Pakistan Journal of Life and Social Sciences

www.pjlss.edu.pk

RESEARCH ARTICLE

Reducing Waste due to Errors and Delays in the Material Procurement Process in the Medium-Sized Hotel Sector in Thailand

Apisara Phuangjan[1], Panutporn Ruangchoengchum[2*]

[1,2]College of Graduate Study in Management, Khon Kaen University, Khon Kaen, Thailand

ARTICLE INFO	ABSTRACT
	The procurement process is a vital business operation that includes buying all the resources and items required to achieve the objectives of an entity. Particularly for the administration in medium-sized hotels in Thailand, the accuracy and timeliness of this process are the most worrisome. The current study set out to investigate what factors lead to wastage because of mistakes and delays in the process of material procurement, and to devise full instructions as to how the wastage could be minimized. The study was confined to medium-sized hotel businesses in Thailand. In this regard, the study was designed using a mixed-method approach involving a highly systematized data collection and analysis system both in the quantitative phase for the sample group of 100 respondents by administering questionnaires and in the qualitative phase for the 15 key informants through conducting interviews with open-ended questions and participant observation. The quantified data was examined using a linear regression technique, and for the qualitative data, the tree diagram in conjunction with the ECRS method was used. The findings further reveal elements of procurement management that contribute heavily to waste through errors and delays in the procurement process. The new ECRS technique drastically cut errors from an earlier level of 5.17% to 2.85% and delays in the procurement process from an ineffective 1.85 days to an effective 1.17 days. This result has given pragmatic guidance and useful insights for the industry, particularly for top management of medium-sized hotels.

INTRODUCTION

The medium-sized hotel sector in the Thai economy are very significant, with its value being part of the country's GDP and total tourism income. In 2023, the industry was valued at 1.03 trillion baht, 6.1% of GDP, and contributing to 65% of the total tourism income. To confirm high dynamics of the industry, the growth rate was estimated at 4.3% from 2021 to 2023. This growth only confirms that medium-sized hotels are significant on the market as stand-alone units and as part of the tourism sector in any economy (World Bank, 2023).

Efficient procurement systems are crucial in defining a hotel's operational efficiency, an aspect that rubs

off on the bottom line and quality of services. For instance, material procurement processes in hotels impact cost management and service quality. Minimization of these has been very paramount since they ensure that there are no or little losses to material mismanagement and that the operational losses are avoided since they greatly tend to affect the profitability and reputation of the hotels. If most hotels are unable to manage these routines well, a lot of economic and operational setbacks may crop up (Kuruppu & Karunarathna, 2022).

An example of such problems is observed in the case of The Hi Place Hotel, a mid-sized luxury hotel located in Roi Et Province, Northeast Thailand. For the most part, capable of hosting major business events and accommodating over 150 guests, the hotel has recurring material procurement problems. The hotel's material procurement system, in fact, runs an error rate of 5.17% per month, a figure that is well above the normal threshold by up to 3%, and an average delay of 1.85 days per purchase request, which is further above the settled efficiency benchmark of 1.5 days, as listed by The Hi Place Hotel, 2023. Many research studies have applied various analytical techniques, including Pareto chart analysis, cause and effect diagrams, and why-why analysis, to overcome these challenges of procurement (Nugroho et al., 2020; Shekarian et al., 2022; Niruchkulrote, 2021). This study has also used advanced statistical methods, including multiple regression analyses, to identify the key predictors of waste and inefficiency within the hotel's procurement processes (Lembo & McGrew, 2023).

The work of Srijuntrapun et al. (2022) highlights the effectiveness of the food waste hierarchy as a strategic policy for the hotel to manage and reduce food waste at its source. It helps both to save costs on foods for the hotel business and to save the environment, and is well integrated into the food distribution process of the hotel. It was also observed that a large hotel has a more integrated distribution system than medium and small hotels.

In their research into sustainable food waste management, Kattiyapornpong et al. (2023) focus on how five five-star hotels based in developing countries have developed food waste management policies regarding medium and large star hotels at developing country levels across the different levels of operation. As the name suggests, the concentration has been on its subsequent reduction. A closer study based on the Food Waste Hierarchy has shown that the research identified the main four key themes in the way the hotels approach it.

The major findings in the study of Filimonau (2021) are that the hospitality sector will have to be included in AFNs and SFSCs as a means of waste food management, hence the realization of coopetition among the hospitality businesses and others in the food supply chain. In the area of plastic waste, the focus should be investments in green innovations, while policy interventions are targeted at the same. These strategies are key to rescuing the sector and ensuring long-term sustainability of the same, especially in response to future crises like climate change.

