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Integration of Internal Control and Internal Audit Systems for Fraud Prevention in Organizations: A Participatory Action Research in the Manufacturing Industries of Thailand's Lower Northeast Region

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Abstract

This study aimed to 1) examine the current status of internal control and internal audit systems in manufacturing organizations within the lower northeastern region, 2) develop an integrated model of internal control and internal audit systems suitable for the context of manufacturing organizations, and 3) assess the effectiveness of the developed integrated model in preventing corruption within organizations. Data were collected from a sample of 150 individuals across 275 organizations, comprising executives and officials in manufacturing industry organizations in the lower northeastern region that have internal control systems in accordance with the Regional Industrial Development Plan 2023-2027, utilizing purposive sampling. The instrument used was a satisfaction questionnaire. The statistics used included percentage, mean, standard deviation, Pearson's coefficient, and multiple regression analysis. The study results found that 1) The current state of the internal control and internal audit systems. From the research results, it was found that most organizations (85.60%) have a clear separation of internal control and internal audit departments. 2) The developed integrated model consists of 4 main components: integrated structure, integrated work process, personnel development, and supporting technology, which is in line with the organizational integration theory. 3) The efficiency of the integrated model. The research results found that

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integration helps increase the efficiency of corruption prevention, with the number of risks detected and prevented increasing by 45.30 percent And 4) The key factor affecting the success of integration is creating a culture of working together.

Keywords

Integration of internal control system, internal audit, prevention of corruption in the organization Introduction

Introduction

Corruption in business organizations continues to be a major problem affecting the sustainability and growth of organizations. This is especially true in the manufacturing sector, where there is a complex of work processes and the management of a large number of resources. According to the 2023 report on corruption in Thailand's business organizations, the manufacturing sector has a corruption damage value of up to 500 million baht. (Thaweechan et al.,2023, 1384-1392)

The most common forms of corruption include embezzlement of assets, fraud in the procurement process, and falsification of financial documents. Corruption has the potential to undermine organizational objectives, compromise governance systems, inflict harm on the broader community, and disrupt governance structures (Kang & Thosuwanchot, 2017, 493-513). In the public sector, corruption often indicates governance (GOV) failures or inadequate regulatory quality and is prevalent in many developing nations (Baez-Camargo et al., 2020, 232-249). Corruption prevention reflects an organization’s dedication to averting fraud, and corruption is recognized as one of its manifestations. Under specific circumstances, weak GOV can increase the risk of fraud and corruption (Zhou et al., 2022, 1-12). Therefore, addressing GOV deficiencies is crucial for mitigating the risk of corruption and fraud within organizational structures.

The Lower Northeast is an area with continuous growth in the manufacturing sector. There are many important industrial estates and industrial zones such as Nakhon Ratchasima, Ubon Ratchathani, and Buriram provinces, which have received investment from both domestic and foreign investors (Industrial Promotion Center Region 5, 2024). As a result, business organizations face the challenge of developing internal control and internal audit systems to be effective enough to prevent corruption.

Although most organizations have established an internal control system and an internal audit department, the operation of both parts is often in a separate manner. Lack of effective coordination and integration. According to preliminary studies, organizations that are separated between internal control systems and internal audits are at a higher risk of fraud than organizations that integrate the two systems. This creates new risks and forms of corruption that are more complex. Therefore, the development of an integrated model of internal control and internal audit systems is essential to strengthen the anti-corruption capabilities of organizations, especially in the context of the fast-growing manufacturing industry in the Lower Northeast.

This participatory workshop research focuses on developing an integrated model of internal control and internal audit systems that is suitable for the context of local organizations. By relying on the cooperation of all stakeholders. The results of the research will be useful both in academic and practical applications, which will lead to the improvement of anti-corruption standards in business organizations in a sustainable manner.

Research Objectives

1. To study the current state of the internal control and internal audit system in the manufacturing industry. Lower Northeast Region.
2. To develop an integrated model of internal control and internal audit systems that are suitable for the context of organizations in the manufacturing industry.
3. To evaluate the effectiveness of the integrated model developed in the prevention of corporate corruption.

