2019; Sohal et al., 2022). This change can be beneficial or detrimental to the success of the company's goals. Macchia (2019) stated that the academic literature that provides evidence on the factors that drive successful change is very limited. Therefore, it is important to understand the critical factors facilitating this change and, in turn, succeed the implementation of lean management control mechanisms.

Contingency-based research suggests that the benefits of management control mechanisms are influenced by various contextual factors (Macchia, 2019; Otley, 2016). This study argues that consensus on strategy (lean thinking strategy) is one of the important contextual factors (Muafi & Adhyka Kusumawati, 2020) that significantly influence the effectiveness of lean management control mechanisms to encourage the achievement of lean goals. Consensus on strategy results from decision-making that aligns with management's understanding of the organization's strategy (Ateş et al., 2020).

Research on the scope of strategic consensus has been continuously expanded and applied to organizations (Li & Guo, 2021). This show that companies, as the subject of rational decision-making, believe that cooperation is more conducive to long-term development and reaching strategic consensus on aspects related to common interests to achieve organizational goals. Since management control mechanisms act as a tool to increase the benefit of lean thinking as a business strategy, this study aims to provide an empirical understanding of the impact of consensus on lean thinking strategy in the relationship between the management control mechanisms and company performance.

Specifically, the first objective of this study is to gain insight into how well the control mechanisms cooperate to complete each other to improve a lean organization's performance. Although there is an agreement that the management control mechanisms are interconnected and work as a package (e.g., Güldenpfennig et al., 2021; Haseeb et al., 2019; Rehman et al., 2019; van der Kolk et al., 2020), researchers typically remain focused on one management control at a time, such as performance measurement systems when studying lean company performance (e.g., Kaldırım, 2020; Staedele et al., 2019). Therefore, testing the complementarity of management control mechanisms and their construction in the lean organizational setting remains an important issue for academics and practitioners (Nielsen et al., 2018; Sohal et al., 2022; Tupamahu et al., 2019; Zarzycka et al., 2019).

Referring to Kennedy & Widener (2008), lean management control in this study encompasses employee empowerment, lean performance measurement, standard operating procedures (SOP), visual control, and peer pressure. Employee empowerment gives employees information and authority to take the necessary actions when needed (Roslin et al., 2019). Lean performance measurement is a control that provides financial and non-financial

performance information that is strategically in line with performance information needs on the work floor (Fullerton et al., 2013).

Visual control provides information as soon as possible in a simple and easy-to-understand way. Furthermore, visual control makes employees complete information to identify production needs and problems and can communicate the information to technical people when help is needed (Knop, 2020). The SOP ensures that the company operates within the limits that protect it from harm and facilitate its survival (Güldenpfennig et al., 2021). Peer pressure refers to pressure on fellow members of the organization to work optimally and increase the skills of each member of the organization (Khanagha et al., 2022).

The second objective of this research is to describe how consensus on lean thinking strategy influences the effectiveness of management control mechanisms used to improve company performance empirically. Even though there is much attention to the critical role of consensus in driving successful strategy implementation (Ateş et al., 2020; Muafi & Adhyka Kusumawati, 2020; Porck et al., 2020), there is limited attention to the implication that consensus on strategy might have an impact on the effectiveness of management control used (Ho et al., 2014), especially in a lean organizational environment. Therefore, there is a lack of empirical understanding of whether high/low consensus in lean thinking strategies affects the relationship between lean management control mechanisms and firm performance.

This study refers to the contingency theory to develop hypotheses. The fit between the management control mechanism and the company's contextual factors will reduce management risk by identifying the indication of the problem and providing the best opportunity for corrective action (Bedford et al., 2016). Conversely, a misfit will result in financial losses, damage the company's reputation, and even significantly impact organizational failure. It implies that the right combination of the contingencies is critical factor to help and motivate managers and lower-level employees in managing all organizational activities in the right direction to achieve the best performance under lean goals.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

The Complementary Effect of Lean Management Control Mechanisms on Company Performance

Lean management control mechanisms encompass employee empowerment, lean performance measurement, visual control, standard operating procedures, and peer pressure. First, employee empowerment is fundamental in the lean organization since one of the main principles of lean thinking is "respect for people." Empowerment encourages employees to respond to various problems, as well as gives employees resources and authority to solve these problems (Fernandez & Moldogaziev, 2013). The main objective of employee empowerment is to create a workforce driven by increasing the ability to produce products or services that are in line with customer expectations. It is believed that through empowerment, employees feel valued and will be involved in the organization's goals, encouraging collective commitment. It is important because it greatly improves the company's performance (Roslin et al., 2019).

Employee empowerment goes hand in hand with other control mechanisms. Existing literature shows that to realize improvements from the increased use of digital data on the shop floor and take advantage of company technology investments, shop floor workers must be empowered. They have to be involved to leverage real-time data to foster insight into production line upgrades and adapt them to new products and machinery (e.g., Saabye et al., 2020; Saabye & Powell, 2022). Empowerment is critical to give employees the skill and knowledge to collect their performance information daily and enable them to understand and perform the standard used in operation activity (Fernandez & Moldogaziev, 2013). Empowerment also allows the employees to apply peer pressure to ensure that all team members perform aligned with team goals (Kennedy & Widener, 2008).

Second, lean performance measurement is used to maintain a balance between different strategic measures by providing feedback information in visual form so that it is easier to understand and access by all members of the organization. It will encourage the organization's members to act in their best interests to achieve the alignment of goals. It provides critical financial and operational matrices related to lean manufacturing initiatives to make continuous improvements, create quality improvements, and reduce inventory (Fullerton et al., 2013), thereby eliminating the need for tracking at the shop-floor level and various reporting. These simplify complex information by providing performance measures that communicate results based on accuracy and suitability in a time that is easy for workers to understand (Maskell et al., 2012;

Zanon et al., 2021).

Third, visual control is the cornerstone of lean thinking implementation. Visual control is a communication device that tells people how to do something and displays deviations at a glance, so people can immediately see how they get the job done (Knop, 2020). It creates transparency in the workplace that everyone is working with the same information and is available when it is needed in simple and easy-to-understand forms (Kennedy & Widener, 2008). Visual metric boards, Kanban, box scores, and other platforms are examples of visual control. It is used not only to share information but also as a trigger and to regulate and maintain work activities (Knop, 2020).

Fourth, SOPs are a set of step-by-step guidelines developed by organizations to help employees perform complex day-to-day operations designed to achieve efficiency, quality performance, and compliance (Wahjoedi et al., 2020). Kristensen & Israelsen (2014) stated that SOPs must always be improved to ensure that the behavior of organizational members is continuously improved. These show that the SOP formally determines how members of the organization should behave under various conditions and when dealing with problems.