Pinho and Lobo (2019) mentioned that waste caused by delays was waste that does non value-added activities, waiting for work, and frequent moving that cause delays in delivery to customers.

And Badiru and Cromarty (2021) explained that delays are a lack of balance due to improper or poor planning of the flow of raw materials in the production process, or relatedness of the replenishment of raw materials in the warehouse. Waste caused by mistakes was the result of incorrect work, broken work occurring, and having to redo the work. Errors is a waste because when errors occur, it affected time, money, resources, and customer satisfaction. (Anderson et al.2021).

This paper will adopt a mix of multiple regression analysis with the ECRS methodologies in zeroing in and minimizing waste in the material procurement process for medium-sized hotels. In taking the case of The Hi Place Hotel, this research will aim to achieve some of the best strategies to improve not only the efficiency of procurement but also the sustainability and economic performance of the hotel industry in Roi Et Province and other similar regions. The findings are anticipated to draw landmine in the area of critical principles necessary for long-term growth and success in the competitive landscape of the hospitality sector.

Objectives

The main objectives of the study were;

- To examine the factors of waste caused by errors

and delays in the material acquisition process of medium-sized hotel businesses in Thailand.

- To formulate guidelines to reduce waste caused by errors and delays in the procurement of materials for medium-sized hotel enterprises in Thailand.

LITERATURE REVIEW

The medium-sized hotel industry is very critical to the economy of Thailand, particularly the tourism sector which is a huge contributor to the country's GDP and employment. This sector, therefore needs effective means of sourcing material to ensure the maintenance of operational efficiency and improved competitiveness. As a result, this literature review tries to look into the several methods and technologies that have been used to eliminate waste emanating from errors and delays in the procurement of materials in medium-sized hotels in Thailand (Ottou et al. 2024).

Procurement efficiency is critical to the hotel sector. Research has found that the success and growth of the hotel industry are heavily dependent on optimizing its operational processes, of which procurement is the key. A number of other studies have also indicated that better procurement strategy can contribute to cost management, waste reduction, and quality improvement, which is associated with increasing profits and satisfying customers.

The use of technology in procurement processes —procurement 4.0— has in turn brought in new tools that enhance precision and speed. Such tools include automated procurement systems, blockchain for transparency, and artificial intelligence for predictive analysis. According to Peaiamamporn and Muangpan (2023), these technologies can prevent human errors and save time in the process, hence preventing delays and mismanagement of inventory.

Lean management techniques have been effectively applied in the reduction of waste and improvements in procurement processes. For example, Just-in-Time (JIT) delivery and Kanban systems are lean strategies that permit an inventory management process to be optimal in terms of reducing the cost of storage and minimizing the risks of stockout or overstocking situations (Aljedaani et al. 2019). Finally, process mapping and re-engineering have made it possible to identify redundancy and bottlenecks within the procurement processes, thus allowing for the streamlining of operations (Myerson, 2023; Kanval et al., 2024).

In addition, other methods such as multiple regression analysis and many other statistical tools have been applied for the analysis of factors that might cause procurement errors and the prediction in real practice. In the process of so doing, it is shown that the various relations between one another may be adequately captured and tell of the procurement performance. Hotels can implement targeted interventions to mitigate these risks by identifying key predictors of errors.

Research at The Hi Place Hotel in Roi Et Province demonstrates practical challenge and solution of procurement in the medium-sized hotel tier. With its ECRS (Eliminate, Combine, Rearrange, Simplify) strategies in place, along with the utilization of multiple regression analysis, the hotel will find it possible to significantly reduce error rates and procurement delays. (The Hi Place Hotel, 2023).

Comparative studies between hotels with an implementation of advanced procurement technologies and those adhering to the traditional procurement methods bring out the benefits and challenges that both approaches pose. In such comparison studies, a common area that usually comes out is the issue of initial cost and adaptation problems that hotels go through as they upgrade their procurement systems. However, long-term efficiency is highlighted.

In fact, a move to advanced procurement systems has both opportunities and challenges. The improvement in efficiency, reduction in waste, and added competitive advantage could easily offset the initial investment and training needs. With a growing global trend to sustainability, effective procurement is paramount in increasing profit while reducing environmental impacts and meeting regulatory requirements.