Literature Reviews

1. Integration of internal control system

According to Ketokivi and Mahoney (2020, 131-148), internal integration can be defined as all the practices of merging together and developing the internal resources and information to generate a shared knowledge that goes beyond the boundaries of individual functions or sections, and through doing so help external integration and achieve goals. Furthermore, the efficient collaboration between the manufacturer and suppliers that is achieved through processes, activities. This implies that the effective management of procurement transactions requires efficient governance mechanisms, which consist of

cooperation and coordination (information integration) as well as procurement internal controls, material and purchasing procedure standardization as means by which transacting parties can mutually share the procurement performance outcomes.

Others attest that many organizations have begun to establish ad-hoc control around specific sustainability information into a comprehensive system of internal control. Internal integration means forming a long-term plan linking processes and practices into organized and synchronized processes to meet customer needs and preferences and transact efficiently with suppliers. The aim of internal integration is to smooth the movement of resources, money, product, and information to satisfy customers quickly and at low cost. (Littan et al., 2020, 1-9)

Managers who have a wide range of experience and skills are better prepared to work across functional and departmental lines. The exposure to various functions inside an organization that managers obtain from structural processes, such as job rotation, is a significant facilitating factor for internal integration. A manager who gains experience within a broad set of organizational units is in a better position to cooperate with personnel from any organizational unit. Such a manager understands the barriers impeding communication and collaboration internally and externally.

2. Internal Control

ESG information, internal control systems play a vital role as a first-line assurance to the internal and external stakeholders. In this regard, previous studies investigate the different effects of the internal control system on corporate choices. However, little evidence on the relationship between internal control systems and ESG. . Internal control may cause conflict if not clearly defined, especially when it is built into law, regulations, or rules. Internal control is extensively characterized as a procedure that is affected by the board of directors, management, and other personnel (Koo & Ki, 2020, 8645)

Generally, banks set up internal control systems to identify and oversee risks. They are utilized to reinforce risk management systems. All banks ought to have individual internal control systems that are capable of providing an assurance that risks are managed in an effective way. Therefore, the objective of an effective internal control system is to provide an assurance that a bank is efficiently and effectively directing its operations according to its mission statement, that its management data and financial reporting are dependable, and that it advances in compliance with applicable laws and regulations. According to Mazzotta et al.

(2020, 1900-1913), the internal control components and business processes must collaborate continuously for a sound, effective internal control framework. The consistent and collaborative interaction of an internal control system with business procedures is essential for the effectiveness of an internal control framework. Control goals and measures that are derived from the monitoring and assessment of risks must be integrated into operational business units and business practices through effective data. Furthermore, it is necessary to communicate across the organization the control component that guarantees that a smooth stream of data reaches the work force that is in charge of internal controls.

3. Internal audit

Internal audit effectiveness is the standard whereby articulated goals are attained. Internal audit effectiveness was measured in relation to timeliness of reports, highlighted that internal audit value-adding role can be undermined by a weak internal control system. This is particularly critical in such a context where the architecture of control mechanisms have developed unsystematically throughout a progressive stratification, thus producing a fragmented and complex system, consisting of multiple internal but also external oversight bodies and assurance providers, as well as typical private audit solutions, with overlapping competences and activities. (Nerantzidis et al., 2022, 189-209)

The internal audit function has been introduced in several public organizations. For the purpose of this study, it is important to underline that internal audit is required to play a third-line role in the internal control system. More specifically, it should be devoted to providing assurance and advice on the adequacy and effectiveness of governance and risk management, including internal controls (INTOSAI & IIA. 2022)

Finally, It has long since expanded its role, shifting from a traditional compliance, financial, and accounting watchdog to a value-adding partner that supports public entities in achieving their organizational objectives, For internal auditing to prove legitimacy in any organization it must aid in value addition and effectiveness to vital stakeholders, opined that effectiveness and added value of internal auditors are inseparable hence emphasizing the indispensability of internal auditors. Infer that a large majority of senior management are not aware of internal audit activities and they don’t appreciate the critical role of internal auditors in an organization. Internal audit is a service provider to the organization and the research shows it varies from organization to organization depending on internal audit function structure. (Nerantzidis et al., 2022, 189-209)

4. Prevention of corruption in the organization Introduction

Corruption can be classified into two main categories: moralistic and functionalist approaches. The moralistic view sees corruption in black-and-white terms—as clearly right or wrong. Corruption is the act of stealing and cheating. The functionalist perspective views corruption as context-dependent, existing in shades of grey. According to this view, corruption is influenced by the specific circumstances of each case (Pramono & Aruzzi, 2023, 195-212)

