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THE FACTORS INFLUENCING THE POLICE INNOVATIVE PERFORMANCE OF THE POLICE STATIONS IN THAILAND

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Abstract

This study aims to investigate the factors influencing the innovative performance of police stations in Thailand by developing a linear structural equation model. The research focuses on four key factors: technological innovation, knowledge management, culture of innovation, and innovation management. The primary objective is to assess the relationships between these factors and their influence on the performance outcomes of police stations in Thailand. By examining the direct, indirect, and overall impacts of the aforementioned factors on police station performance, this study aims to contribute to academic knowledge and offer valuable insights for the field of law enforcement. The research findings reveal that all the variables in the model have a positive direct effect on the factors influencing innovation performance, indicating their significance in driving effective performance within police stations.

The model explains 56% of the variance in the performance factors, highlighting the substantial influence of the studied variables. Among the factors, IT technology innovation exhibits the highest impact on organizational performance, followed by cultural innovation and knowledge management. Specifically, IT technology innovation has the highest direct effect on performance, followed by knowledge management. Furthermore, knowledge management, which is improved through innovation management, demonstrates the highest indirect influence on organizational performance. The study underscores the importance of IT technology innovation, knowledge management, and cultural innovation in enhancing the performance of police stations in Thailand. The research findings contribute to a deeper understanding of these factors, facilitating academic discussions

and potential practical applications in the realm of law enforcement.

Introduction

The National Police Agency plays a crucial role in upholding internal security and providing essential services to the public across the country. In today's increasingly complex social environment, characterized by various threats such as crime, terrorism, economic challenges, and environmental hazards, ensuring the safety and well-being of citizens has become a top priority (Kapuria & Maguire, 2022). Maintaining peace and order is a fundamental policy outlined in the constitutional laws of many nations, including the Kingdom of Thailand, emphasizing the importance of societal harmony

This research article explores the significance of social innovation in enhancing the performance of police stations, which serve as the backbone of the Royal Thai Police. The success or failure of the entire police organization relies heavily on the effectiveness of individual police stations and the performance of their officers (Naiyana Rattanasuwanachat et al., 2019). By fostering an environment conducive to innovation, police stations can effectively address the diverse challenges they face and contribute to the development of society, communities, and the environment.

The article delves into two critical aspects understanding social innovation and factors influencing police station performance. Social innovation refers to novel activities, products, or services that meet societal needs and are disseminated through social organizations (Laufs & Borrion, 2021). It serves as a mechanism for driving positive change, promoting fairness, and reducing inequality within society, improving the quality of life for individuals and communities. By adopting innovative strategies, police stations can effectively tackle social problems and fulfill their public duties.

The factors affecting police station performance are examined in detail. Firstly, innovative technology, encompassing hardware, software, and network technologies, plays a crucial role in crime prevention and suppression. Additionally, the absence of long-distance training programs focused on tactical technical competence for department heads has been identified as an area for improvement (Weerawut Chaichanamongkhon et al., 2020). Secondly, effective knowledge management practices, including creating, sharing, capturing, and applying knowledge within the police force, have the potential to enhance overall performance

Thirdly, an innovation culture within police stations is vital for fostering creativity, organizational learning, and the satisfaction and participation of police officers (Alosani, Yusoff & Al-Dhaafri, 2020). Research indicates

that an innovative culture acts as a mediator between quality improvement processes and the performance of police personnel. Lastly, effective innovation management, encompassing strategies, organizational structures, and project management, significantly impacts organizational performance. Emphasizing innovation management can lead to organizational success and improved performance outcomes.

In conclusion, enhancing the performance of police stations through social innovation is crucial in effectively addressing the complex challenges faced by modern societies. By embracing innovative technologies, implementing knowledge management practices, fostering an innovation culture, and employing effective innovation management strategies, police stations can elevate their performance in terms of efficiency, effectiveness, service quality, and agency development. This research article provides valuable insights into the factors influencing police station performance, offering a foundation for future research and the formulation of targeted interventions to improve the functioning of these vital institutions.

