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STUDY ON APPLYING LEAN ACCOUNTING IN MECHANICAL FIRMS

ESTUDO SOBRE A APLICAÇÃO DA CONTABILIDADE LEAN EM EMPRESAS DO SETOR MECÂNICO

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Abstract
The purpose of the study is to present, analyze and measure the implementation of lean accounting in mechanical firms in Hanoi. The study applies both qualitative and quantitative research methods. The sample size includes 395 survey forms from accountants, department heads, deputy heads, directors and boards of directors of mechanical firms. SPSS statistical software is used with descriptive statistics, analysis of the reliability of scales through Cronbach's alpha coefficient, and EFA analysis. The research results show that the implementation of lean accounting in mechanical firms in Hanoi includes 8 scales (observed variables) that are rated at a fairly average level (3.43/5 points). These 8 observed variables are all reliable and qualified for EFA analysis, and EFA exploratory factor analysis is appropriate. There are 8 scales extracted with the eigenvalue criterion greater than 1, with a total cumulative variance of 71.684%. Based on the research results, we propose recommendations to enhance the implementation of lean accounting in mechanical firms in Hanoi.

Resumo
O objetivo do estudo é apresentar, analisar e avaliar a implementação da contabilidade enxuta em empresas do setor mecânico em Hanói. O estudo aplica métodos de pesquisa tanto qualitativos quanto quantitativos. A amostra inclui 395 questionários respondidos por contadores, chefes de departamento, vice-chefes, diretores e conselhos de administração de empresas do setor mecânico. Utiliza-se o software estatístico SPSS com estatísticas descritivas, análise da confiabilidade das escalas por meio do coeficiente alfa de Cronbach e análise EFA. Os resultados da pesquisa mostram que a implementação da contabilidade enxuta em empresas mecânicas em Hanói inclui 8 escalas (variáveis observadas) que são avaliadas em um nível bastante médio (3,43/5 pontos). Essas 8 variáveis observadas são todas confiáveis e qualificadas para a análise EFA, e a análise fatorial exploratória (EFA) é apropriada. Existem 8 escalas extraídas com o critério de valor próprio superior a 1, com uma variância cumulativa total de 71,684%. Com base nos resultados da pesquisa, propomos recomendações para aprimorar a

Keywords: Accounting. Managerial Accounting. Lean Accounting. Lean. Lean Manufacturing.

implementação da contabilidade enxuta em empresas mecânicas em Hanói.

Palavras-chave: *Contabilidade. Contabilidade Gerencial. Contabilidade Enxuta. Lean. Manufatura Enxuta.*

1 INTRODUCTION

According to Maskell and Kennedy (2007), implementing lean accounting brings many benefits to firms, such as (i) contributing to preventing waste and loss occurring in the production process of the business, thereby reducing costs and increasing profits, and (ii) using lean accounting tools in firms contributing to improving capacity to achieve sustainable advantages and improve production performance and business performance. Therefore, today many managers and researchers have acknowledged the importance of lean accounting for the sustainable development of firms.

In developed economies such as the United States and Japan, where lean management principles are well-established, lean accounting has proven to be one of the effective tools for successfully linking operations with financial performance (Fullerton *et al*., 2014). However, while lean accounting has been widely studied and applied in these advanced economies, its implementation in developing countries, including Vietnam, has not been fully exploited, and there are still many gaps.

In recent years, the Vietnamese mechanical industry in general and mechanical enterprises in Hanoi in particular have achieved important achievements, contributing significantly to economic growth and fulfilling the mission of ensuring to meet the needs of the people. However, there are still many challenges for enterprises, such as (i) the pressure of economic integration and internationalization of the market leading to the entry of more and more foreign competitors into the market and (ii) the explosion of the fourth industrial revolution and the emergence and popularity of digital technology platforms integrating smart technology towards optimizing processes and methods of production and processing of mechanical products. To adapt to changes in the business environment in the new context, mechanical enterprises in Hanoi, which are industries with low technological levels, need to orient their business strategies to create new