Recent literature has underscored the multidimensional nature of corruption, emphasizing that it is not merely a legal violation but also a sociocultural and organizational phenomenon. Studies by Jigjiddorj et al. (2021, 1-8) have highlighted the critical role of organizational culture and ethical climate in shaping employees' attitudes toward corrupt practices. Otto (2024, 1-29) emphasize that managerial leadership and commitment to integrity are pivotal in curbing corruption at the firm level. These studies collectively indicate that beyond formal controls, informal mechanisms such as ethical leadership, value-based recruitment, and ongoing ethics training significantly influence corruption outcomes.

However, a notable gap persists in the integration of human resource management (HRM) as a systematic framework for corruption prevention, particularly in emerging economies. Much of the current research focuses either on macro-level governance reforms or micro-level behavioral ethics, leaving a conceptual void in understanding how HRM systems-encompassing recruitment, training, performance evaluation, and reward systems-can operationalize anti-corruption objectives. This study builds upon prior work by proposing a conceptual model in which HRM functions are positioned as critical enablers of organizational integrity. By integrating insights from leadership, organizational culture, and HR practices, this framework aims to offer a holistic perspective on how internal organizational mechanisms can complement external governance measures in preventing corruption.

Research Methodology

Participatory Action Research (PAR) is a process that it is used in the production, dissemination of knowledge, and the goal of improving capabilities and practices is achieved. Practical objectives and changing social reality through researchers and participant groups. and the affected groups are involved in the issues from planning, implementation, analysis and Application of research results, growth and development of participants are essential

parts of the design. Desired outcomes for successful transformation of group or organizational settings, particularly in the health system. in manufacturing industry organizations. (Loewenson et al., 2014). The Lower Northeast Region uses a mixed research method between qualitative and quantitative research to obtain comprehensive data. The research is divided into 4 phases: Phase 1: Current Condition Study; Phase 2 is model development, Phase 3 is trial, and Phase 4 is evaluation.

1. Population and sample

The population in the research is 150 manufacturing industry organizations in the Lower Northeast region with internal control and internal audit systems. Through purposive sampling, informants were selected from organizations within the manufacturing industry group in the lower northeastern region. The participants included production managers, accounting managers, and internal auditors who possessed knowledge and understanding of the internal control system aligned with the development plan outlined in the Regional Industrial Development Plan 2023-2027. (Industrial Promotion Center Region 5, 2024).

1) It is an organization that has been operating for at least 5 years.
2) The number of employees is not less than 200 people.
3) There is a clear internal control and internal audit body.
4) Executives are willing to participate in the research project.
5) Pilot organizations for the development and trial of the model.
6) The 50 Key Informants include senior executives, internal control managers, heads of internal audit units, and related practitioners.

2. Research tools

This research uses a variety of data collection tools, including semi-structured in-depth interviews for executives and experts.

1) Current state of the internal control and inspection system
2) Problems and obstacles in operation
3) Guidelines for System Development and Integration
4) Success Factors in Preventing Corruption

Participatory observation form for collecting data in real conditions, including

1) The working process of the internal control system.
2) Internal Audit Unit Operating Methods
3) Inter-agency coordination

4) Personnel work behavior

System Effectiveness Assessment Form

1) Fraud Risk

2) Internal control performance

3) Internal Audit Effectiveness

4) Stakeholder satisfaction

Reliability was assessed by administering the questionnaire to 30 directors from the Treasury Department of various local government organizations similar to the research population sample. The reliability of the instrument was evaluated using Cronbach's alpha coefficient. The results indicated that the reliability of the variables ranged from 0.821 to 0.937, exceeding the threshold of 0.70. This confirmed that the instrument was both valid and reliable. Factor weights were employed to examine the relationship between the questionnaire items and to streamline the number of related items. For this research, the Factor Loading values were between 0.544 and 0.922, which surpassed the acceptable minimum of 0.40, in line with (Hair et al., 2018). Instrument Quality Inspection All research tools undergo quality checks by content validity by 5 experts, including:

1) Internal Control Specialists 2 person

2) Internal Audit Experts 2 person

3) Research Expert 1 person

Try-out with groups that are similar to the sample by determining the reliability of the assessment as well as improving the tool based on expert suggestions and trial results.