Research Objectives

The primary objective of this study is to develop a linear structural equation model that assesses the relationships between technological innovation, knowledge management, culture of innovation, and innovation management, with a specific focus on their influence on the performance of police stations in Thailand. This research aims to provide an academic contribution by offering insights into the factors that contribute to effective performance within the context of police stations.

The main purpose of this academic study is to examine the direct, indirect, and overall impacts of technological innovation, knowledge management, culture of innovation, and innovation management on the performance of police stations in Thailand. By investigating these relationships, this research seeks to enhance scholarly understanding of the key factors that contribute to the performance outcomes of police stations, providing valuable insights for academic discussions and potential practical applications in the field of law enforcement.

Scope of study

The research population for this study consisted of police station executives in Thailand, totaling 8,336 individuals from 10 districts, including the Metropolitan Police Headquarters and the Provincial Police Region 1-9 (Royal Thai Police Office, 2022).

To ensure an adequate sample size for the structural equation model analysis (SEM) and parameter estimation using the Maximum Likelihood

method, a sample group of 360 police station executives was selected. This sample size was determined based on the recommendation by Hair, Black, Babin, and Anderson (2010) that suggests setting the sample size to be 10-20 times the number of observed variables for structural equation statistical analysis. In this particular study, given a total of 18 observed variables, the researcher opted for a sample size that was 20 times the number of variables, resulting in a sample size of 360 participants.

Variables

The research variables in this study can be categorized into three types includes, the independent variable, this category comprises three variables, namely innovative technology, knowledge management, and innovation culture. These variables serve as the starting point for the analysis and investigation of their relationships with other variables. The mediator variable in this study is Innovation Management. It holds a pivotal role in examining the influence and impact of various factors on the management of innovation within the organization. The dependent variable in this study is the performance of the organization. It serves as the ultimate outcome of interest, reflecting the overall effectiveness and success of the organization in relation to the variables being examined.

Research Methodology

This research employed a quantitative research methodology with the following objectives

1) To investigate the direct, indirect, and overall influences of technological innovation, knowledge management, culture of innovation, and innovation management on the performance of police stations in Thailand.

2) To develop a linear structural equation model that examines the relationships among technological innovation, knowledge management, culture of innovation, innovation management, and the performance of police stations in Thailand.

3) To accomplish these objectives, the research methodology encompassed the following steps

3.1 Research Guidelines Clearly defined guidelines were established to provide a framework for conducting the study.

3.2 Population Determination and Sample Selection The population for the study was determined, and a sample of participants was selected based on predetermined criteria.

3.3 Development of Research Tools and instruments were created to gather data related to the research variables.

3.4 Equipment Quality Check The quality and functionality of the research equipment were verified to ensure accurate data collection.

3.5 Data Collection Data related to the variables of interest were collected from the selected sample using the research tools.

3.6 Data Analysis The collected data underwent statistical analysis to examine the relationships and patterns among the variables.

3.7 Statistical Analysis Various statistical techniques and methods were employed to analyze the data and draw meaningful conclusions from the findings.

The research plan began with an extensive review of relevant literature, including academic papers, theses, and articles from both domestic and international sources. Secondary data sources such as thesis databases, university research repositories, and electronic media were utilized to gather concepts, theories, and variables related to the service innovation performance of government agencies in Thailand. This literature review served as the foundation for developing a conceptual framework for the research.

To collect primary data, a questionnaire with an estimation scale was created based on the identified variables. The researcher sought guidance from their dissertation advisors to ensure the accuracy of the questionnaire. Content validity was established by consulting with experts in the field, who evaluated the consistency of the questions with the defined terminology. The Index of Content Validity (IOC) was calculated, with a minimum value of 0.60 considered acceptable.

To assess the quality and reliability of the questionnaire, a trial was conducted with a group of 30 individuals who shared similar characteristics to the sample group but were not included in the actual sample. This trial helped evaluate the quality of questionnaire items and determine the reliability through Cronbach's Alpha Coefficient method. A reliability coefficient (α) of 0.70 or higher was deemed acceptable for ensuring questionnaire reliability.

Once the questionnaire was finalized, data collection was conducted from the actual sample group. Confirmatory component analysis, specifically confirmatory factor analysis, was performed to validate the questionnaire's constructs. The collected data were then analyzed using the structural equation model (SEM) to examine the relationships among the variables.