The literature posits that the Thai medium hotel sector can be better supported with its operating efficiency within its procurement process by reducing waste and technological integration, maximization, and the infusion of statistical applications. Moreover, the development of further

research and future investigations into more advanced ways of procurement methods will be vital to the continuous growth of the competitiveness of this crucial sector of the Thai economy. Future research should be targeted towards the long-term results of these measures and the scalability of such initiatives across different regions and hotels of different sizes.

Multiple Regression Analysis (MRA)

Multiple Linear Regression analysis was a statistical method used to study the relationship between the independent variable and the dependent variable. MRA analyzed more than one primary variable, with the relationship of the variables represented by a mathematical equation as follows: (Roback & Legler, 2021)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots \beta_k X_k + \epsilon$$

When:

X = Independent Variable

Y = Dependent Variable

ϵ = Random Error

β = Regression Coefficient

k = Number of Independent Variables

n = Number of Samples of the Variable

How-how analysis and tree diagram

How–how analysis is used to find corrective measurement to achieve the desired objectives by the top of the tree diagram. It will be the goal that study want to achieve (Seiter, 2018). Kubiak and Benbow (2016) stated that the tree diagram is a tool that depicts the hierarchy of tasks and subtasks needed to complete an objective. The finished diagram resembles a tree. There are good steps so that nothing is missed. It is a tool for organizing ideas. It starts with one point and continues to spread out like a tree. Tree diagram used in conjunction with How-how Analysis to find measures or solutions to reach the desired goals.

ECRS techniques

Gopalakrishnan and Saravanan (2017) described ECRS principles as principles consisting of elimination, combination, rearrange and simplify, which are simple principles that can be applied to reduce waste in the work process very well. ECRS was waste minimization and improvement tool that is referred to as eliminate, combine, rearrange, simplify; which is an approach for process improvement and optimization (Jana & Tiwari, 2021).

Conceptual framework

This study employs an explanatory sequential design within a case study framework, as described by Creswell & Plano-Clark (2018), which includes the use of both quantitative and qualitative data.
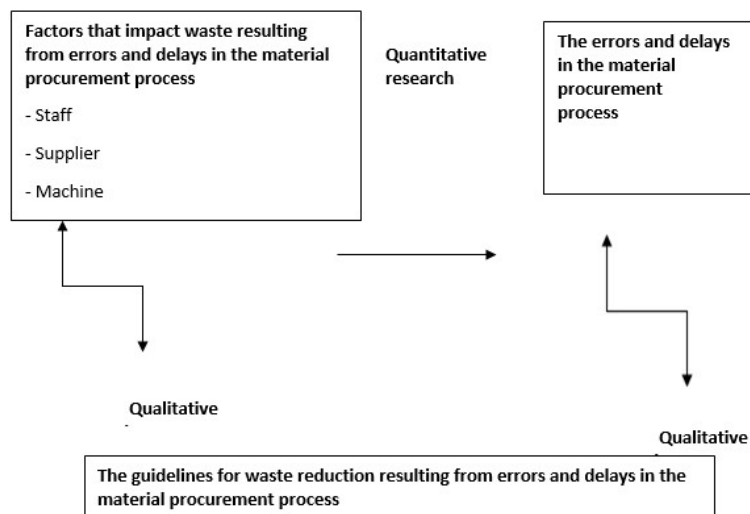
Figure 1: Conceptual framework

The objective is to understand the variables or factors that impact waste resulting from errors and delays in the material procurement process. A comprehensive examination of concepts, theories, and pertinent research was undertaken by the researcher in order to ascertain essential variables, including personnel, suppliers, machinery, and procurement management (Pakpoom et al., 2019; Nugroho et al., 2020; Shekarian

et al., 2022; Kannu et al. 2022; Riswandi & Yudoko, 2023). This research effectively demonstrates the connections among the variables in the case study, providing a clear understanding of the phenomena related to waste reduction and offering a thorough interpretation of the findings to meet the defined research inquiries. The conceptual foundation for the study (Figure 1) and the subsequent research hypotheses are outlined as follows.

Research hypotheses

H1: Staff factors influence waste resulting from errors and delays in the material purchasing process.

**H2**: Supplier factors impact waste resulting from errors and delays in the material purchasing process.

H3: Machine factors contribute to waste resulting from errors and delays in the material purchasing process.

H4: Procurement management factors play a role in waste resulting from errors and delays in the material purchasing process.