Finally, the possibility of a member who has a higher performance than other team members will produce pressure on the team in the lean organizational environment. Peer pressure constraints fellow members of the organization to work optimally and increase the skills of each member of the organization. When team members face peer pressure, team managers can help improve overall team performance through two key actions: goal optimization and frequent interactions (Khanagha et al., 2022). Focusing on optimizing goals and outcomes can be beneficial when peer pressure is high and can be detrimental when peer pressure is low (Khanagha et al., 2022). High peer pressure reduces the actions of selfish employees with interests that conflict with organizational goals (Bonein & Denant-Boèmont, 2015). Peer pressure shows the work teams involved in providing jobs and giving penalties. These can be a motivation in itself because the full involvement of the team in controlling each work activity will be able to direct the team to experience continuous performance improvement (Bonein & Denant-Boèmont, 2015; Mani et al., 2013).

As described above, employee empowerment, lean performance measurement, visual control, SOPs, and peer pressure influence each other. The emphasis on employee empowerment encourages every employee to understand every piece of information to make improvements in each process (Roslin et al., 2019) to serve customers, create value-added, eliminate waste, and increase profitability (Maskell et al., 2012). Using performance measurements that are displayed visually, workers at the shop-floor level will be ready and able to identify production needs and solve problems encountered in work (Knop, 2020). This measurement lets employees know how to solve problems that create waste and hinder value creation.

Lean performance measurement and visual control are also used to monitor cross-training information that motivates employees to have additional training to improve their skills and performance (Kennedy & Widener, 2008). In turn, for lean performance measurement to be more effective, employees are empowered to collect and produce daily performance information (Saabye et al., 2020; Saabye & Powell, 2022). Lean performance measurement and visual control also complement the peer pressure on team members. For example, visual performance metrics make quality and production information visible to workers outside the team members, increasing peer pressure to ensure workers perform with high productivity. This information encourages peer pressure since better performance results in the board instilling pride in the team members.

SOPs work together with visual control and lean performance measurement. For example, SOPs are used to document steps in an operational process that are visually displayed on the board and can be seen in manufacturing cells in the form of writing and drawing flow operations (Knop, 2020). Furthermore, lean performance measurement provides the operational metrics encompassing day-by-the-hour production, on-time delivery, sales per employee, dock-to-dock-time, quality first-time-through, and average cost, which shows the results of the employees' work. This operating information is used to complement SOPs to align employee efforts with lean goals and help define customer order processing, raw material ordering, product testing, and other supplies in the production process. Standard used in current operating activities makes variations in information in operations output more reliable and deviation from the SOPs more visible. This variation is crucial for lean improvement, as it works with low inventory levels to buffer variation problems (Kristensen & Israelsen, 2014).

Peer pressure is complementary to empowerment. For example, peer pressure affects the desire for additional training and cross-training to improve their skills. The employees' willingness to look superior to other employees makes members more responsible for performing better. Additional training and cross-training will empower an employee to identify any workplace problem and make the right decision to solve this problem (Nordin & Md Deros, 2017). Based on the explanation described above, the following hypothesis is formulated.

H_1: The complementarity of lean management control mechanisms has a positive impact on both operation and financial performance.

The complementarity effect on the relationship between lean management control mechanisms and company performance

In a lean environment, management becomes a determining factor in the successful use of various tools and the whole process of applying lean thinking. They have the main task of consistently and accurately communicating the strategic goal to the functional level (Liker, 2004). However, this process is often constrained, resulting in a lack of harmony of understanding between top-level management and other organizational members. Therefore, management must understand lean thinking and all business functions and be able to transform knowledge to others/employees (Zhang et al., 2017). Since management provides the resources needed to train workers to use new principles and methods (Kaynak, 2003; Zhang et al., 2017), incompatible management understanding of the strategy implemented will cause the organization to become disoriented and fail to achieve lean thinking goals (Ateş et al., 2020).

As discussed above, this study argues that consensus on lean thinking implementation strengthens the impact of control mechanisms on company performance by eliminating variations in information distribution and increasing confidence in using tools that align with lean objectives. In the case of a higher level of consensus, management clearly understands the tools used to support lean thinking strategies, and management will use management control mechanisms that align with lean thinking to encourage increased company performance. This high level of trust in management control mechanisms (such as employee empowerment, lean performance measurement, visual control, SOPs, and peer pressure), in turn, will motivate and direct the organizational member's behavior and produce information that is appropriate for achieving the strategic objectives inherent in lean thinking. On the other hand, if management has a low level of consensus on lean thinking implementation, it will lead to inappropriate management control mechanisms that result in dysfunctional behavior. For instance, using improper performance measurements may produce wrong information and lead to inappropriate decision-making. Thus, it will adversely impact company performance. Based on the explanation described above, the following hypothesis is formulated.

H_2: The complementary effect of management control mechanisms on the operation and financial performance is greater in a high level of consensus on lean thinking strategy than in a low level of consensus on lean thinking strategy.

To provide clear evidence on the consensus effect on the relationship between management control mechanisms and company performance, this study compares the company performance arising from using management control mechanisms in a case of high consensus and low consensus on lean thinking implementation. The theoretical model of this research is illustrated in Figure 1.