Thus, the research plan involved a comprehensive literature review, questionnaire development, content validation, reliability testing, data collection, confirmation.

Population and sampling

The target population for this research consists of police station executives in Thailand, specifically the station supervisors or deputy station supervisors responsible for overseeing the police stations. The total number of individuals in this population is 8,336, distributed across 4,168 police stations (Royal Thai Police Office Operational Office, 2022).

The sample group used in this study consists of 360 police station executives in Thailand, including station supervisors and deputy supervisors responsible for crime prevention and suppression at the police stations. The sample size was determined based on the criteria for estimating the number of samples for the analysis of the structural equation model (SEM) using the Maximum Likelihood method, as suggested by Hair, Black, Babin, and Anderson (2010). They recommend that structural equation statistical analysis should have a sample size 10-20 times the number of observed variables. For this research, which involves the analysis of a structural equation model with a total of 18 observed variables, the researcher selected a maximum sample size that is 20 times the number of variables. Therefore, the sample size was determined to be 360 participants.

The sampling procedure for this research involved a two-step approach to ensure the representation of the target population and obtain a sufficient sample size. In the first step, a targeted sampling method was employed, focusing on specific areas under the supervision of the Regional Police Headquarters (Provincial Police Region 1-9) and Metropolitan Police Headquarters. This ensured coverage of diverse geographic regions within Thailand. In the second step, a quota sampling technique was implemented to determine the sample composition. The data collection process aimed to gather information from police stations in proportion to their representation in the overall population. A total of 360 participants were selected, ensuring that each police station was adequately represented based on the predetermined quota. By combining targeted sampling and quota sampling, this research achieved a balanced and representative sample that captures the perspectives and experiences of police station executives across various regions in Thailand. This sampling approach enhances the validity and generalizability of the study findings, providing valuable insights into the factors influencing the performance of police stations. The questionnaire will be distributed to each individual participant in their respective police stations. The targeted respondents for the questionnaire are the police station executives, including station supervisors and deputy supervisors responsible for crime prevention and suppression at the police stations. This ensures that the survey captures the perspectives and insights of the key personnel involved in the management of the police stations. By directly engaging with these individuals, the questionnaire aims to gather detailed and specific information about the factors influencing the performance of the police stations.

Tools and instruments

The process of developing and ensuring the quality of the research tool involved several key steps. First, relevant information was gathered from academic research reports, books, documents, and articles to establish a strong foundation for the study. Based on this collected information, a conceptual framework was formulated, outlining the key variables and their interrelationships. Next, a questionnaire was created to effectively capture the research objectives. The questionnaire comprised two parts multiple-choice questions and Likert rating scales. The multiple-choice questions aimed to gather basic demographic information about the respondents, such as gender, age, education level, employment status, length of work experience, and affiliation. The Likert rating scales were utilized to explore the variables of interest. The questionnaire covered five aspects technological innovation, knowledge management, culture of innovation, innovation management, and organizational performance. Respondents were asked to rate the significance of each factor's influence on decision-making using a five-level Likert scale. The developed questionnaire underwent careful consideration and refinement to ensure its quality. This involved assessing the clarity of the questions, logical flow, and appropriateness for capturing the desired information. Additionally, experts and advisors provided input to enhance the questionnaire's content validity. By following this systematic approach, the research tool was tailored to address the research objectives effectively. Its quality and reliability were verified through careful development, content validation, and refinement, ensuring that it accurately captured the intended variables and facilitated meaningful data collection for the study.

Data Collection

This study adopts a quantitative research method, and data collection is conducted using two methods

Primary Data Collection, this method involves gathering data directly from police station executives in Thailand. A total of 380 individuals were selected as the sample group, and data collection was conducted through an online system. The selected police stations were provided with questionnaires to be completed by the executives themselves. Subsequently, the completeness and accuracy of all received questionnaires were verified to ensure data quality for subsequent analysis.