RESEARCH METHODOLOGY

Design

According to Creswell and Plano-Clark (2018), the design for the current study is that of the explanatory sequential mixed-method, which begins with the collection of quantitative data and is followed by the exploration of the findings collected in greater depth using qualitative. The qualitative phase of the study provides explanatory information that helps to understand the findings of the quantitative phase using the explanatory sequential design model as represented in Figure 2.
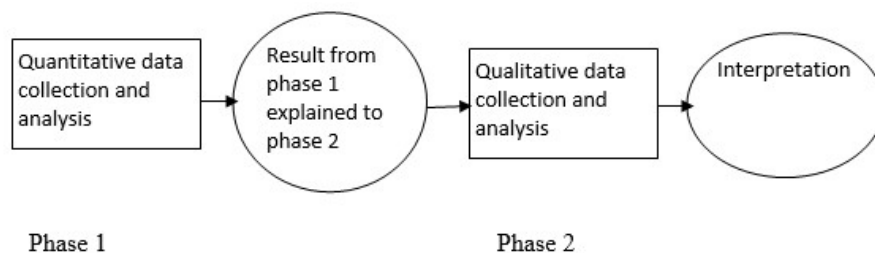
Figure 2: Explanatory sequential design. Source: Adapted from Creswell & Plano-Clark (2018)

Participants

The participants were personnel engaged in the procurement of materials process in a medium-sized hotel company in Roi Et Province, Thailand. The study used the purposive sampling technique and selected 100 participants so that, at worst, the minimum of each of the four independent variables would be represented in the study at 80 participants: personnel, suppliers, machines, and procurement management. For the qualitative part, 15 key informants having been in the procurement department of a medium-sized hotel for over one year were purposively sampled. In-depth interviews were done with the key informants to salvage strategies for reducing procurement waste.

Instrumentation

A structured questionnaire was developed to capture continuous variables that focus on elements contributing to waste due to errors and delays in

procurement. The reliability of the questionnaire was pre-tested with 30 respondents and found to achieve a cronbach alpha coefficient of 0.91, which is very reliable. The approach was the adoption of participant observation and in-depth interviews with open-ended questions.

Data collection

The data gathering phase was completed in two stages: Quantitative data were collected by the researchers administering questionnaires to the selected respondents within the procurement department of the hotel. Qualitative data will be collected through participant observation and in-depth interviews with key informants.

Data analysis

Questionnaire data were analyzed with IBM SPSS Statistics version 26. Means, multiple correlation, and multiple linear regression were employed as the principal statistical techniques to determine

relationships between variables.

The focus Tree diagram analysis applied with the ECRS method was used to analyze qualitative data and identify themes and patterns from the interviews in order to arrive at workable strategies to reduce the occurrence of waste.

The use of the qualitative data was ensured to be triangulated with the quantitative data, which were made reliable by pretesting the questionnaire and computing a high cronbach alpha coefficient. The qualitative data were, in turn, triangulated with the quantitative data to improve the reliability of the findings of the study. This was to cross-check the consistency in the findings through different methods of data collection. In this regard, the methodology provides a sound framework that will aid in the understanding and addressing of the factors causing waste in the procurement processes of medium-sized hotels.

The data were interpreted by the researcher via the use of criteria for categorizing averages into ranges, which were determined by the breadth of the class interval. Gunel (2018) provides a set of criteria for the interpretation of opinion-level data.

The range of mean:

4.21-5.00: strongly agree

3.41-4.20: Agree.

2.61-3.40: Uncertain.

1.81-2.60: disagree

1.00-1.80: Strongly disagree.

In addition, the researcher conducted multiple correlation and multiple linear regression analysis, using equations appropriate for analyzing numerous variables. For problems having more independent variables has equation (Meyer, 2023):

$Y = a + b_1X_1 + b_2X_2 + ... + b_nX_n$ (1)

where:

Y = Dependent (response) Variable

$X_1...X_n$ = Independent (predictor) Variables

a = Y-Intercept or Constant

$b_1...b_n$ = Regression Coefficients

Research tools validity and reliability

In order to evaluate the reliability of the quantitative data, the researcher used a methodology that included examining the quality of the questionnaire. The pre-test of the questionnaire was sent to 30 respondents. The cronbach alpha coefficient (α-Coefficient) was computed and yielded a value of 0.91, beyond the established threshold of 0.8, indicating a reliable measure (Sekaran & Bougie, 2020). In order to enhance the dependability of qualitative data, the researcher used the strategy of triangulation, which involves the use of several data gathering techniques (Flick, 2018). The research used a range of methodologies, such as participant observation and in-depth interviews, to meticulously analyze and contrast data acquired via diverse data gathering techniques.