competitive advantages and improve business performance. One of the effective management tools suitable for the current new context is lean accounting. Lean accounting is a flexible accounting system, including a set of flexible principles and practices, simulating lean production by providing appropriate control and measurement reports, disclosing information about activities that bring value to customers by cutting costs and eliminating meaningless processes at each level of production to reflect the best financial performance of the company (Hijleh & Mashhour, 2020). However, how to implement lean accounting in mechanical enterprises has not been specifically answered by previous studies. Therefore, in this study, the authors want to clarify by measuring the implementation of lean accounting in mechanical firms in Hanoi.

Through qualitative research methods and quantitative research methods, the structure of the article includes part 1, the introduction to the research; part 2, the background theory and literature review; part 3, the research method; part 4, the research results and discussion; and part 5, the implications and recommendations.

2 BACKGROUND THEORY AND LITERATURE REVIEW

2.1 Lean accounting and lean accounting implementation

Lean accounting has been recognized in many countries, especially in industries that have adopted lean manufacturing, such as automotive, electronics, and aerospace (Hines *et al*., 2004). Lean accounting reflects business strategy; information is collected and presented in a simple, intuitive way (Maskell & Kennedy, 2007).

Unlike traditional accounting, which often relies on complex cost allocations and detailed reporting, lean accounting focuses on value stream costing, visual management tools such as scorecard reporting, and the elimination of non-value-added activities from financial processes (Maskell & Baggaley, 2006). Its core objective is to provide timely information to stakeholders to directly support lean initiatives, reduce waste, and make effective decisions across the entire value chain (Kaiser, 2001).

Lean accounting is a flexible accounting system, which includes a set of flexible principles and practices, simulating lean manufacturing by providing appropriate control and measurement reports, disclosing information about activities that bring value to

customers by cutting costs and eliminating meaningless processes at each level of production to reflect the best financial performance of the firm (Hijleh & Mashhour, 2020).

Nguyen Thi Sam (2022) believes that lean accounting has developed in recent years to provide accounting, control and measurement methods to support lean production in enterprises. Lean accounting is developed to upgrade the accounting system to keep up with the business processes of the enterprise. Lean accounting is an accounting model applied to enterprises applying lean production processes. Lean accounting has implemented a process called the value stream management process. In addition, with lean accounting, the budget is prepared according to each business process with details of each activity. The application of lean accounting also has a positive impact on the profits and inventory consumption of the enterprise. When applying lean accounting, each value chain will regularly report the financial status and operations at the chain.

According to Ngo Thi Hai Chau (2024), for the first time, the implementation of lean accounting in enterprises in Vietnam only occurred in multinational corporations, such as electronics corporations (Samsung, LG), automobiles (Toyota, Honda), manufacturing enterprises such as garment enterprises... have begun to integrate lean accounting to complement their lean production systems. The rest, most domestic enterprises that dominate the Vietnamese economy have not yet fully applied lean accounting. The above situation shows that the majority of enterprises in Vietnam are still implementing traditional management accounting and currently there are no mandatory regulations, no guiding documents on the implementation of lean accounting in enterprises.

Thus, lean accounting is an accounting model applied to firms that apply lean production processes. This model includes methods such as organizing and managing costs according to value streams, changing inventory valuation techniques, and adding some non-financial information to the firm's financial statements.

2.2 Background theory

Previous studies on lean and lean production in general, and lean accounting in particular, have acknowledged a number of theories that promote the implementation of

lean accounting in enterprises, such as diffusion of innovation theory, agency theory, contingency theory, etc. Based on these theories, researchers, business administrators and information users within enterprises have discovered factors that promote or hinder the implementation of lean accounting. In the framework of this article, the group of authors focuses on discussing and analyzing the diffusion of innovation theory, which is one of the theories used by many researchers for studies on lean accounting.