Secondary Data Collection, this method involves conducting a comprehensive review of information sources, including scholarly articles, research reports, books, and online media, related to the concepts, theories, and research studies relevant to the factors influencing the operational performance of police stations in Thailand. This secondary data is utilized as a valuable source of information for analysis and data synthesis. By employing both primary and secondary data collection methods, this study aims to gather comprehensive and

reliable data to address the research objectives and provide a robust analysis and interpretation of the findings.

Data Analysis

The data collected from the questionnaires were analyzed using the SPSS software, which is a widely used statistical package. The statistical techniques employed in the data analysis include. Descriptive statistics were used to summarize and describe the characteristics of the respondents. This involved calculating measures such as means, percentages, frequencies, and standard deviations. The analysis was performed on different sections of the questionnaire, including general information about the respondents (Part 1) and Likert scale questions (Parts 2, 3, 4, and 5). Content analysis was also employed to interpret open-ended questions in Part 2.

Hypothesis Testing, the Pearson correlation analysis was conducted to evaluate the hypotheses regarding the relationships among the variables. The significance level was set at 0.05, and the strength and direction of the correlations were assessed based on the interpretation of the correlation coefficient. By utilizing these statistical techniques, the data were analyzed to gain insights into the general characteristics of the respondents and examine the relationships between variables. The findings from the data analysis provide valuable information for drawing meaningful conclusions and implications for the research objectives.

The research hypotheses were evaluated by encoding the obtained data using the SPSS software (Statistical Package for the Social Sciences) Version 23.0. The data were analyzed using descriptive statistics to summarize the characteristics of the variables. Additionally, inferential statistics were applied, specifically Structural Equation Modeling (SEM) and Path Analysis, using SPSS-AMOS. SEM and Path Analysis allowed for the examination of the relationships between variables and the evaluation of the overall model fit. These statistical techniques facilitated a deeper understanding of the underlying mechanisms and direct and indirect influences among the variables of interest. By utilizing SPSS-AMOS for the statistical analysis, the research aimed to assess the research hypotheses and provide insights into the complex relationships and pathways among the variables. The findings from the SEM and Path Analysis contribute to a comprehensive understanding of the research topic and support evidence-based conclusions and recommendations.

Result

The study ensured the confidence and reliability of the data through several measures. Firstly, the quality of the questionnaire was assessed for content validity by five experts) who checked the alignment between the questionnaire's structure and theoretical content. The Concordance Index (IIT) technique was used to calculate the consistency index, and questions with an IIT value greater than 0.60 were selected.

Consequently, the questionnaire comprised 51 items with an IIT score of 1.00, meeting the acceptable criterion. To further validate the questionnaire's reliability and effectiveness, the researcher conducted a pre-test with a group of 30 similar samples to the actual study participants. This pre-test aimed to evaluate the discriminant power and accuracy of the questionnaire. Based on the results, the data validity and reliability were deemed sufficient for collecting data with the real samples. Moreover, the reliability of each variable group was assessed by calculating the Corrected Item-Total Correlation, which measures the power of classification for each variable. Additionally, Cronbach's Alpha value was computed to determine the questionnaire's overall reliability and the consistency of information gathered from the sample. In this study, data were collected from a total of 360 samples.

The baseline statistics provide an overview of the sample characteristics in this study. The sample consisted of 360 individuals who were police station executives, specifically police station superintendents or deputy superintendents responsible for the suppression department in the police station. The sample size was determined based on the criteria proposed by Hair, Black, Babin, and Anderson (2010) for structural equation model (SEM) analysis, which suggests a sample size of 10-20 times the number of observed variables. In this study, since there were 18 observed variables, a maximum sample size of 20 times was chosen, resulting in a sample size of 360.

The researcher conducted a comprehensive analysis of various variables in this study. The first variable examined was the Technology Culture, which encompassed three observable variables hardware technology, software technology, and network technology. These variables were assessed to understand the level of technological infrastructure and capabilities within the organization. The second variable focused on Knowledge Management, comprising four observable variables knowledge storage, knowledge sharing, applying knowledge, and knowledge creation. This analysis aimed to evaluate the organization's knowledge management practices, including how information was stored, shared, and utilized to enhance performance and innovation. Moving on, the Culture of Innovation variable consisted of four observable variables innovation creation, corporate learning, people's satisfaction and participation, and motivation and relationship. This assessment provided insights into the organization's overall innovative culture, including factors such as idea generation, learning opportunities, employee satisfaction, and collaborative relationships. The fourth variable examined was Innovation Management, which encompassed four observable variables innovation strategy, culture and organizational structure, project management, and innovation strategy. This analysis aimed to assess the organization's approach to managing and implementing innovation, including strategic planning, organizational structures, project management practices, and the alignment of innovation efforts with overall business objectives. Lastly,