RESULTS

Table 1: Mean, standard deviation, and interpretation of opinions on factors affecting waste in the material procurement process of medium-sized hotel businesses

Factors	Opinions		
	$\overline{X}$	*S.D.*	Interpretation
Staff	4.27	0.29	Strongly Agree
Supplier	4.29	0.33	Strongly Agree
Machine	4.21	0.33	Strongly Agree
Procurement Management	4.39	0.32	Strongly Agree

The research conducted an analysis of opinion levels about the elements that contribute to waste resulting from errors and delays in the material purchasing process of medium-sized hotel enterprises. The findings indicate that the most significant issue is the management of the purchasing process, with an average rating of 4.39. This aspect has a substantial effect on the amount of waste generated due to errors and delays in the process of procuring materials, as shown in Table 1.

Table 2: Correlation values between independent variables and dependent variables

X1 (staff)	1				
X2 (supplier)	.615**	1			
X3 (machine)	.545**	.413**	1		
X4 (procurement management)	.393**	.434**	.423**	1	
Y (waste caused by errors and delays)	.594**	.451**	.621**	.724**	1

** *p* < 0.01 (2-tailed)

The examination of the correlation coefficients among the variables indicated that all independent variables (X) demonstrate multicollinearity within the range of 0.393-0.615 (see Table 2), suggesting a significant association among them. Moreover, a robust connection exists between the independent variables and the dependent variable, with correlation coefficients ranging from 0.451 to 0.724. This indicates a statistically meaningful relationship between the main variables and the dependent variable.

Table 3: Results of guideline recommendations for reducing waste in the material purchasing process of medium-sized hotel businesses in Thailand

	B	SE	Beta	t	Sig.	VIF
Y (waste due to errors and delays)						
X1 (staff)	0.199	0.084	0.218	2.373	0.019*	2.052
X2 (supplier)	0.163	0.100	0.171	1.936	0.035*	2.665
X3 (machine)	0.242	0.101	0.276	3.005	0.003**	2.053
X4 (procurement management)	0.502	0.116	0.428	4.317	0.000***	1.632
(Constant)	1.218	0.437		7.808	0.000	

R = 0.823 R^2 = 0.678 Adjust R^2 = 0.645 F = 32.009 Sig.=0.000** Durbin-Watson = 2.216, Mean VIF = 2.100

The multiple linear regression study examined the variables that affect waste caused by errors and delays in the material purchase process. The investigation revealed the following important statistics. The multiple correlation coefficient (R) is 0.823, the coefficient of determination (R^2) is 0.678, the adjusted coefficient of determination (adjusted R^2) is 0.645, the F Value is 32.009, the VIF value is 1.632-2.665, and the Durbin Watson Value is 2.216 (see Table 3). The investigation of the association between variables and the assessment of multicollinearity via the use of VIF values revealed that the VIFs of the factor variables exhibited a range of 1.632-2.665, and mean VIF = 2.100; all of which were below the threshold of 10. This suggests that the independent variables exhibit a degree of association that does not give rise to issues of multicollinearity or dependency among them (Black, 2016). In addition, the Durbin-Watson value of 2.216 is within the range of 1.50-2.50, indicating that the error values of the initial variables were independent (Hair et al., 2019). The findings are consistent with the first study by

further regression analysis.

From the multiple linear regression analysis of investigating factors influencing waste due to errors and delays in the material purchasing process, it was identified that staff factors, the supplier factors, tool-related factors, and purchasing process management significantly impact waste (refer to Table 3). The analysis revealed a multiple correlation coefficient (R) of 0.823 and a regression coefficient indicating a predictive power of 64.50 percent (Adjusted R^2=0.645). Based on these findings, a predictive equation can be formulated in both raw scores and standard scores, presented as follows.

Unstandardized Score

Y = 1.218+ 0.199X_1* + 0.163X_2* + 0.242X_3** + 0.502X_4**

Standardized Score

$Z(Y)$ = 0.218X_1* + 0.171X_2* + 0.276X_3* + 0.428X_4**

From the equation, it can be elucidated that staff factors, the supplier factors, machine-related factors, and procurement management collectively have the ability to predict waste caused by errors and delays in

the material purchasing process with an accuracy of 64.50 percent (adjusted R^2=0.645).