3. RESEARCH METHOD

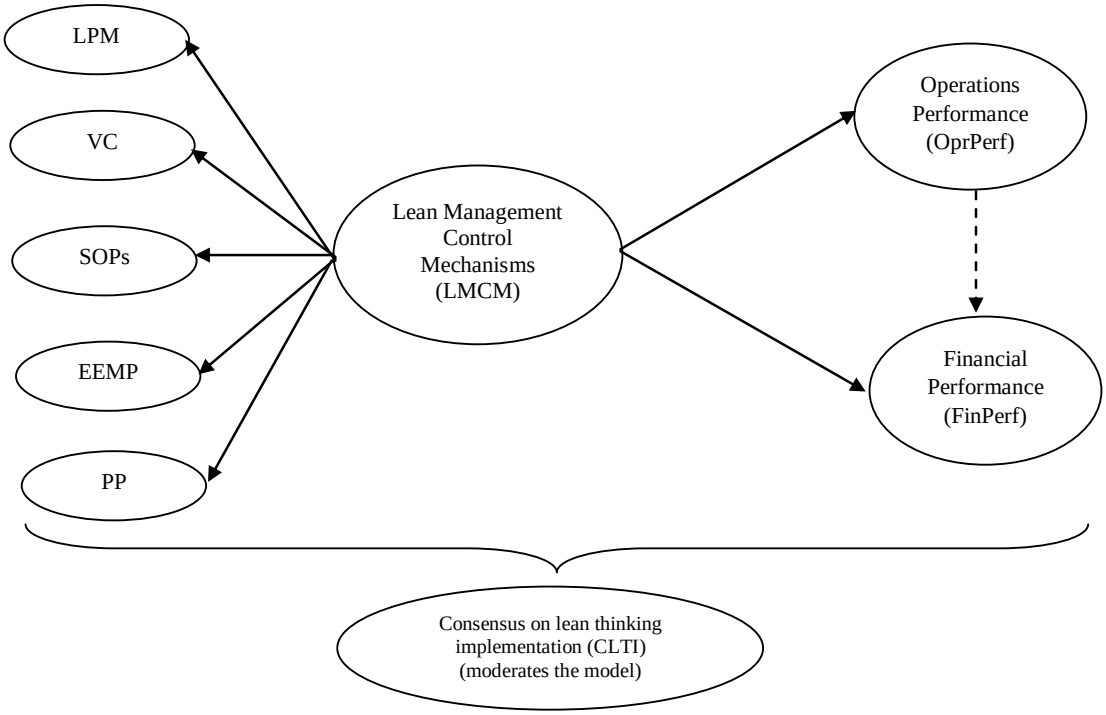
Sample and data collection

This study uses a survey method to collect data. In this study, the research sample drew from IDX.co.id, a database of organizations listed on the Indonesian stock exchange. After surveying 350 manufacturing companies, 159 (45.43%) responses were received from managers of Indonesian manufacturing companies. The sample characteristics are presented in Table 1.

Measures

In this study, the control mechanisms items developed drew upon Kennedy & Widener (2008) and used several indicators items from Fullerton et al. (2013). Four of the seven items covering employee empowerment adapted from Fullerton et al. (2013) include cross-training (emp1), quality decision (emp2), employee suggestions (emp3), and quality recognition (emp4). The rest of the three items were developed to capture the employee access to performance information (emp5), the authority to collect their performance information (emp6), and to

make all scheduling and production decisions (vpm7).



Note: LPM (lean performance measurement), VC (visual control), SOPs (standard operating procedures), EEMP (employee empowerment), PP (peer pressure). The dotted line act as the control path (not hypothesized).

Figure 1. Theoretical model

Table 1. Sample characteristics

Sample characteristics	Number of responses	Classifications	Totals
Industrial Sub-sector	159	Automotive and Components	58
		Food	8
		Textiles and Garments	22
		Metal	25
		Pharmacy	7
		Electronic	10
		Cosmetics	9
		Chemistry, Paper, and Plastics	20
Respondent positions	159	Accounting and Finance Manager	105
		Manufacturing Manager	53
		Director	1
Respondent's years of management experience	159	0-5 years	66
		6-5 years	57
		>11 years	36

Source: Research data tabulation

The lean performance measurement consists of five items. Two items developed drew upon Kennedy & Widener (2008), intended to capture the importance of lean performance measurement to linking operations and financial output (lpm3) and real-time information (lpm5), while the other three items (collect shop floor (lpm1), aligned measures (lpm2), and quality info (vpm4)) adapted from Fullerton et al. (2013). The visual control consists of four items (visual boards (vis1), defect charts (vis2), visual organization (vis3), and data work stations (vis4)) adapted from (Fullerton et al., 2013). The SOPs construct developed drew upon Kennedy & Widener (2008). The six items used to capture the document of an operational process (sop1), standardize work (sop2), eliminate non-value-added activity (sop3), pattern in operation activity (sop4), boundary (sop5), and frameworks for decision making (sop6). The four items covering peer pressure developed drew upon Barron &

Gjerde (1997). It includes the standards (pp1), monitoring actual performance (pp2), sanctions (pp3), and encourages additional work (pp4).

Company performance is a process to measure the level of success in achieving company goals based on overall performance measures, both financial and non-financial (Puryantini et al., 2018). In this study, the company's performance is proxied using operation and financial performance. The operation performance was developed based on the competitive advantage derived from the lean thinking implementation. The five items scale consist of self-assessed improvement of reduced buffer inventory (op1), reduced cost (op2), quality (op3), flexibility (op4), and on-time delivery (op5). The financial performance constructs were adapted from Bedford (2015) and related literature reviews. The five items scale includes self-assessments of company changes in return on sales (ROS) (fp1), return on investment (ROI) (fp2), relative market shares (fp3), product sales growth (fp4), and delivery systems productivity (fp5). The measure of consensus on lean thinking implementation covers the level of agreement on four lean thinking principles. To provide evidence of the impact of consensus, it will be divided into high and low categories based on the total score of each indicator compared to the median value of the respondent's answers.

Data Analysis

The data were analyzed using Structural Equation Modeling (SEM) using the AMOS 24 program. The reason for using SEM as a data analysis method is that SEM can develop models and is statistically efficient in analyzing complex models with many dependent and independent variables (Bagozzi & Yi, 2012; Ghozali, 2017; Widarjono, 2015).

4. DATA ANALYSIS AND DISCUSSION

Exploratory Factor Analysis (EFA)

In this study, principal-components-based EFA is conducted to develop a parsimonious representation of the various constructs in the survey. Five items are eliminated that loaded greater than 0.4 on more than one factor or loaded onto a factor that did not make logical sense. After removing five items, second exploratory factor analysis was performed to verify the initial results, which yielded eight factors with eigenvalues greater than 1, collectively explaining 72.9% of total variances in the data (see Table 2). The CFA resulted in the factors of lean performance measurement (LPM), standard operating procedures (SOPs), visual control (VC), employee empowerment (EEMP), peer pressure (PP), operations performance (OprPerf), financial performance (FinPerf), and consensus on lean thinking (CLTI).

The factor solution from the defined constructs supports the construct validity of the survey instrument. Convergent validity is fulfilled when the multiple-question loadings for the factors are above 0.50 (Bagozzi & Yi, 2012). None of the items has loadings above 0.40 on more than one factor, demonstrating discriminant validity. Furthermore, the statistical analysis shows that the first factor explains only 28.2% of the variance, and the balance of the variance is explained by the remaining variables (12.7%, 9.1%, 6.3%, 5.5%, 4.5%, 3.7%, 2.9%). This result indicates that the potential for common method bias in this research is low (see., Podsakoff et al., 2003).