Diffusion of Innovations Theory (Rogers, 1962) describes the process by which new technologies and other innovations spread throughout society, from product introduction to product adoption; seeks to explain how and why new ideas are adopted with timescales that are likely to spread over long periods of time; and how innovations are connected to different parts of the organization and the subjective opinions associated with the innovation are important factors in how diffusion occurs so rapidly.

According to the diffusion theory of innovation, there are four factors that influence the diffusion of a new idea, including the level of innovation, communication channels, time, and social system.

In the field of management accounting, Dunk (1989) used this theory in his research to explain the slow change of management accounting systems in the production process and discussed the application of this theory in the implementation of new techniques in management accounting. In addition, Damanpour and Evan (1984) applied the diffusion of innovation theory in the study of management information systems and accounting. Based on this theory, the results of the studies showed that the application of management accounting techniques in quantitative analysis increased the effectiveness of the financial management system. In addition, according to Romal (2000), the factors affecting the application of modern management accounting systems include organizational structure, management support, enterprise size, technology and financial capacity.

Lean accounting is one of the basic components and techniques of management accounting. The application of lean accounting is considered as one of the innovations to meet the requirements of lean production in enterprises, so it requires time, knowledge sharing, inheritance and experience. Therefore, diffusion of innovation theory refers to the implementation of lean accounting in enterprises.

3 RESEARCH METHODOLOGY

The study was conducted using qualitative and quantitative research methods to measure the implementation of lean accounting in mechanical firms.

Qualitative research methods were conducted through a review of research documents and discussions with experts who are lecturers at economic universities with experience in lean accounting and chief accountants of mechanical firms in Hanoi.

The survey subjects in the study are mechanical enterprises in Hanoi. According to Hair *et al*. (1998), the sample size for EFA analysis is at least 5 times the number of observed variables. The proposed number of observed variables is 8. According to the above formula, the minimum number of samples required to be surveyed is 40. The authors conducted direct and indirect survey collection and investigation at mechanical enterprises in Hanoi. Using a non-probability survey method, convenience in the period from June 10, 2024, to August 10, 2024. After collecting and cleaning the survey forms, 395 survey forms were used for analysis.

The questionnaire was piloted with 15 respondents to check wording, completeness, sequence and possible errors in the questions. The questionnaire used a 5-point Likert scale, ranging from “strongly disagree” to “strongly agree” for the observed variables from THKTTG1 to THKTTG8.

The collected data were encoded and processed using Excel and SPSS 22 software. The analysis method was carried out through descriptive statistics, Cronbach's alpha reliability assessment, factor analysis, T-test and ANOVA analysis. According to Hair *et al*. (1998), a Cronbach's alpha coefficient ranging from 0.7 to 0.9 is good reliability. To use the factor analysis technique, according to Kaiser (2001), a KMO test method can be used, and Bartlett's test is used to consider the appropriateness of factor analysis. When using this test, the KMO test value must have a value from 0.5 to 1.0 to be appropriate.

4 RESULTS AND DISCUSSION

4.1 Descriptive statistics

The statistical results from Table 1 show that the survey subjects agreed with the variable "Implementing lean accounting in mechanical enterprises (THKTTG)," including 8 observed variables, at a fairly average level, with an average value of 3.43 compared to the highest level of the 5-point Likert scale. All 8 observed variables were rated at an average level of 3.26 or higher.

Table 1

Results of respondents' survey on THKTTG

	N	Minimum	Maximum	Mean	Std. Deviation
THKTTG1	395	1	5	3.75	.822
THKTTG2	395	1	5	3.31	.850
THKTTG3	395	1	5	3.61	.797
THKTTG4	395	1	5	3.51	1.031
THKTTG5	395	1	5	3.36	.917
THKTTG6	395	1	5	3.38	.978
THKTTG7	395	1	5	3.26	.879
THKTTG8	395	1	5	3.27	.905
Valid N (listwise)	**395**			**3.43**	

Source: Prepared by the authors (2025) and SPSS software.