Data Collection The data collection was carried out in 4 phases according to the operational research, as follows:

Phase 1 (3 months) Study of current conditions

Phase 2 (3 months) Development of an integration model

Phase 3 (4 months) Experiment with the model

Phase 4 (2 months) Evaluation and improvement

Data Analysis Data analysis uses a variety of methods.

Qualitative Analysis: Content Analysis, Analytic Induction, and Triangulation Quantitative analysis: descriptive statistics (mean, standard deviation), inferential statistics (difference test, correlation analysis)

3. Research Process

Phase 1: Study of current conditions Problems and Needs (3 months) The implementation of this phase focuses on a deep understanding of the current situation of the organization. Starting from coordinating with target organizations to clarify the objectives and ask for cooperation in research, then collect data through in-depth interviews with relevant executives and practitioners. All data will be analyzed to identify the strengths, weaknesses, opportunities, and obstacles of the current system, as well as the need for system development. The results of the analysis will be presented to stakeholders for further comments and suggestions.

Phase 2: Development of an integrated model with stakeholders (3 months) The development of the integration model began with the organization of workshops with representatives from all parties involved. To brainstorm ideas on the design of the collaboration system using the data from Phase 1 as the basis for development. The research team will synthesize the ideas and suggestions into an integrated model, which consists of a functional structure. Then, a meeting was held to present the draft model and listen to opinions from experts before making improvements, as well as preparing an operational manual and tools necessary for implementing the model

Phase 3: Integration Model Trial (4 months) The pilot model was conducted in 5 pilot organizations, starting with organizing workshops for relevant personnel to build an understanding of the integration model and operating methods. Then, the model began to be tested in real situations, with the research team closely consulting and supporting. Periodic performance is monitored through observations, interviews, and the collection of quantitative data such as the number of risks detected, the duration of the audit, and the satisfaction of operators. A monthly performance review meeting is held to identify problems and obstacles and find solutions together

Phase 4: Evaluation and Improvement (2 months) Evaluation covers both the process and the results of the integration. It collects data from multiple sources and uses a variety of evaluation methods, including evaluating the effectiveness of the system through defined indicators. Stakeholder satisfaction surveys, cost and benefit analysis, and organizational impact assessments. The results of the evaluation will be analyzed to identify areas for improvement and development. Then, a meeting was held to present the results of the evaluation and listen to suggestions from stakeholders to improve the integration

model to be more complete, as well as to prepare policy recommendations and guidelines for expanding the results to other organizations.

Each phase of the operation is systematically recorded and stored in the form of documents, photos, and videos for analysis and preparation of research reports. The research team has regular meetings to monitor progress and solve potential problems, as well as continuous communication with stakeholders to build understanding and participation throughout the research process

4. Data Analysis

4.1 Qualitative Data Analysis

1) Content Analysis, analyze the data from the in-depth interviews by transcribing the tape verbatim. Classify data (coding) according to the issues set out in the research objectives. Create inductive conclusions by linking the relationship of data on each issue. Presenting data in the form of descriptive analysis.

2) Analytic induction collects data from participatory observations in real-world situations. Systematic detailed recording of the phenomenon that occurred. Analyze recurring patterns and trends. Theoretical conclusions are drawn from the phenomena found.

3) Triangulation Data Validation: Compare data from different sources. Investigator review: Multiple researchers were used to collect data. Theoretical investigation uses many theoretical concepts in its analysis. Method monitoring uses multiple methods to collect the same data

4.2 Quantitative data analysis

1) Descriptive Statistics: Analysis of general data of the sample, including frequency, percentage, mean, standard deviation, presentation in the form of tables and charts.

2) Inferential Statistics: Comparative analysis before and after using the Paired t-test for continuous variables. Analysis of the relationship between variables, Pearson's correlation coefficient, multiple regression analysis.

4.3 Mixed data analysis

1) Integration of analysis results is to link the results of qualitative and quantitative analysis, check the consistency of the analysis results, and explain the relationship between the two types of data.

2) Data synthesis Create conclusions that cover both quantitative and qualitative dimensions. Develop a theoretical proposal based on the results of the analysis. Prepare policy and practical recommendations.