Results obtained from the use of protocols aimed at reducing waste in the acquisition of resources for medium-sized hotel businesses in Thailand. In medium-sized hotel firms, the study's findings uncover several factors that lead to waste arising from mistakes and delays in the material procurement process. The causes include many issues linked to workers, problems related to suppliers, complexities related to machines, and challenges encountered in managing the buying process.
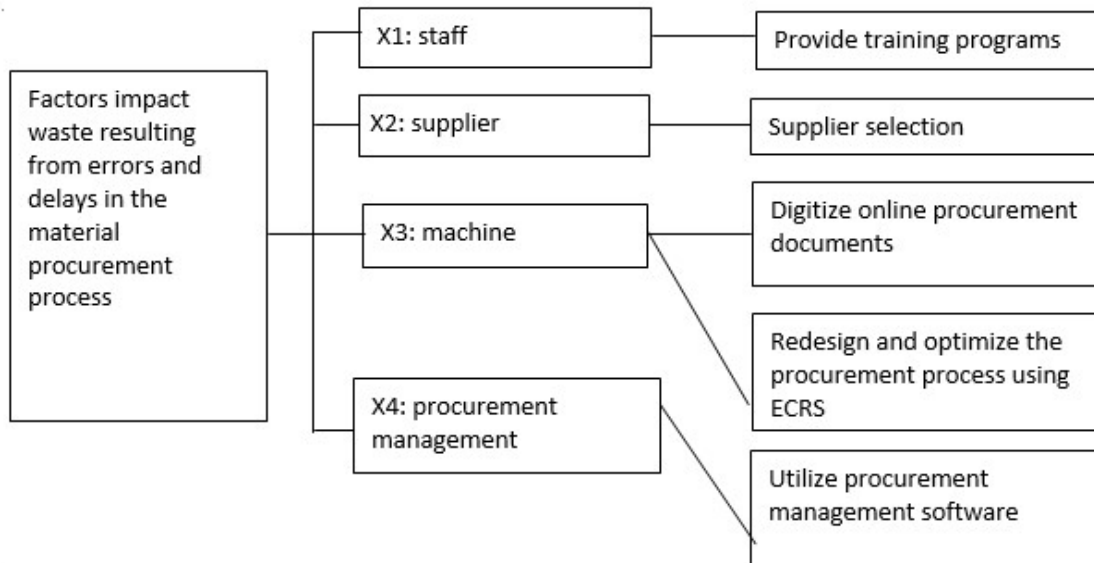
Figure 3: Tree diagram of guidelines for reducing waste caused by errors and delays in the material purchasing process

The qualitative data collected from in-depth interviews was used by the researcher to provide further elaboration on the quantitative results. This was done in order to formulate effective recommendations for waste reduction in the material purchase process. The guidelines were developed by combining a Tree diagram with ECRS methodologies. The researcher put forward a set of five guideline: procurement training, supplier evaluation, development of digital buy documentation, adoption of purchasing management software, and installation of a novel purchasing process management system using the ECRS method (see Figure 3).

Table 4: Five guideline recommendations for reducing waste in the material purchasing process of medium-sized hotel businesses in Thailand

Guideline	Explain in detail
Provide training programs for procurement staff	These training programs can be delivered through a blend of workshops, online courses, seminars, and on-the-job training to provide a comprehensive development experience for procurement staff.
Supplier selection	strategic process that plays a vital role in the success of supply chain management and procurement. It involves a thorough evaluation of potential suppliers based on criteria such as quality, price, reliability, and compliance. Effective supplier selection can lead to improved operational efficiency, cost savings, and enhanced product quality. By selecting the right suppliers, organizations can build strong partnerships that contribute to their competitiveness and overall success in the market. Overall, a well-executed supplier selection process is essential for achieving supply chain excellence and driving sustainable business growth.

Cont.....

Guideline	Explain in detail
Digitize online procurement documents	Using online procurement documents with Digitize is an efficient and convenient process. Through automated data extraction via OCR technology, users can upload documents, organize them, search for information, and collaborate effectively. With extracted data and efficient reporting capabilities, Digitize offers a user-friendly platform for managing online procurement documents in the business sector. Users can efficiently and effectively manage procurement documents, work collaboratively with others, and tailor data management to their needs. Working with others and managing procurement documents online is made quick and efficient with Digitize.
Redesign and optimize the procurement process using ECRS	By applying the principles of "eliminate, combine, rearrange, and simplify," businesses can strategically restructure and enhance their procurement processes. Through the removal of redundant steps, consolidation of related tasks, reorganization of activity sequences, and simplification of documentation protocols and communication pathways, organizations can optimize their procurement workflows. This systematic approach enables the streamlining of procurement operations, boosting efficiency, mitigating bottlenecks, and fostering increased effectiveness within the procurement function. Consequently, such initiatives can yield cost efficiencies, bolster supplier partnerships, and fortify governance over procurement activities.
Utilize procurement management software	Procurement management software serves as a valuable instrument for enhancing the efficiency of the procurement process, overseeing supplier relationships, and managing costs. To optimize the utilization of this software, it is essential to delineate organizational requirements, carefully select an appropriate software solution, diligently implement it, integrate it with existing systems, centralize procurement operations, automate routine tasks, monitor performance metrics, and engage in continuous improvement efforts.