The aggregate mean value of 3.43 reflects that the level of implementation of lean accounting in mechanical enterprises in Hanoi is quite good, but not high. Enterprises have initially recognized the role of lean accounting, but the implementation is uneven, lacking integration between the stages: planning, measurement, control, and improvement. This shows great potential to perfect the lean accounting model through personnel training, digital transformation, and linking lean accounting with production improvement strategies.

Implementing lean accounting in inventory management (THKTTG1 – Mean = 3.75; SD = 0.822): The mean value of 3.75 shows that mechanical enterprises have a relatively high level of application of lean accounting in inventory management. This reflects the effort to minimize material waste, optimize inventory and apply control tools such as Kanban, Just-in-Time. The low standard deviation (0.822) demonstrates a high

level of consensus among enterprises, meaning that most of them have implemented this aspect relatively evenly.

Implementing lean accounting in product costing (THKTTG2 – Mean = 3.31; SD = 0.850): The average value is quite average (3.31), showing that the application of lean accounting in determining cost is only at the initial level. Enterprises still depend on traditional methods (actual cost, standard cost), not fully exploiting the value stream cost system. The standard deviation of 0.85 shows a slight dispersion of opinions, reflecting the uneven implementation level among enterprises.

Implementation of lean accounting in lean budgeting and planning (THKTTG3 – Mean = 3.61; SD = 0.797): The mean of 3.61 reflects a fairly good level of application of lean accounting in budgeting and planning, showing a trend of improving planning work towards reducing redundancy and increasing flexibility. The low standard deviation (0.797) shows that firms have similarities in their perception and practice of lean planning.

Implementation of lean accounting in decision support (THKTTG4 – Mean = 3.51; SD = 1.031): The mean of 3.51 shows that lean accounting tools have been initially used in decision support, but are not really effective. The highest standard deviation (1.031) shows significant differences between enterprises, reflecting that some enterprises have applied them well (such as value analysis, value stream reporting), while small enterprises are still limited in data and analytical skills.

Value stream costing implementation (THKTTG5 – Mean = 3.36; SD = 0.917): The mean value of 3.36 represents a medium level of adoption—many firms have recognized the importance of value stream costing but have not fully implemented it or lack standardized guidance. The standard deviation of 0.917 shows relative differences between firms, possibly due to differences in size, technology, and digitalization capabilities.

Implementation of lean accounting in capacity management (THKTTG6 – Mean = 3.38; SD = 0.978): The average of 3.38 shows that the enterprise has only applied lean accounting in capacity management at the initial level, mainly monitoring machine capacity and productivity, not deeply integrated with financial and non-financial data. The high standard deviation (0.978) reflects the inconsistent implementation level among units.

Implementation of lean accounting in reporting (THKTTG7 – Mean = 3.26; SD = 0.879): The average of 3.26 is relatively low, indicating that lean accounting reporting has not been effectively applied, with most firms still using traditional financial reports instead of reports that support value stream improvement. The standard deviation of 0.879 represents a moderate difference, possibly due to large firms adopting ERP systems, while small firms are still manual.

Implementing lean accounting in performance evaluation (THKTTG8 – Mean = 3.27; SD = 0.905): The mean value of 3.27 shows that performance evaluation according to lean criteria is still limited. Enterprises mainly use traditional financial indicators (revenue, cost, profit), while not integrating process efficiency indicators or cycle time. The standard deviation of 0.905 shows a clear difference between the group of enterprises with a continuous improvement orientation and the group maintaining the old way of doing things.

4.2 Analysis of the reliability of observed variables

Analysis of observed variables of THKTTG in mechanical enterprises in Hanoi City was performed using Cronbach's alpha reliability coefficient. The results in Table 2 show that these observed variables have Cronbach's alpha coefficients greater than 0.8, and the correlation coefficients of all observed variables are greater than 0.3. Therefore, all observed variables of THKTTG in mechanical enterprises in Hanoi City have high reliability and statistical significance (Hoang & Chu, 2008; Hair *et al*., 2009; Hair *et al*., 2014).