Confirmatory Factor Analysis

The confirmatory factor analysis (CFA) is performed in AMOS 24 to evaluate the measurement model of the construct, using maximum likelihood estimation. It is a two-step modeling approach that first evaluates the measurement model without a structural path to ensure its fit and then evaluates the full structural model (Hair Jr et al., 2014). The measurement model is evaluated using $X^{2,}$ and the ratio of X^2 to the degree of freedom; Root Mean Square Error of Approximation (RMSEA); Incremental Fit Index (IFI); Tucker-Lewis Index (TLI); Comparative Fit Index (CFI); and Akaike Information Criterion (AIC) to address the issue of parsimony in the assessment model (Ghozali, 2017). The result shows that although the X^2 is significant ($p < 0.001$), the X^2 to the degree of freedom (chi-square ratio) is less than 2, and another fit index is more than acceptable (see Table 3).

Table 3 show that all factor indicated a good convergent validity, as all of the standardized coefficients are highly significant at $p < 0.01$ with factor loadings above 0.50 (Bagozzi & Yi, 2012), their AVE is above 0.50, and composite reliability is well above 0.70. In addition, none of the standardized residuals in the fitted residual matrix was large enough (> 2.58) to demonstrate a potential area of model misfit (Joreskog & Sorbom, 1988). Good discriminant validity is shown in Table 4, as the square root of AVE indicated in the diagonal row is greater than the inter-factor correlation. It indicates that all factors correlate significantly, except for the relation between lean performance measurement (LPM) and operations performance (OprPerf).

Table 2. Exploratory factor analysis: factor loadings for explanatory variables

Factors	Factor 1 LPM	Factor 2 OprPerf	Factor 3 VC	Factor 4 SOPs	Factor 5 CLTI	Factor 6 PP	Factor 7 EEMP	Factor 8 FinPerf
lmp1	0.879							
lmp2	0.655							
lpm3	0.670							
lpm4	0.818							
lmp5	0.879							
op1		0.885						
op2		0.876						
op3		0.894						
op4		0.877						
op5		0.549						
vis1			0.740					
vis2			0.828					
vis3			0.852					
vis4			0.900					
sop1				0.683				
sop2				0.776				
sop3				0.798				
sop4				0.737				
sop5				0.617				
clti1					0.789			
clti2					0.694			
clti3					0.833			
clti4					0.739			
pp1						0.756		
pp2						0.731		
pp3						0.586		
pp4						0.797		
emp1							0.656	
emp2							0.734	
emp3							0.584	
emp4							0.653	
emp5							0.610	
fp1								0.867
fp2								0.847
fp3								0.828

Notes: n = 159; all factor loadings above 0.40 are shown. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.848. Bartlett's test of sphericity is significant at $p < 0.000$.
Source: Author calculations

Assessment of Second-Order Measurement Model (Testing for the Complementarity of Lean Management Control Mechanisms)

According to the procedure used by Nielsen et al. (2018), the first-order model where the control mechanisms are correlated will be compared with the second-order model. It is to assess the existence of a second-order model of management control mechanisms and to ensure the multidimensionality and validity of the second-order model. The existence of a second-order construct will be strongly supported if the target coefficient (X^2) approaches unity (Marsh et al., 2020). The result shows that the target coefficient of the second-order model is 0.975, which means that a second-order model explains 97.5% of the relations among the first-order factors. In addition, all second-order factor loadings showed a significant value ($p < 0.001$), further accepting a second-order model. Overall, these results support the existence of a second-order construct in this study (see Table 5).

Hypothesis Testing Result

The results of a goodness-of-fit evaluation statistically indicate a good fit of the data (See Table 6). Although the Chi-square value is significant, the Chi-square ratio shows a value below two, indicating fit acceptance. Table 6 also shows that the other fit model (IFI, TLI, CFI) show an acceptable fit with a value above 0.90 (Ghozali, 2017). RMSEA value is also under the acceptable fit value (<0.08), and the parsimony value demonstrated by AIC is lower than the saturated model (Ghozali, 2017).

Table 3. Confirmatory factor analysis, AVE, composite reliability, and Cronbach's *a*

Construct indicators	Standardized loadings	*t*-value (all significant to p <0.001)	AVE	Composite reliability	*a*
LPM			0.624	0.887	0.886
lmp1	0.974	A			
lmp2	0.579	8,632			
lpm3	0.553	8,088			
lpm4	0.786	14,848			
lmp5	0.956	28,328			
SOPs			0.549	0.856	0.852
sop1	0.591	A			
sop2	0.864	7,908			
sop3	0.615	6,326			
sop4	0.850	7,839			
sop5	0.743	7,226			
VC			0.746	0.920	0.910
vis1	0.656	A			
vis2	0.930	10,003			
vis3	0.920	9,925			
vis4	0.918	9,912			
EEMP			0.557	0.861	0.849
emp1	0.845	A			
emp2	0.709	9,866			
emp3	0.699	9,696			
emp4	0.831	12,330			
emp5	0.625	8,378			
PP			0.514	0.808	0.795
pp1	0.788	A			
pp2	0.753	9,015			
pp3	0.697	8,359			
pp4	0.621	7,423			
OprPerf			0.683	0.912	0.908
op1	0.881	A			
op2	0.888	15,960			
op3	0.908	16,714			
op4	0.880	15,672			
op5	0.503	6,760			
FinPerf			0.762	0.905	0.905
fp1	0.919	A			
fp2	0.869	14,939			
fp3	0.830	13,876			

Notes: n = 159, measurement models are estimated using maximum likelihood.
Model fit indices: Chi-square, 702.573; degree of freedom, 413; p-value, 0.000; chi-square ratio, 1.701; IFI, 0.917; TLI, 0.905; CFI, 0.916; RMSEA, 0.067; AIC, 868.573 (saturated model, 992.000). "a" indicate that parameter was fixed at 1.0.
Source: Author calculations

The statistical examination of hypothesis 1 is shown in Figure 2 and Table 6. The test results show that the second-order model that represents the complementarity of lean control mechanisms shows a positive and significant effect on company performance associated with both operating performances (standardized coefficient: 0.255, p <0.01) and financial performance (standardized coefficient: 0.264, p <0.01), provides support for hypothesis 1. These results indicate that the lean management control mechanisms work complementary to increasing operational and financial performance.

In this study, hypothesis 2 was formulated to test whether lean control mechanisms' complementary effect on the operation and financial performance were moderated by consensus on lean thinking strategy. To perform the test, the sample is divided based on the median of consensus on lean thinking strategy to derived groups with either "high" or "low" levels of consensus. To test whether consensus on lean thinking is a moderating variable, the models were compared between the restricted and unrestricted models. In this study, χ^2 difference was used to test the hypothesis that consensus on lean thinking strategy (moderator variable) affects

the path group. The results show that the model does differ between low and high levels of consensus on lean thinking strategy (p<0.05). The model comparisons result shows that the relationship between lean management control systems and financial performance is moderate by consensus on lean thinking strategy. This study finds that consensus on lean thinking is necessary to increase financial performance using lean management control mechanisms (low coefficient = 0.076, p = n.s; high coefficient = 0.301, p<0.01). The result is presented in Table 7.