Therefore, the researcher will explain five guideline to reduce this problem as follows in table 4. Upon implementation of the ECRS technique, significant reductions in errors were seen, with a notable fall from 5.17% to an impressive 2.85%. In addition, there was a significant reduction in the time of the material procurement process, decreasing from 1.85 days to a more efficient 1.17 days. This reduction represents a major drop of 36.75%.

Table 5: Comparison of purchasing process time before and after the renovation

Comparison	Before	After	Difference (Before-Before)	t	p-Value
Purchasing Process Time (day)	1.85	1.17	0.68	34.02	0.000***

Noted: *** Statistically significant at the 0.001 level

From table 5 guidelines for reducing waste in the material purchasing process of medium-sized hotel businesses in Thailand have been implemented three months. That showed the difference in purchasing process time between before and after improving the purchasing process was statistically significant ($p<0.001$).

DISCUSSION

The study identified multiple factors that significantly influence waste generation due to errors and delays in the material procurement process of medium-sized hotel businesses. These factors include aspects related to employees, suppliers, machinery, and procurement process management. The burden of labor placed on staff during the procurement process is considerable, which can lead to errors and delays. This is particularly evident when staff fail to provide comprehensive details on purchase orders, such as material specifications which are crucial for accurate procurement. This oversight often leads to the receipt of incorrect materials, contributing directly to wastage. These findings are consistent with those of Nugroho et al. (2020), who noted that the inadequate allocation of personnel to procurement tasks significantly affects the efficiency of the process. Similar observations were made by Muhia et al. (2017), Shekarian et al. (2022), and Moon (2020) who also reported that shortages in proficient labor contribute to delays in procurement and Srijuntrapun et al. (2022), Kattiyapornpong et al. (2023) and Filimonau (2021) encourage a more holistic, sector-wide approach to waste management, including partnerships and policy interventions, suggesting a broader strategic framework that could complement the more focused strategies in material procurement. Challenges with suppliers, such as the cancellation of orders and insufficient supplier capabilities, play a significant role in procurement inefficiencies. These issues underscore the critical nature of selecting reliable suppliers to minimize errors and delays, aligning with findings from Marek (2021) and Suresh & Mathan (2020), who highlighted supplier inadequacy as a key factor contributing to procurement challenges.

The availability and efficiency of machinery, especially tools used for inputting purchasing information, are crucial. Deficiencies in this area can lead to significant errors in order procurement. This is in line with findings from Riswandi and Yudoko (2023) and Muhia et al. (2017), who emphasized how machinery limitations can cause delays and inaccuracies in procurement processes.

The extended timeframes and procedural inefficiencies in procurement management significantly contribute to material wastage. This is corroborated by the studies of Riswandi and Yudoko (2023) and Shekarian et al. (2022), who pointed out that flaws in procurement management, including prolonged clarification processes, are major causes of procurement errors and delays.

To mitigate these issues, the study suggests several strategic interventions e.g. enhancing staff skills through targeted training programs can reduce errors and improve efficiency, as suggested by Kannu et al. (2022).

Carefully selecting reliable suppliers and fostering strong partnerships can decrease the likelihood of order cancellations and supply issues. Implementing robust online order documentation systems can streamline the procurement process, as supported by Mwangi & Kagiri (2016) who noted the effectiveness of online purchasing in reducing procurement errors. Introducing comprehensive procurement management programs that incorporate ECRS techniques can optimize the entire procurement process by systematically eliminating inefficiencies.

These strategies are designed to address the specific challenges identified in the study, aiming to enhance the overall effectiveness of the procurement process and reduce associated wastage. By implementing these measures, medium-sized hotel businesses can achieve more reliable and efficient procurement operations, ultimately leading to reduced operational costs and improved service delivery.