Table 2

Results of reliability analysis of observed variables through Cronbach's alpha coefficient

Cronbach's Alpha	N of Items
0.942	8

Code	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
THKTTG1	0.822	0.933
THKTTG2	0.732	0.939
THKTTG3	0.710	0.940

THKTTG4	0.847	0.931
THKTTG5	0.810	0.934
THKTTG6	0.745	0.939
THKTTG7	0.838	0.932
THKTTG8	0.857	0.930

Source: Prepared by the authors (2025) and SPSS software.

4.3 Analysis EFA

EFA analysis was performed using the component analysis method and Varimax rotation; the analysis results are shown in Table 3.

Table 3

EFA analysis results

STT	Detailed description		Value
1	**KMO**		0.924
2	**Bartlett's test**	Chi-Square	2,679.304
		Df	28
		Sig.	<0.001
3	**Total Variance Explained**	Number of forming factors	1
		Eigenvalue	5.735
		Total % of extracted variance	71.684
4	**Rotation matrix**	THKTTG8	0.893
		THKTTG4	0.888
		THKTTG7	0.882
		THKTTG1	0.868
		THKTTG5	0.857
		THKTTG6	0.804
		THKTTG2	0.796
		THKTTG3	0.776

Source: Prepared by the authors (2025) and SPSS software.

The KMO index is 0.924, greater than 0.5 (>0.5), according to the Bartlett test results used to test the hypothesis about the correlation between observed variables. The extracted variance is 71.684%, meaning that these 8 observed variables account for 71.684% of the variation in the data. The Bartlett test is statistically significant (Sig. < 0.05). Therefore, it can be said that the observed variables of the study satisfy the requirements of EFA analysis (Hoang & Chu, 2008; Hair *et al*., 2009; Hair *et al*., 2014).

These statistics demonstrate that the analysis of research data to explore observed variables is appropriate. Through ensuring the quality of observed variables and testing

the EFA model, we have identified 8 components of THKTTG in mechanical firms in Hanoi City (Hoang & Chu, 2008; Hair *et al*., 2009; Hair *et al*., 2014).

4.4 Independent T-test: genders

A comparison of the results of the evaluation of the differences in the implementation of lean accounting in mechanical firms in Hanoi with participants of different genders (female and male) can be seen in Table 4. According to the results shown in Table 4, the sig Levene's test is 0.059, which is more than 0.05. The variance between a female and a male is not different. Moreover, the sig value t-test is 0.580, which is more than 0.05, which means that there is not a statistically significant difference in the implementation of lean accounting in mechanical firms in Hanoi between these different genders (Hoang & Chu, 2008; Hair *et al*., 2009; Hair *et al*., 2014).

Table 4

Differences in the implementation of lean accounting in mechanical firms in Hanoi with participants of different genders-Independent Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
THKTTG	Equal variances assumed	3.594	.059	.554	393	.580	.05873021	.10598916	-.14964646	.26710688
	Equal variances not assumed			.535	248.972	.593	.05873021	.10977365	-.15747316	.27493358

Source: Prepared by the authors (2025) and SPSS software.

4.5 ANOVA - seniority

An ANOVA test was needed to make a comparison of the results of the evaluation of the implementation of lean accounting in mechanical firms in Hanoi between the three subjects, including participants who have seniority of less than 5 years, participants who have seniority from 5 years to less than 10 years, and participants who have seniority of

10 years or older. Table 5 shows that the sig Levene statistic of 0.592 is larger than 0.05, which means that the hypothesis of homogeneity of variance among the variable value groups (different seniority) has not been violated. Table 6 shows that sig. is 0.817, which is more than 0.05, which indicates that there is not a statistically significant difference in the implementation of lean accounting in mechanical firms in Hanoi between the mentioned three groups of seniority (Hoang & Chu, 2008; Hair *et al*., 2009; Hair *et al*., 2014).

Table 5

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.524	2	392	.592

Source: Prepared by the authors (2025) and SPSS software.