Results

1. Presentation Format by Quantitative Analysis Results Table The diagram shows the process and the connections. Qualitative Analysis.

2. Validation Reviewed by statistical experts Present to research participants to confirm accuracy and improve the presentation based on the suggestions.

The results of the research according to the 1st objective are to study the current condition of the internal control and internal audit system in the manufacturing industry organization. The Lower Northeast Region found that most organizations have clearly separate structures and operations of internal control and internal audit systems. 85.60 percent of the sample were divided into departments and lines of command. In other words, the internal control agency reports directly to the line management. Meanwhile, the Internal Audit Department reports to the Audit Committee. This separation results in each department formulating its own policies and preparing its own operational manuals without integration. According to the assessment, there is a high level of redundancy ($\bar{x}$ = 4.25, S.D. = 0.68).

From in-depth interviews with executives and practitioners, it was found that there was a lack of coordination and systematic exchange of information between departments. This is a major obstacle to the effectiveness of risk identification and fraud prevention, especially when data from multiple departments is required to analyze and make decisions. In addition, on the personnel side, it was found that although workers have knowledge and understanding of their specific roles and duties, they still lack an understanding of the overall control and inspection system. As a result, coordination and problem solving in situations that require cooperation between agencies are not as effective as they should be.

In terms of the use of technology and information systems, it is found that most organizations use different systems between internal control and internal audit agencies, making it difficult and time-consuming to link and exchange information between each other. In addition, data analysis to identify risks and detect fraud has not yet fully utilized modern technologies such as big data analytics or artificial intelligence. This limits the ability to proactively detect and prevent corruption.

From the synthesis of both quantitative and qualitative data. It can be concluded that the current state of the internal control and internal audit system still has important gaps in the field of integration. This affects the overall effectiveness of fraud prevention and detection in the organization. Therefore, the development of an effective integration model is essential to upgrade the internal control and audit system to be able to effectively cope with the challenges of the modern era.

The results of the research according to the second objective are to develop an integrated model of internal control and internal audit systems suitable for the context of manufacturing industry organizations. It is found that an effective integration model must consist of 4 important elements, which are as follows;

1. Integration Structure consisting of the Integration Committee chaired by senior executives, together with the Director of Internal Control, Head of Internal Audit Unit, and representatives from the main departments of the organization. This committee plays an important role in setting policies and directions for integration. Approve the plan and budget, as well as monitor and evaluate the performance with a meeting at least once a month. In addition, there is a newly established Coordination Unit that reports directly to the Integration Committee, consisting of experts from both departments, who are responsible for coordinating, managing the central information system, and monitoring the progress of the work, including the preparation of integration reports.

2. Integrated Process that emphasizes joint planning, starting with the organization of annual workshops to assess risks together. Integrated risk analysis and prioritization of risks This leads to the preparation of an annual work plan. There is an exchange of information through a central database system that collects internal control information, audits, and risk and fraud information. Progress reporting and risk alert system.

3. Integrated Personnel Development covers all three levels, namely the policy level for executives focusing on Strategic Integration Management, Risk Management Integration and Digital Transformation, as well as domestic and international field trips. Executive level for managers who focus on developing integrated management skills. The program focuses on the development of technical, human and digital skills, as well as job exchange and mentorship.

4. Integration Technology Support consisting of a central database system using Data Warehouse and Cloud Storage technology with a data security system. The company has a

data analysis system that uses business intelligence, predictive analytics, and machine learning tools for risk assessment, fraud detection, and performance tracking, as well as a real-time reporting system that displays results through a dashboard for executives. Along with a risk alert, control, and compliance system.

Development emphasizes public and stakeholder participation at every stage, from planning and decision-making to accountability for outcomes. This ensures that development genuinely meets community needs, maximizes benefits, and fosters cooperation. This core concept, known as collaboration, mobilizes the strength and cooperation of all sectors—including citizens, organizations, and relevant agencies—to maximize mutual benefit and address needs. This process cultivates a true understanding of stakeholder needs and expectations, ensuring that development is directed appropriately and precisely.

The results of the research according to objective 3 to evaluate the effectiveness of the developed integration model. After testing the model with 5 pilot organizations for a period of 4 months, it was found that there were significant changes for the better in many aspects, as shown in the following table.