the Organizational Performance variable consisted of five observed variables budget perspective, service user perspective, internal process perspective, perspectives on learning and growing, and budget perspective. This analysis aimed to evaluate the organization's performance from multiple perspectives, including financial aspects, customer satisfaction, internal processes, and learning and growth initiatives. By analyzing these variables and their corresponding observable measures, the researcher gained a comprehensive understanding of the organization's technological capabilities, knowledge management practices, innovative culture, innovation management strategies, and overall performance. These insights laid the foundation for further analysis and exploration of relationships between variables in the study.

The researcher presents the results of the confirmatory factor analysis of the variables within the conceptual framework of the study, as follows, technology Culture The analysis confirmed that the three observable variables, namely hardware technology, software technology, and network technology, are reliable indicators of the overall technology culture construct. Knowledge Management The results indicate that the four observable variables—knowledge storage, knowledge sharing, applying knowledge, and knowledge creation—adequately represent the underlying construct of knowledge management. Culture of Innovation The analysis supports the notion that the four observable variables—innovation creation, corporate learning, people's satisfaction and participation, and motivation and relationship—reflect the culture of innovation construct effectively. Innovation Management The findings suggest that the four observable variables—innovation strategy, culture and organizational structure, project management, and innovation strategy—successfully capture the essence of the innovation management construct. Organizational Performance The analysis confirms that the five observed variables—budget perspective, service user perspective, internal process perspective, perspectives on learning and growing, and budget perspective—appropriately measure the organizational performance construct. These results provide validity and reliability evidence for the selected variables and their alignment with the conceptual framework of the study. The findings support the researchers' assumptions and provide a solid foundation for further analysis and interpretation of the data.

Table1: Correlation coefficient

Observe variable	**Correlation**		
	Hardware Technology (IT1)	**Software Technology (IT2)**	**Network Technology (IT3**
Hardware Technology (IT1)	1.00		

Software Technology (IT2)	0.70**	1.00	
Network Technology (IT3	0.32**	0.57**	1.00
KMO: Measure of Sampling Adequacy = 0.51			
Barlett's Test of Sphericity: Chi-Square = 15.15, df = 3, p = 0.02*			

Observed Variables Correlation Coefficients

Hardware Technology (IT1) 1.00

Software Technology (IT2) 0.70** 1.00

Network Technology (IT3) 0.32** 0.57** 1.00

KMO: Measure of Sampling Adequacy = 0.51

Barlett's Test of Sphericity: Chi-Square = 15.15, df = 3, p = 0.02*

**Note: ** indicates a significant correlation coefficient at $p < 0.01$.

In the table above, the observed variables (IT1, IT2, and IT3) represent different aspects of technology, namely hardware, software, and network technology. The correlation coefficients show the relationships between these variables. The correlation coefficient between Hardware Technology (IT1) and itself is 1.00, as it represents the same variable. The correlation coefficient between Software Technology (IT2) and Hardware Technology (IT1) is 0.70, indicating a positive and moderate correlation between these two variables. Similarly, the correlation coefficient between Network Technology (IT3) and Hardware Technology (IT1) is 0.32, suggesting a weaker positive correlation. The correlation coefficient between Software Technology (IT2) and itself is 1.00, as it represents the same variable. The correlation coefficient between Network Technology (IT3) and Software Technology (IT2) is 0.57, indicating a positive and moderate correlation between these two variables.

Finally, the correlation coefficient between Network Technology (IT3) and itself is 1.00, as it represents the same variable. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.51, which suggests a moderate level of adequacy for the analysis. The Bartlett's Test of Sphericity is statistically significant (Chi-Square = 15.15, df = 3, p = 0.02*), indicating that the variables are not completely unrelated and can be meaningfully analyzed together.