Table 6

ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.406	2	.203	.202	.817
Within Groups	393.594	392	1.004		
Total	394.000	394			

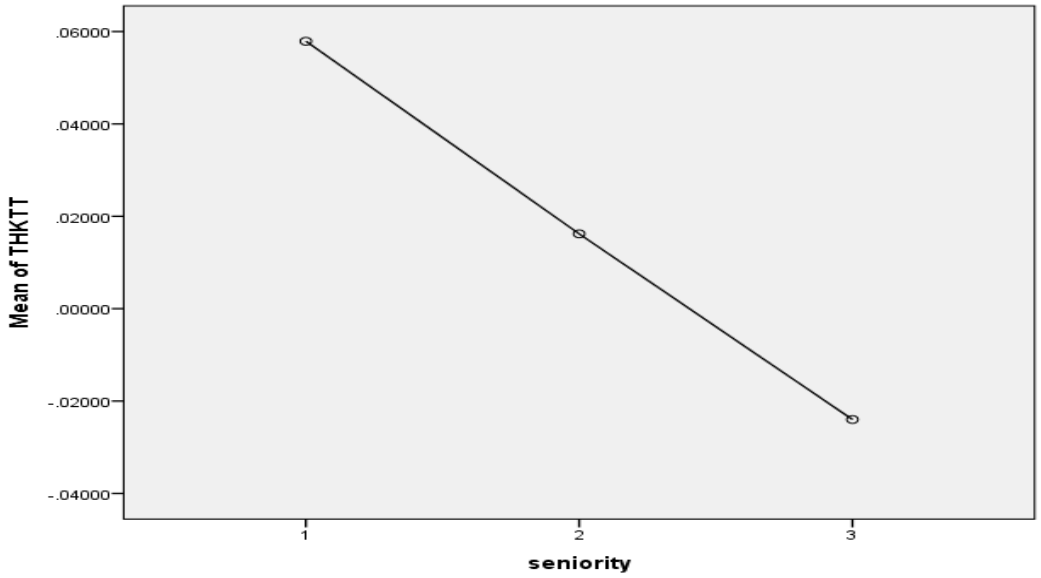
Source: Prepared by the authors (2025) and SPSS software.

The relationship between the implementation of lean accounting in mechanical firms in Hanoi – seniority

Next, the line graph shows the relationship between the implementation of lean accounting in mechanical firms in Hanoi and each respondent's seniority (Figure 1). Figure 1 shows that this line tends to go down when the respondents have seniority from 5 years to less than 10 years and participants who have seniority of 10 years or older.

Figure 1

The line graph shows the relationship between the implementation of lean accounting in mechanical firms in Hanoi and each respondent's job position.



Source: Prepared by the authors (2025) and SPSS software.

4.6 Discussion

All eight scales of implementing lean accounting (THKTTG) in mechanical enterprises are rated at an average of 3.26 or higher; however, there are still opinions that completely disagree, proving that mechanical enterprises have been and are implementing lean accounting (THKTTG) but not fully and synchronously. Mechanical enterprises consider implementing lean accounting to be an urgent requirement to save costs and improve business performance.

The observation variable THKTTG1 (implementing lean accounting in inventory management) was rated the highest by respondents (3.75/5 points), which is also completely consistent with the current context of inventory accounting in mechanical enterprises in the context of digital transformation. Inventory is one of the assets that accounts for a large proportion in mechanical enterprises. Implementing lean accounting in inventory management will help mechanical enterprises save costs. Inventory accounting has become an indispensable part of the operations of mechanical enterprises; inventory management in general and lean inventory accounting in particular increasingly

play a key role in supporting and improving business performance. According to Choi and Kim (2018), investing in technology such as ERP systems and automated software helps improve inventory management efficiency and increase productivity. Miller (2020) points out that policies that encourage efficient inventory management and the adoption of international standards improve productivity and reduce costs.