Practical and theoretical implications

The findings from this research are expected to identify critical inefficiencies in the procurement processes of materials for use in medium-sized hotels. This way, the top management of the hotels can identify key factors like employee training deficiencies, supplier unreliability issues, inadequacies in machinery, and management process flaws and be able to provide targeted interventions. This would be through several ways like, Improve the training of procurement staff in understanding and executing the significance of entering complete and accurate data in purchase orders. Training on the possible errors and how to avoid them should also be high. Similarly, introduce more stringent supplier selection criteria. The hotel should maintain a sound system for supplier evaluation, and the

performance should be evaluated on a regular basis, to ensure all the selected suppliers are reliable and time-conscious. This could enable the hotel to employ suppliers that can deliver up to its demand and expectations, without causing delays. At the same time purchase technological or procurement software. Technology that can automate and simplify procurement processes should be employed. The technology would help to cut down on the occurrence of human errors and improve the speed of activities execution by providing and availing information timely and accurately. Use of ECRS systematically can be instrumental in eliminating inefficiencies in the procurement process. The significant errors and delays in the study indicate that if more companies adopted this measure, they could be of great assistance in improving operational efficiency. This could improve the general performance of the company. By Creating a monitoring and evaluation framework that will continuously evaluate the effectiveness of the procurement process. The evaluation of the process will continuously adjust the gains in efficiency derived from several interventions. Success in the reduction of errors and delays when applying ECRS techniques is congruent with systems theory itself, as the latter recommends that the optimization of parts of a system would better the performance of a system. This simply means systems theory could be a very good framework for the study and improvement of procurement processes, not only in hospitality but also in other sectors of the economy. Success in improvement of the error and delay metrics has been established and now may serve as a benchmark for future research. Future studies might be focused on the scalability of such interventions in the different sizes or types of hotels or other sectors. Finally, research might probe into the long-term impacts that such improvements would have on the profit and customer satisfaction of hotels.

Limitations and future directions

The research focuses only on medium-sized hotel businesses, which may not provide generalizability to larger or smaller hotels or to other sectors within the hospitality industry. Different sizes and types of hotels may face problems peculiar to them and hence, not covered in this research. If the research were region- or country-specific, the findings may represent regional practices and not have relevance in other places. Cultural and economic differences can influence procurement practices and outcomes significantly. The research relies a lot on quantitative data through error and delay metrics. Though this gives specific measurements of the outcome, it may not measure the qualitative aspects such as employee satisfaction, supplier relations, and other intangibles that may impact the procurement process. The benefits derived subsequent to the implementation of ECRS techniques were measured over too short a period. There is no guarantee that these benefits can be kept sustained over the long term, and likewise, short-term benefits should not be taken to mean long-term benefits. Due to the lack of a control group, it is difficult to prove that the improvements indeed resulted from the interventions introduced. It may also be that other forces or industry trends brought forth such changes.

Future research should also be conducted to test the generalizability of the findings to other sectors of the hospitality industry and even other industries with a similar operational structure. This could support the validation of the efficacy of the suggested improvements under a variety of circumstances. Longitudinal studies would offer insight into the sustainability of the changes observed. This would make it possible to understand whether and how initial reductions in errors and delays are maintained over time and what additional measures may be needed to keep these reductions going. To make the findings more generalizable, future research might use a sample that is more geographically diverse. This would enable an understanding of the regional and cultural differences in the procurement processes and the effectiveness of interventions such as ECRS. Qualitative research methods, for instance, interviewing or conducting focus groups with procurement staff and suppliers, will also provide deeper insights into human and relational factors that may impact the efficiency of procurement. This might also help in identifying unseen barriers to process improvement. This study should be conducted with a control group where one group will carry out procurement using the more traditional methods and the other with the modified approach. Such a study would increase the possibility of drawing

causal inferences with respect to the effectiveness of definite interventions. The research should also look at the effect of emerging technologies, such as AI and blockchain, on the procurement processes, to have a state-of-the-art view of how further improvements in the effectiveness and reduction in the errors and delays may be realized.

CONCLUSION

The study on material procurement processes in medium-sized hotel businesses shed some light on some critical variables in waste generation due to errors and delays, which include problems in employees, suppliers, machines, and management practices. The application of ECRS techniques led to noteworthy improvements in reducing both errors and delays, hence offering a very practical guide in improving overall operational efficiency within the hospitality industry. The study identified a number of factors that have an impact on the generation of waste through errors and delays in the material procurement process of medium-sized hotel businesses. These include human resources, suppliers, machines, and procurement process management. The human resource factor is a major burden to staff during the procurement process, leading to errors and delays. This is apparent in most cases where staff fail to capture all the details on purchase orders, especially materials specifications required for accurate procurement. This is a loophole in the entire process which results in issuance of the wrong material and hence directly causes waste.

ACKNOWLEDGMENT

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