Table 4. Factor correlation and squared root of AVE

	Factor	Indicators	1	2	3	4	5	6	7
1.	LPM	5	**0.790**						
2.	SOPs	5	0.435**	**0.741**					
3.	VC	4	0.385**	0.325**	**0.863**				
4.	EEMP	5	0.554**	0.735**	0.497**	**0.746**			
5.	PP	4	0.008**	0.611**	0.261**	0.609**	**0.717**		
6.	OprPerf	5	-0.008	0.226*	0.410*	0.217*	0.310**	**0.826**	
7.	FinPerf	3	0.182*	0.261**	0.221*	0.297**	0.378**	0.410**	**0.873**

Notes: n = 159, Square root of AVE on diagonal in boldface; **significant at the p < 0.01; *significant at the p < 0.05.
Source: Author calculations

Table 5. Assessment of the first-order and second-order measurement model of lean management control

Panel A: fit indices for the first-order and the second-order measurement model

Fit indices	First-order measurement	Second-order measurement
X^2	402.110	412.568
Degree of freedom	220	225
X^2 degrees of freedom	1.828	1.834
RMSEA	0.072	0.073
TLI	0.912	0.911
CFI	0.924	0.921
IFI	0.925	0.922
AIC (default model/saturated model)	514.110/552.000	514.568/552.000
Target statistic: 0.975 (402.110/412.568)		

Panel B: factor loading of second-order measurement model

Relationship			Standardized coefficient	t-value (all significant at p < 0.001)
VC	<---	Lean MCM	0,502	4.559
PP	<---	Lean MCM	0,653	5.518
EEMP	<---	Lean MCM	0,948	6.679
SOPs	<---	Lean MCM	0,778	5.312
LPM	<---	Lean MCM	0,578	A

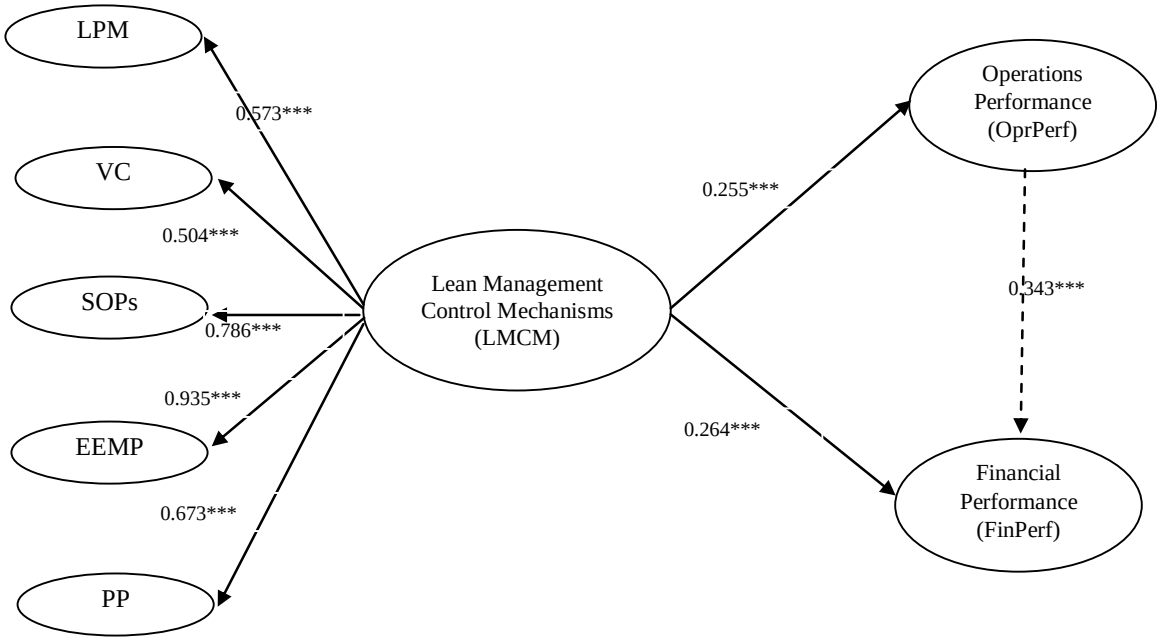
Note: "a" indicate a loading fixed to 1.

Table 6. Base result

The complementarity effect of lean management control mechanisms on company performance

Relationship			Hypothesis	Standardized coefficient	t-value
Lean MCM	→	OprPerf	H1	0.255***	2.907
Lean MCM	→	FinPerf	H1	0.264***	3.096
OprPerf	→	FinPerf	NH	0.343***	4.182

Note: n = 159
Model fit indices: Chi-square, 727.616; degree of freedom, 426; p-value, 0.000; chi-square ratio, 1.708; IFI, 0.913; TLI, 0.904; CFI, 0.912; RMSEA, 0.067; AIC, 867.616 (saturated model, 992.000).
***significant at the p < 0.01; **significant at the p < 0.05; *significant at the p < 0.10.
Source: Author calculations



Note: The dotted line act as the control path (not hypothesized).
***, **, * respectively represent of significance of the *p*-value at < 0.01, 0.05, and 0.10
Source: Author calculations

Figure 2. Depiction of results (structural model)

Table 7. Moderating analysis: consensus on lean thinking strategy

Partition variable			Hypotheses	Consensus on lean thinking strategy	
				High Mn=4,115 N=105	Low Mn=2,833 N=54
Lean MCM	→	OprPerf	H2	0.162	0.276
Lean MCM	→	FinPerf	H2	0.301***	0.076
OprPerf	→	FinPerf	NH	0.213**	0.383**

Model Comparison Statistics	
χ^2 unrestricted model (restricted model)	1690.658 (1728.078)
χ^2 difference test	p=0.040
DF	852 (876)
CMIN/DF	1.984 (1.973)

Note: The coefficients are from a model in which groups are constrained to have a common measurement model, but the path coefficients are allowed to vary freely between groups. We report two-tailed p-values for all relationships.
* Significance of the p-value at <0.10; ** Significance of the p-value at <0.05*** Significance of the p-value at <0.01.
Source: Author calculations

While hypothesis 2 is not fully supported, the result does reveal an important insight. From the contingency perspective, to increase the financial performance from the use of complementarity lean management control mechanisms, it is a need to have a high level of consensus on lean thinking strategy. Since the overall sample of companies has adopted some lean thinking practices, respondents may feel that there is a consensus already built to support the use of lean control mechanisms within the company. Therefore, it could be that because the managers are relatively easier to move forward to make improvements in operating activities, the use of lean control mechanisms does not significantly impact operations performance. In contrast, improving financial performance may be considered the most important performance dimension since it shows the company's ability to manage and control its resources to generate profits. Unfortunately, this study does not have data to conduct further testing

in this regard and should be left for further research.