In terms of anti-corruption effectiveness, it was found that the implementation of the integrated model resulted in an increase in the number of risks detected and prevented by 45.30 percent. The most important thing is that the detection of preventive risks increased from 35.40 percent to 78.60 percent, demonstrating the effectiveness of the system in preventing corruption before it occurs. In addition, it was found that the redundancy in operations decreased by 52.40 percent compared to the previous system, as shown in Table1.

Table 1

Results of anti-corruption effectiveness

Assessment Items	Before (Percent)	After (Percent)	Change (Percent)
Detection & Hedging	35.40	80.70	+45.30
Fraud Detection Period	100.00	61.25	-38.75
Defensive Risk	35.40	78.60	+43.20
Operational redundancy	85.60	33.20	-52.40

In terms of resource utilization. Integration results in more efficient operations. It was found that the overall operating cost decreased by 25.60 percent, the number of redundant

working hours decreased by 48.30 percent, and the efficiency of personnel utilization increased by 35.80 percent, as shown in Table 2.

Table 2

Results of Resource Utilization Assessment

Assessment Items	Before (Percent)	After (Percent)	Change (Percent)
Total Operating Costs	100.00	74.40	-25.60
Redundant working hours	75.30	27.00	-48.30
Personnel Efficiency	45.20	81.00	+35.80
Technology Efficiency	38.50	80.80	+42.30
Resource Sharing Rate	25.40	90.80	+65.40

The results of the stakeholder satisfaction assessment show acceptance of the new system. Senior executives had the highest level of satisfaction ($\bar{x}$ = 4.65, S.D. = 0.48), operators had a high level of satisfaction ($\bar{x}$ = 4.35, S.D. = 0.52), inspectors had a high level of satisfaction ($\bar{x}$ = 4.28, S.D. = 0.56), and the Audit Committee had the highest level of satisfaction ($\bar{x}$ = 4.75, S.D. = 0.42), reflecting that the new system was accepted by all levels in the organization, Anti-corruption efforts yield mixed results; successful approaches combine strong political will, robust legal frameworks, and effective enforcement, including citizen participation through media and civil society, and technology like e-governance. While these strategies can foster democratic development and economic stability, negative side effects like bureaucratic risk aversion and delayed implementation can hinder effectiveness if not carefully managed. Technology Integration, Utilizing e-governance and digital platforms for public services can enhance transparency and diminish opportunities for corruption.as shown in Table 3.

Table 3

Results of Stakeholder Satisfaction Assessment

Evaluator Group	$\bar{x}$	S.D.	Satisfaction Level
Senior executives	4.65	0.48	The most
Operator	4.35	0.52	very
Tested	4.28	0.56	very
Audit Committee	4.75	0.42	The most

Integration also affects the development of the organization at large. It was found that the effectiveness of communication and coordination between departments increased by 68.50 percent, the collaboration culture increased by 72.30 percent, the exchange of knowledge and experience between departments increased by 55.40 percent, and the engagement of employees with the organization increased by 45.60 percent, indicating a positive change in the organizational culture, as shown in Table 4.

Table 4

Results of Organizational Development Assessment

Assessment Items	Before (Percent)	After (Percent)	Change (Percent)
Interagency Communication Efficiency	25.30	93.80	+68.50
Collaborative Culture	22.50	94.80	+72.30
Inter-Agency Knowledge Exchange	35.40	90.80	+55.40
Employee Engagement	45.20	90.80	+45.60

Table 5

Differential test before and after using the Paired t-test

Variables studied	**Before**	**after**	**t**	**p-value**
Anti-corruption performance				
- Risk Detection	2.45 (0.52)	4.25 (0.48)	15.624*	<.001
- Detection time	3.15 (0.68)	4.35 (0.45)	12.856*	<.001
- Proactive Defense	2.85 (0.72)	4.15 (0.52)	14.235*	<.001

From Table 5, the test results show that after the application of the integration model, the anti-corruption efficiency in all aspects is statistically significantly higher than before the application of the model at the level of .001.