The analysis of the model's confirmatory factor assessing, assessing the goodness of fit of the structural equation model's factors influencing the innovation performance of police stations in Thailand, is presented. The correlation values between the observed variables (18 variables in total) in the structural equation model's factors influencing the innovation performance of police stations in Thailand were examined. The analysis revealed a total of 136 pairs of significant correlations, with statistical

significance at the .01 level. These results indicate that the observed variables exhibit positive and significant relationships, ranging from 0.07 to 0.75. Additionally, the Bartlett's Test of Sphericity was performed with a Chi-Square value of 136.37 and 82 degrees of freedom, yielding a p-value of 0.00. This significant result aligns with the findings of the Kaiser-Meyer-Olkin (KMO) measure, which yielded a value of 0.55. This suggests that the correlation matrix of the observed variables used in the study is not an identity matrix and demonstrates sufficient interrelatedness among the variables to conduct further analysis of the structural components and evaluate the structural validity or analyze the structural equation model. These findings provide evidence of the interrelationships among the observed variables and support the use of the structural equation model to examine the structural components and investigate the fit of the structural equation model for analyzing the factors influencing the innovation performance of police stations.

Table 2: The statistical analysis examined the internal influence within the structural equation model of factors affecting the innovation performance of police stations in Thailand.

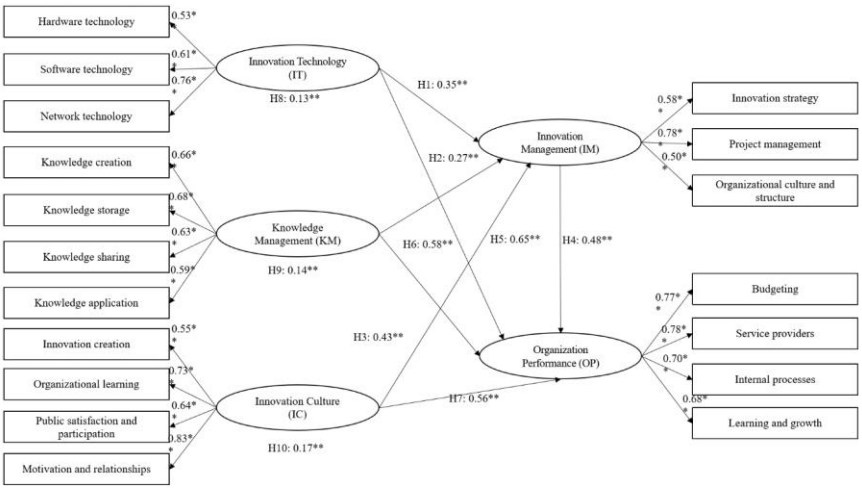
Variable	R^2	Impact	Causal factor			
			Innovation Technology IT	Knowledge KM	Innovation Vulture IC	Innovation Management (IM)
Innovation Management (IM)	0.39	DE	0.35**	0.27**	0.43**	
		IE				
		TE	0.35**	0.27**	0.43**	
Organization Performance (OP)	0.57	DE	0.65**	0.58**	0.56**	0.48**
		IE	0.13 **	0.14**	0.17**	
		TE	0.76**	0.72**	0.73**	0.48**

Note: *p<.05, **p<.01: DE refers to Direct Effect, IE refers to Indirect Effect, TE refers to Total Effect.

All the variables in the model have a positive direct effect on the factors influencing the innovation performance of police stations in Thailand. When considering the combined explanation of the variance in the performance factors (R2), it is found to be 56%. When examining the total effects, it is observed that IT technology innovation has the highest impact on organizational performance with a value of 0.76, followed by cultural innovation with a value of 0.73, and knowledge management with a value of 0.72. However, when considering the direct effects specifically, IT technology innovation has the highest impact on organizational performance with a value of 0.65, followed by knowledge management with a value of 0.58. Regarding the indirect effects, it is found that knowledge management, which has been improved through innovation management, has the highest indirect influence on

organizational performance, with a value of 0.14. Based on the findings from the development of the structural equation model for factors influencing the innovation performance of police stations in Thailand, it can be concluded that IT technology innovation has the greatest impact on organizational performance, followed by knowledge management and cultural innovation, respectively.