Discussion

This research aims to study the complementarity effect of lean management control mechanisms on company performance (both operations and financial performance) and whether the consensus on lean thinking affects the relationship between lean management control mechanisms and lean manufacturing company performance. Early research provides limited evidence of the complementary effect of management control mechanisms on company performance and the contextual factors that influence the effectiveness of lean management control mechanisms used to improve company performance. For example, in their cross-sectional study, Fullerton et al. (2013) found that visual performance measures and employee empowerment are interrelated. Zarzycka et al. (2019), in their case studies using levers of control, showed that a combination of management control systems provides reinforcement that enables the coexistence of various innovations and standardization at various levels of the organization. Fullerton et al. (2013) and Zarzycka et al. (2019) did not find the impact of management control mechanisms on performance. In their case study, Kristensen and Israelsen (2014) investigated the joint effect of control mechanisms on a lean organization's performance. They found that a high balance between dimensions of control mechanisms (output control, SOPs, empowerment, training, peer pressure) will greatly impact company performance. Nielsen et al. (2018) conducted a cross-sectional study to investigate the complementary relationships of control mechanisms in a lean organizational environment. They found that social control (employee empowerment, peer pressure, visualization, training, and lean thinking), SOPs, and financial and non-financial output control work complementary in improving company performance. Tupamahu et al. (2019) showed that visual performance measures, employee empowerment, and SOP work complementary to support lean thinking implementation and positively impact performance improvement. None of these studies, though, shed insight into what factors influenced the effectiveness of management control mechanisms as complementary mechanisms in support of lean companies to improve their performance.

Drawing on contingency theory, this study expected that lean management control mechanisms were complementary to improve company performance. The consensus on lean thinking strategy act as a contextual factor that moderates the relationship between management control mechanisms and company performance. This study utilized the control framework, which characterized management control mechanisms in lean companies as employee empowerment, lean performance measurement, visual control, standard operating procedures, and peer pressure.

The results of this study indicate that the lean management control mechanisms consisting of lean performance measurement, visual control, employee empowerment, SOPs, and peer pressure work complementary to encourage operational and financial performance improvement in a lean company environment. Lean performance measurement provides information measures that are easy to understand to ensure the creation of quality products according to customer requirements and on-time delivery (Zanon et al., 2021). SOPs provide standardized work, and production flow maps to ensure that employees work according to to lean goals to produce high quality in both processes and output. Lean performance measurement, visual control, and SOPs empower employees so that they have sufficient information to evaluate their entire job and make quick and precise decisions on their jobs. Empowered employees will use their knowledge, skills, and experience to redefine value from the customer's point of view to increase their work's effectiveness and efficiency, leading to increased performance (Roslin et al., 2019).

Furthermore, peer pressure increases motivation in the work environment by displaying the work productivity results of each team at the work cell level in the form of a performance matrix so that all employees know the work productivity of their colleagues (Khanagha et al., 2022). The high productivity displayed on the visual matrix board will give employees a special pride for each cell, that they can make the best contribution to the organization's success. It creates positive pressure in the work environment because it will encourage employees to maximize their performance to create a quality production process and results, which in turn, increases company performance both from operating performance and financial performance.

This study also shows that consensus on lean thinking strategy is a critical factor that influences the effectiveness of management control mechanisms on company performance. Consensus helps companies resolve differences, promote integrated direction, increase strategic commitment,

and successfully implement the strategies provided (Ateş et al., 2020) since high consensus increases coordination and cooperation within an organization. In turn, it creates behavior synergy among organizational members (Kellermanns et al., 2005; Muafi & Adhyka Kusumawati, 2020). It needs to get attention, considering the weak consensus in the organization will cause a varying distribution of the information that will cause the organization to lose direction and fail in achieving the strategic objectives (Ateş et al., 2020).

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

Based on the findings of this study, it can be concluded that the respective dimensions of lean management control mechanisms work complementary in providing comprehensive control to create visible, accurate, and timely information. It will facilitate employees to have good skills and knowledge and be useful for them to identify the various types of waste that occur in the entire operating process and solve problems to eliminate these wastes, which will positively impact improving operating and financial performance.

The present paper contributes to the relatively sparse body of literature exploring multiple management control mechanisms within the lean management domain (Güldenpfennig et al., 2021; Haseeb et al., 2019; Otley, 2016; Rehman et al., 2019; Sohal et al., 2022; Tupamahu et al., 2019; van der Kolk et al., 2020). This study provides empirical evidence that strengthens the contingencies perspective (Otley, 2016), as five control mechanisms complementary to form a complex system of lean management control mechanisms that can enable opportunities for management to improve performance. The current study also complements the work of previous studies (Nielsen et al., 2018; Zarzycka et al., 2019) by providing an alternative explanation of which types of management control mechanisms interrelate in a lean manufacturing setting.

Furthermore, the identified complementarity and control mechanisms provide new insights into what it takes to ensure continuous improvement work in a lean organization (Fullerton et al., 2014; Tillema & van der Steen, 2015). The identified control mechanisms also contribute to research and provide new insights into the dynamics of complementarity of management control mechanisms in practice (Grabner & Moers, 2013; Pfister & Lukka, 2019). Finally, empirical research on management control mainly focuses on the fit between the contextual factors faced by the company and the design of effective control mechanisms (Otley, 2016). This study contributes to the contingency research on the complementarity between management control mechanisms by illustrating how the high-level consensus on lean thinking strategy strengthens the functioning of a broad range of lean control mechanisms to improve the company's performance. This result complements the work of Ho et al. (2014), which proved that consensus on strategy influences the effectiveness of management control mechanisms.

Based on the previous discussion, it is recommended for lean companies to implement control mechanisms that are in line with lean thinking. These control mechanisms should be used together to complement each other to maximize the performance benefits that can be obtained from implementing lean thinking. In addition, to strengthen the benefits derived from the use of lean control mechanisms used, companies need to pay attention to consensus in implementing lean thinking strategies.