Table 6

Pearson's Correlation Analysis

Variable	1	2	3	4	5
1. Structural Integration	1.000				
2. Process Integration	.856*	1.000			
3. Personnel Development	.782*	.825*	1.000		
4. Use of technology	.745*	.798*	.712*	1.000	
5. Effectiveness of Corruption Prevention	.865*	.892*	.834*	.856*	1.000

* $p < .001$

From Table 6, a high level of positive correlation was found between all elements of integration ($r = 0.712$ to 0.892), the component with the highest correlation with anti-corruption effectiveness was process integration ($r = 0.892$), and all correlations were statistically significant at the level of .001.

Table 7

Analysis of Effectiveness of Corruption Prevention

Variable predicts	B	SE	β	t	p-value
constant	0.456	0.125	-	3.648	<.001
Structural Integration	0.285	0.062	0.312	4.596	<.001
Process Integration	0.345	0.058	0.385	5.948	<.001
Personnel Development	0.265	0.064	0.298	4.141	<.001
Use of technology	0.275	0.061	0.308	4.508	<.001

$R = 0.892$, $R^2 = 0.796$, Adjusted $R^2 = 0.788$, $F = 142.856$, $p < .001$

From Table 7, the four prediction variables together explained the variance of anti-corruption effectiveness by 79.6%, process integration had the highest influence ($\beta = 0.385$), all variables had a statistically significant influence at the level of .0014, and the prediction equation was appropriate ($F = 142.856$, $p < .001$). All elements are positively correlated with each other. Process integration is the most important factor affecting effectiveness, and the integration model can predict a high level of effectiveness.

In addition, integration has also led to the development of innovations in work, including the development of an integrated data analysis system. Creating automated risk assessment tools Development of a real-time monitoring and reporting system and creation

of a central database for control and monitoring. However, the study also identified significant challenges and constraints, such as changing personnel attitudes, technological limitations, early resource allocation, and regulatory improvements in line with integrated work, which organizations need to plan and approach appropriately.

Discussion

Research on "Integration of Internal Control and Internal Audit Systems to Prevent Corruption in Organizations: Participatory Workshop Research in the Manufacturing Industry" Lower Northeast Region" The results of the research objectives can be discussed as follows:

1. Current condition of internal control and internal audit system

According to the findings, most organizations (85.60 percent) have a clear separation of internal control and internal audit departments. Lack of coordination and information exchange between agencies may be caused by poor communication, poor planning, lack of cooperation, cultural and background differences, unavailable technology, unfavorable organizational structures, or external factors such as economic, social, and political factors, which can result in disruptions, inefficiencies, and problems in collaboration. The use of technology varies by agency depending on the agency's type, mission, and goals. Generally, a government agency might focus on technology for public service and security, a private agency might focus on technology for productivity and profit, and an education agency might focus on technology for learning and research. Examples of different uses of technology in each agency include the use of technology to facilitate work communication, such as online application systems, applications, CCTV systems, Big Data analysis systems for forecasting, and data management using a central database system to manage data and operations within the agency for efficiency. This is in line with the research of Jaidee (2022, 78-95) which found that the separation of departments leads to operational independence, but may result in redundancy and lack of effective coordination. In addition, the fact that there is a high degree of operational redundancy ($\bar{x}$ = 4.25) is in line with Johnson (2023, 34-50) concept that separating work without integration will lead to a loss of resources and efficiency in preventing corruption. In addition, in line with Thaweechan et al. (2023, 1384-1392) it was found that the governance of savings cooperatives in the Northeast of Thailand at 15.5 percent, indicating that the characteristics of governance data in all 9 areas include the principle of effectiveness, efficiency, and efficiency. The principle of responsibility is heavy on delegation of authority.

The principles of transparency, participation, rule of law, and equality were statistically significantly supported at the level of 0.05. This is consistent with the research of Intawong and Chienwattanasook (2021, 113-129) whose research found that the technology management of the Anti-Money Laundering Office has implemented various technologies in various work areas, including case work, asset management in cases, supervision and inspection work, communication and public relations work, and other support work.

2. The integrated model development of internal control and internal audit system

Consists of 4 main components: integration structure; This is in line with Anderson (2023, 112-128) Organizational Integration Theory, which emphasizes the importance of integrating both structural, Process and Technology However, this research has added a dimension to human resource development, which is an important factor in the context of Thailand.