Figure 1: Model of the factors influencing the police innovative performance of the police stations in Thailand



The findings from the structural equation model examining the factors influencing the innovation performance of police stations in Thailand revealed that IT innovation had the most significant impact on organizational performance, particularly on operations. This was followed by knowledge management and organizational culture. The statistical analysis of the variables and components of each latent variable is presented. All the causal variables in the model demonstrated a positive influence on the factors affecting innovation performance in Thai police stations. Collectively, these variables accounted for 56 percent of the variance in performance factors (R2). Specifically, the impact of IT innovation on operations was the highest, with a coefficient of 0.76. This was followed by the influence of innovation culture at 0.73 and knowledge management at 0.72. In terms of technology innovation's effect on overall organizational performance, it had the greatest impact on operations with a coefficient of 0.65, followed by knowledge management at 0.58. Regarding indirect influences, it was found that knowledge management had the most significant indirect influence on organizational performance through innovation management, with a coefficient of 0.14. This indicates an improvement in performance resulting from the indirect relationship between knowledge management and innovation management.

Results of hypothesis testing:

Hypothesis 1: Technological innovation has a significant influence on innovation management. The study found that technological innovation significantly affects innovation management ($p < .01$), supporting Hypothesis 1.

Hypothesis 2: Knowledge management has a significant influence on innovation management. The study found that knowledge management significantly affects innovation management ($p < .01$), supporting Hypothesis 2.

Hypothesis 3: Innovation culture has a significant influence on innovation management. The study found that innovation culture significantly affects innovation management ($p < .01$), supporting Hypothesis 3.

Hypothesis 4: Innovation management has a significant influence on organizational performance. The study found that innovation management significantly affects organizational performance ($p < .01$), supporting Hypothesis 4.

Hypothesis 5: Technological innovation has a significant influence on organizational performance through innovation management. The study found that technological innovation significantly affects organizational performance through innovation management ($p < .01$), supporting Hypothesis 5.

Hypothesis 6: Knowledge management has a significant influence on organizational performance through innovation management. The study found that knowledge management significantly affects organizational performance through innovation management ($p < .01$), supporting Hypothesis 6.

Hypothesis 7: Innovation culture has a significant influence on organizational performance through innovation management. The study found that innovation culture significantly affects organizational performance through innovation management ($p < .01$), supporting Hypothesis 7.

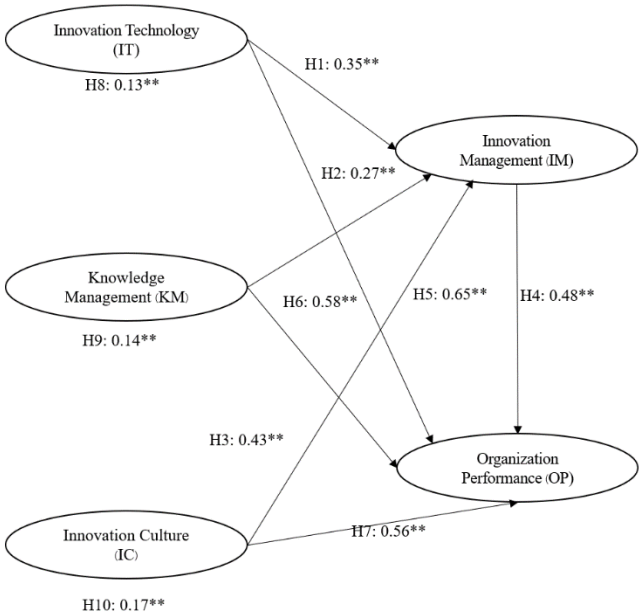
Hypothesis 8: Indirect effects of innovation management on organizational performance are mediated by innovation management. The study found that innovation management has indirect effects on organizational performance mediated by innovation management ($p < .01$), supporting Hypothesis 8.

Hypothesis 9: Indirect effects of knowledge management on organizational performance are mediated by innovation management. The study found that knowledge management has indirect effects on organizational performance mediated by innovation management ($p < .01$), supporting Hypothesis 9.