However, this study has several limitations. First, this study only focuses on the impact of consensus on the lean thinking implementation on the effectiveness of the lean management control mechanism in improving operational performance and financial performance, without considering other contextual factors (e.g., organizational culture) that can contribute to strengthening the causal relationship of variables in this study. Second, data for the companies that have fully implemented lean thinking in Indonesia are unavailable. Instead, the ownership of ISO 9001 certification is based on assumptions that companies have adopted lean thinking. Third, the research sample is too small and may not fully represent the population of manufacturing companies implementing lean thinking in Indonesia.

Several previous research claim factors influence the successful implementation of lean thinking (Bortolotti et al., 2015; Pakdil & Leonard, 2015) and the design of effective control mechanisms (Rehman et al., 2019; Verbeeten & Speklé, 2015). To fully flesh out the contingency approach, future research can be including other contextual factors, such as cultural factors (organizational culture and national culture). Future research on the same area can use a random and larger sample from various industries to increase the generalizability of the findings. Furthermore, researchers can also use experimental or longitudinal studies to control causality.

REFERENCES

Agyabeng-Mensah, Y., Ahenkorah, E., Afum, E., & Owusu, D. (2020). The influence of lean management and environmental practices on relative competitive quality advantage and performance. *Journal of Manufacturing Technology Management*, 31(7), 1351-1372

Ateş, N. Y., Tarakci, M., Porck, J. P., van Knippenberg, D., & Groenen, P. J. (2020). The dark side of visionary leadership in strategy implementation: Strategic alignment, strategic consensus, and commitment. *Journal of Management, 46*(5), 637-665.

Bagozzi, R. P., & Yi, Y. (2012). Specification, Evaluation, and Interpretation of Structural Equation Model. *Journal of the Academy of Marketing Science, 40*, 8-34.

Barron, J. M., & Gjerde, K. P. (1997). Peer Pressure in an Agency Relationship. *Journal of Labor Economics, 15*(2), 234-254.

Bedford, D. S. (2015). Management Control Systems Across Different Modes of Innovation: Implication for Firm Perfomance. *Management Accounting Research, 28*, 12-30.

Bedford, D. S., Malmi, T., & Sandelin, M. (2016). Management control effectiveness and strategy: An empirical analysis of packages and systems. *Accounting, Organizations and Society, 51*, 12-28.

Bellisario, A., Appolloni, A., & Ranalli, F. (2015). Reviewing strategy matters to gain an understanding of balanced scorecard's possible benefits within lean production contexts: a management control perspective. *International Journal of Manufacturing Technology and Management, 29*(1-2), 1-29.

Bhasin, S. (2012). An Appropriate Change Strategy for Lean Success. *Management Decision, 50*(3), 439-458.

Bonein, A., & Denant-Boèmont, L. (2015). Self-control, commitment and peer pressure: a laboratory experiment. *Experimental Economics, 18*(4), 543-568.

Bortolotti, T., Boscari, S., & Danese, P. (2015). Successful lean implementation: Organizational culture and soft lean practices. *International Journal of Production Economics, 160*, 182-201.

Fernandez, S., & Moldogaziev, T. (2013). Using employee empowerment to encourage innovative behavior in the public sector. *Journal of public administration research and theory, 23*(1), 155-187.

Fullerton, R. R., Kennedy, F. A., & Widener, S. K. (2013). Management accounting and control practices in lean manufacturing environment. *Accounting, Organizations and Society, 38*, 50-71.

Fullerton, R. R., Kennedy, F. A., & Widener, S. K. (2014). Lean manufacturing and firm performance: The incremental contribution of lean management accounting practices. *Journal of Operations Management, 32*, 414-428.

Ghozali, I. (2017). *MODEL PERSAMAAN STRUKTURAL: Konsep Dan Aplikasi Dengan Program AMOS 24 Update Bayesian SEM Edisi 7* (7 ed.). Semarang: Badan Penerbit Universitas Diponegoro.

Grabner, I., & Moers, F. (2013). Management Control as a System or a Package? Conceptual and Empirical Issues. *Accounting, Organizations and Society, 38*, 407-419.

Güldenpfennig, M., Hald, K. S., & Hansen, A. (2021). Productivity improvement and multiple management controls: evidence from a manufacturing firm. *International Journal of Operations & Production Management, 41*(6), 991-1017.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*: Sage Publications.

Haseeb, M., Lis, M., Haouas, I., & WW Mihardjo, L. (2019). The mediating role of business strategies between management control systems package and firms stability: Evidence from SMEs in Malaysia. *Sustainability, 11*(17), 4705.

Ho, J. L. Y., Wu, A., & Wu, S. Y. C. (2014). Performance Measures, Consensus on Strategy Implementation, and Performance: Evidence from the Operational-Level of Organizations. *Accounting, Organizations and Society, 39*, 38-58.

Joreskog, K., & Sorbom, D. (1988). A guide to the program and applications. Chicago: SPSS: Inc.

Kaldırım, Y. (2020). Performance Measurement and Reporting in Lean Manufacturing Environment: Integration of Balanced Scorecard and Lean Accounting Box Score. *İşletme Araştırmaları Dergisi, 12*(2), 1098-1108.

Kaynak, H. (2003). The relationship between total quality management practices and their effects on firm performance. *Journal of Operations Management, 21*(4), 405-435.

Kellermanns, F. W., Walter, J., Lechner, C., & Floyd, S. W. (2005). The Lack of Consensus about Strategic Consensus: Advancing Thery and Research. *Journal of Management Accounting Research, 31*(5), 719-737.

Kennedy, F. A., & Widener, S. K. (2008). A control framework: Insights from evidence on lean accounting. *Management Accounting Research, 19*, 301-323.

Khanagha, S., Volberda, H. W., Alexiou, A., & Annosi, M. C. (2022). Mitigating the dark side of agile teams: Peer pressure, leaders' control, and the innovative output of agile teams. *Journal of Product Innovation Management, 39*(3), 334-350.

Knop, K. (2020). Indicating and analysis the interrelation between terms-visual: management, control, inspection and testing. *Production Engineering Archives, 26*(3), 110-120

Kristensen, T. B., & Israelsen, P. (2014). Performance effects of multiple control forms in lean organization: a quantitative case study in systems fit approach. *Management Accounting Research, 25*, 45-62.

Li, Z., & Guo, X. (2021). *The influence of strategic consensus among enterprises on supply chain financing performance*. Paper presented at the E3S Web of Conferences.

Liker, J. K. (2004). *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*. New York, NY: McGraw Hill, Inc.

Macchia, S. (2019). A review on Management Accounting Change. What's next? *Economia Aziendale Online-, 10*(1), 107-134.

Mani, A., Rahwan, I., & Pentland, A. (2013). Inducing peer pressure to promote cooperation. *Scientific reports, 3*(1), 1-9.