The observed variable THKTTG2 (implementing lean accounting in product costing) was rated the lowest by respondents (3.31/5 points), the reason being that cost accounting and costing are the central steps of the entire accounting work of the enterprise, affecting the quality of other accounting operations as well as the quality and effectiveness of the economic management and administration of the enterprise. Therefore, implementing lean accounting in product costing in mechanical enterprises is only at the initial stage, lacking synchronization, unity and effectiveness. Cost and product price are important indicators in the system of economic indicators serving the management of enterprises and have a close relationship with revenue and business performance. The implementation of lean accounting in cost accounting, calculating product prices scientifically, reasonably and correctly, is of great significance in contributing to enhancing the effective management of assets, labor, and capital. On the other hand, it creates conditions for cost savings and reduces product prices. This is one of the factors that increase the competitive advantage of enterprises. Moreover, product cost is also the basis for determining product selling prices, the basis for evaluating internal economic accounting prices, analyzing costs, and also the basis for determining business performance. However, implementing lean accounting in cost accounting and calculating product costs in mechanical enterprises is not an easy task.

5 IMPLICATIONS AND RECOMMENDATIONS

The main purpose of lean accounting is to eliminate waste through identifying sources of costs. Lean accounting has increasingly affirmed its important role and position in economic management and has become an effective method of managing and controlling business operations. However, lean accounting has higher requirements, so when implemented, it also requires certain conditions.

Implementing lean accounting in firms plays a huge role for firms, such as

identifying wasteful damage in each stage and step of the current production process of the business; reducing management time as well as reducing the number of unfinished products on the line and scrap; providing a plan to implement production process improvements to cut costs; providing a clear content of each process related to raw materials and other relevant information flows; scrutinizing, monitoring and controlling from the beginning to the end of the process; and developing and improving product quality as well as overall usefulness for customers.

Regarding the implementation of lean inventory accounting: When mechanical enterprises build and implement a reasonable inventory plan, demand forecasting, inventory control and inventory cost optimization are carried out more effectively. A scientific inventory plan not only helps to minimize the risk of shortage or excess of goods but also contributes to improving the accuracy of financial management and inventory control, thereby contributing to improving the operational efficiency of the enterprise. Mechanical enterprises should establish good relationships with suppliers to help adjust inventory and reduce costs. In addition, data analysis applications support demand forecasting and optimize inventory management.

Regarding product costing: Cost norms are an important basis for mechanical enterprises to make production and business cost estimates as well as to check, control, and evaluate results and make decisions. Therefore, mechanical enterprises should prioritize completion. The construction of production cost norms should be carried out on the basis of complete and clear financial and non-financial information; the construction process should be specific, with strict assignment of responsibilities and completion time for each department to have timely production cost norms before receiving customer orders.

Products should establish production cost norms according to a complete and strict process for both quantity norms and price norms of production cost items.

Regarding budgeting and lean planning, mechanical enterprises should make flexible budgets with different expected levels of activity. However, mechanical enterprises should only propose 3-4 different levels of activity, because if they propose too many levels of activity, it will lead to unnecessary complexity. From flexible budgeting, business leaders will have a basis to decide on the level of activity that is appropriate to the business's implementation capacity and the characteristics of the

business environment. In addition, because the actual level of activity is often different from the expected level, thanks to flexible budgeting, after the end of the business period, the enterprise can determine the expected cost for the actual level of activity as a basis for comparison with the actual costs incurred. The difference between the actual costs incurred and the costs allowed to arise for that actual level of activity will help the units evaluate how the managers of the departments have performed their cost control responsibilities. In addition, mechanical enterprises should clarify the participating departments, functions and tasks of each department and avoid overlapping work or when problems arise, departments pushing responsibilities to each other; and mechanical enterprises should assign the accounting department as the specialized department to manage the entire overall budget system in the enterprise.

The budget contents should be done on a separate subsystem of the software that the mechanical enterprise is using, such as ERP or accounting software. The administrator assigns access rights and updates data for each individual and department in charge. The enterprise's chief accountant will be the one to approve each step of the budget. This budget work is done annually and detailed for each quarter and month.

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Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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