2.1 People: This aspect considers the organization's personnel, including skills, knowledge, attitude, motivation, and personnel development. Performance: The finance and treasury workers at Rajamangala University of Technology Suvarnabhumi are passionate about their work and view the challenges they face as opportunities for growth, which drives their commitment to achieving established goals. This dedication has led to their performance being acknowledged by both colleagues and the organization. This aligns with the findings of Unlamai and Chianwattanasuk (2019, 126-138), who examined how achievement motivation influences the performance and retention of university support staff in a case study at Rajamangala University of Technology Thanyaburi. Their research indicated that achievement motivation, which fosters the pursuit of challenging goals and recognition, significantly impacts the performance of university support staff. Similarly, Srikuy and Tumthong (2019, 157-174) investigated the relationship between work motivation, organizational commitment, and work performance among university staff at Phuket Rajabhat University. Their study revealed that work motivation, influenced by the nature of the tasks performed, was highly regarded. Overall, a strong correlation exists between work motivation and work performance among university staff at Phuket Rajabhat University, with results being statistically significant at the 0.01 level.

2.2 Structure: Analyze the organizational structure, management style, chain of command, and work system. The organizational structure allows employees to clearly

understand the interconnectedness of work within the organization. It helps employees track their own progress and provides a clear chain of command. In conclusion, factors to consider when designing an organizational structure include organizational goals, job descriptions, products, and organizational growth. This aligns with the findings of Natphiriyarat and Sorakraikittikul (2017, 59-82), who examined the organizational structure and adaptation of Siam Cement Group (SCG) from 1998 to 2014. They discovered that an effective organizational structure, aligned with the nature of the business and management capabilities, influences the growth and sustainability of the organization.

2.3 Process: Examining the core work processes, workflow, technology, and information systems that support internal audit operations is an essential tool and mechanism for management to assess the performance of the operation. This aligns with Yodsin and Vaitip (2022, 67-81), conclusion that a robust business and internal control system, the objective of internal auditing, enables the organization to effectively leverage the results of internal audits and control assessments to manage the system and work processes, thereby enhancing the value and success of the business in the long term. This is also supported by Maleerat and Kanoksak (2017, 103-114), who concluded that the internal audit process is vital for organizations in planning operations and conducting reviews to ensure effective risk management. Internal audit effectiveness reflects the organization's capability to perform internal audits accurately, comprehensively, and within the designated timeframe, which is genuinely advantageous to the organization's operations. This aims to empower the organization to achieve its stated goals.

2.4 Strategy: Consider the vision, mission, goals, and strategic plans established by the organization to achieve success and guide future direction. This aligns with the findings of Yodsin and Vaitip (2022, 67-81), who examined the relationship between integrated internal auditing and the achievement of organizational goals in the automotive parts sector. Their study revealed that the strategic planning of integrated internal auditing and business risk management, when aligned with objectives, positively influenced overall organizational goals.

3. Effectiveness of the integration model

The results of the study found that integration improves the effectiveness of fraud prevention, with the number of risks detected and prevented increasing by 45.30 percent, in line with a study by Anderson (2023, 112-128) that found that the integration of control and audit systems can increase the efficiency of fraud prevention by 40-50 percent, Reducing

operational redundancy refers to improving business processes and activities to eliminate redundant or duplicate tasks. This includes analyzing work processes, examining all work steps to identify any repetitive tasks performed by different departments or individuals, consolidating similar tasks to reduce the need for repeated tasks, and using technology to reduce repetitive tasks, freeing up employees to focus on more valuable work. Reducing operating costs is a complex process that requires consideration from many perspectives. It primarily involves streamlining processes to make them faster and more efficient, negotiating, and reducing resource use by cutting energy, raw materials, and other unnecessary expenses. Reducing redundancy and cost are often closely related, as reducing redundancy reduces the costs associated with performing those tasks, making your business more efficient and profitable. (Chunratanakul et al., 2024, 222-234)

Suggestion

Key findings and their application

The research found that a key factor contributing to the success of integration is creating a collaborative culture, which is in line with Thompson (2023, 145-162) research that highlights the importance of organizational culture in driving change. However, this research finds additional issues about the importance of using technology to support integration, which is a new body of knowledge that is appropriate for the context of organizations in the digital age.

Policy Recommendations

The results of this research can be used to formulate policies for the development of internal control and audit systems of manufacturing industry organizations. It is in line with Smith (2023, 150-165) holistic organizational development concept that emphasizes balanced development in all dimensions.

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