Marodin, G., Frank, A. G., Tortorella, G. L., & Netland, T. (2018). Lean product development and lean manufacturing: Testing moderation effects. *International Journal of Production Economics, 203*, 301-310.

Marodin, G. A., Tortorella, G. L., Frank, A. G., & Godinho Filho, M. (2017). The moderating effect of Lean supply chain management on the impact of Lean shop floor practices on quality and inventory. *Supply Chain Management: An International Journal, 22*(6), 473-485.

Marsh, H. W., Guo, J., Dicke, T., Parker, P. D., & Craven, R. G. (2020). Confirmatory factor analysis (CFA), exploratory structural equation modeling (ESEM), and set-ESEM: Optimal balance between goodness of fit and parsimony. *Multivariate Behavioral Research*, 55(1), 102-119.

Maskell, B., Baggaley, B., & Grasso, L. (2012). *Practical Lean Accounting: A Proven System for Measuring and Managing the Lean Enterprise (2nd Ed)* (Second Ed ed.). Boca Raton, FL: CRC Press.

Muafi, M., & Adhyka Kusumawati, R. (2020). Strategic consensus on organizational performance: a contingency approach of organizational culture and isomorphic pressure. *Journal of Industrial Engineering and Management, 13*(2), 352-370.

Nielsen, H., Kristensen, T. B., & Grasso, L. P. (2018). The performance effects of complementary management control mechanisms. *International Journal of Operations & Production Management, 38*(11), 2124-2148.

Nordin, N., & Md Deros, B. (2017). Organisational change framework for lean manufacturing implementation. *International Journal of Supply Chain Management (IJSCM), 6*(3), 309-320.

Oliveira, M. A. D., Pereira, M. S., Lima, R. M., & Vieira, A. F. (2021). Lean practices to improve the learning process and production document control: a case study. *International Journal of Productivity and Quality Management, 33*(2), 157-179.

Otley, D. (2016). The contingency theory of management accounting and control: 1980–2014. *Management Accounting Research, 31*, 45-62.

Pakdil, F., & Leonard, K. M. (2015). The effect of organizational culture on implementing and sustaining lean processes. *Journal of Manufacturing Technology Management*, 26(5), 725-743.

Pfister, J. A., & Lukka, K. (2019). Interrelation of controls for autonomous motivation: A field study of productivity gains through pressure-induced process innovation. *The Accounting Review, 94*(3), 345-371.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of applied psychology, 88*(5), 879-903.

Porck, J. P., van Knippenberg, D., Tarakci, M., Ateş, N. Y., Groenen, P. J., & de Haas, M. (2020). Do group and organizational identification help or hurt intergroup strategic consensus? *Journal of Management, 46*(2), 234-260.

Puryantini, N., Rofikotul, A., & Tjahjadi, B. (2018). The association of knowledge management, organization culture, and innovation with organizational performance: A case at study institute research xyz. *Jurnal Akuntansi dan Keuangan, 20*(1), 39-52.

Rehman, S.-u., Mohamed, R., & Ayoup, H. (2019). The mediating role of organizational capabilities between organizational performance and its determinants. *Journal of Global Entrepreneurship Research, 9*(1), 1-23.

Roslin, E. N., Ahmed, S., Ahamat, M. A., Bahrom, M. Z., & Ibrahim, N. (2019). The impact of employee involvement and empowerment in Lean Manufacturing System implementation towards organizational performances.

International Journal on Advanced Science, Engineering and Information Technology, 9(1), 188-193.

Saabye, H., Kristensen, T. B., & Wæhrens, B. V. (2020). Real-time data utilization barriers to improving production performance: an in-depth case study linking lean management and Industry 4.0 from a learning organization perspective. *Sustainability, 12*(21), 8757.

Saabye, H., & Powell, D. J. (2022). Fostering insights and improvements from IIoT systems at the shop floor: a case of industry 4.0 and lean complementarity enabled by action learning. *International Journal of Lean Six Sigma*(ahead-of-print).

Schmidt, S. (2011). From Hype to Ignorance - A Review of 30 Years of Lean Production. *International Journal of Economics and Management Engineering, 5*(1), 82-85.

Sohal, A., De Vass, T., Vasquez, T., Bamber, G. J., Bartram, T., & Stanton, P. (2022). Success factors for lean six sigma projects in healthcare. *Journal of Management Control*, 1-26.

Staedele, A. E., Ensslin, S. R., & Forcellini, F. A. (2019). Knowledge building about performance evaluation in lean production: an investigation on international scientific research. *Journal of Manufacturing Technology Management, 30(5), 798-820*.

Stone, K. B. (2012). Four decades of lean: a systematic literature review. *International Journal of Lean Six Sigma, 3*(2), 112-132.

Tillema, S., & van der Steen, M. (2015). Co-existing concepts of management control: The containment of tensions due to the implementation of lean production. *Management Accounting Research, 27*, 67-83.

Tupamahu, K. H., Ghozali, I., & Basuki, P. (2019). Lean management, competitive advantage, and firm performance: the role of management control systems (evidence from Indonesia manufacturing firms). *Academic Journal of Interdisciplinary Studies, 8*(3), 221-221.

van der Kolk, B., van Veen-Dirks, P. M., & Ter Bogt, H. J. (2020). How combinations of control elements create tensions and how these can be managed: An embedded case study. *Management Accounting Research, 48*, 100677.

Verbeeten, F. H., & Speklé, R. F. (2015). Management control, results-oriented culture and public sector performance: Empirical evidence on new public management. *Organization Studies, 36*(7), 953-978.

Wahjoedi, T., Harjanti, W., & Kesumawatie, M. I. (2020). Management Control & Reporting System For Sustainability Organization Manufacturing Industries In Surabaya. *International Journal of Scientific & Technology Research, 9*(3), 1761-1765.

Widarjono, A. (2015). *Analisis Multivariat Terapan: Dengan Program SPSS, AMOS, dan SMARTPLS Edisi II*. Yogyakarta: UPP STIM YKPN.

Zanon, L. G., Ulhoa, T. F., & Esposto, K. F. (2021). Performance measurement and lean maturity: congruence for improvement. *Production Planning & Control, 32*(9), 760-774.

Zarzycka, E., Dobroszek, J., Lepistö, L., & Moilanen, S. (2019). Coexistence of innovation and standardization: evidence from the lean environment of business process outsourcing. *Journal of Management Control, 30*(3), 251-286.

Zhang, L., Narkhede, B. E., & Chaple, A. P. (2017). Evaluating lean manufacturing barriers: an interpretive process. *Journal of Manufacturing Technology Management, 28*(8), 1086-1114.