Hypothesis 10: Indirect effects of knowledge management on organizational performance are mediated by innovation management.

The study found that knowledge management has indirect effects on organizational performance mediated by innovation management ($p < .01$), supporting Hypothesis 10.

Figure 2: Summary of Model of the factors influencing the police innovative performance of the police stations in Thailand



In this study, a total of 360 questionnaires were collected, representing 100% response rate, which was considered suitable for conducting structural equation analysis. Data accuracy and precision were ensured through various analyses, including Assessment of discriminant power and reliability using Cronbach's Alpha values for each group of variables. Basic statistics to describe the sample characteristics. Calculation of mean, standard deviation, skewness, and kurtosis for each variable. Examination of correlations between observed variables. First-order Confirmatory Factor Analysis (CFA) to evaluate the measurement model and factor loadings, utilizing factor analysis to identify relevant variables. Hypothesis testing using statistical values such as regression weights (factor loadings), squared multiple correlations (R2), Chi-square, degrees of freedom, X2/df, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), root mean square residual (RMR), and root mean square error of approximation (RMSEA). During the CFA analysis, adjustments were made to achieve model fit, considering Modification Indices (MI) and Standardized Residual Covariance values. Variables with problematic values (-2 to 2) were trimmed from the analysis.

The final step involved conducting confirmatory factor analysis (CFA) using the AMOS program to establish the appropriate measurement model for structural equation analysis. The results showed that technology innovation, knowledge management, innovation culture,

innovation management, and organizational performance were all at high levels, aligning with theoretical expectations. The observed variables demonstrated component weights ranging from 0.58 to 0.83, and the reliability of latent variables ranged from 0.20 to 0.30. The structural equation analysis indicated a good fit for the model (Chi-Square = 80.523, df = 85, p = 0.01, X2/df = 0.95, RMSEA = 0.03, RMR = 0.02, GFI = 0.89, AGFI = 0.82, p-value = 0.01).

Conclusion and discussion

The study of Yuthana Klaikaew (2019) supports Hypothesis 1, which suggests that technological innovation significantly influences innovation management. The motivation of police officers at Muang Trat Police Station to perform their duties can be attributed to the efficient management of innovations facilitated by technological innovations. The use of questionnaire tools and statistical hypothesis testing methods such as t-tests and one-way ANOVA enables immediate data analysis and comparison of means and standard deviations among different groups, thus assessing motivation in task performance. Technological innovation plays a crucial role in innovation performance as it brings about changes and advancements in organizational processes. It enhances work efficiency, product quality, competitiveness, and market leadership. Technological innovations contribute to process improvements, reduce operational time and resource consumption, and increase confidence in meeting customer or public needs effectively. In the case of police officers at Muang Trat Police Station, their high motivation to perform can be linked to technological innovation, which influences innovation management. The use of modern tools and methods for quick data exploration and analysis, along with various technological innovations, enhances the ability of police officers to perform their duties effectively. This, in turn, leads to more efficient development and improvement of future innovation operations. Furthermore, motivation to perform is vital in driving and fostering innovation within an organization. It creates an environment where employees can present and implement new ideas, encouraging learning and the development of new skills. This adaptability to technological and social changes enables efficient work aligned with current conditions.

Hypothesis 2 suggests that knowledge management has a significant influence on innovation management, which aligns with the findings of Lerawongrat (2015). The study indicates that effective and efficient knowledge management can lead to the development and improvement of using closed-circuit television (CCTV) technology to support police station operations in combating crime. Effective knowledge management establishes a strong foundation for innovation and facilitates the integration of new technologies into organizational practices. The study highlights the importance of knowledge

management in supporting and promoting innovation management within an organization. Knowledge management plays a crucial role in innovation operations by enabling the collection, storage, and appropriate presentation of valuable knowledge and information. It helps organizations gather and access knowledge and experiences systematically, fostering innovation. Additionally, knowledge sharing and information exchange within the organization create a stimulating environment for learning and developing new capabilities. This is essential for effectively adapting to technological and social changes. In practice, knowledge management is facilitated by the appropriate use of technology and tools. Utilizing suitable technology and tools for knowledge storage, comprehension, and efficient data sharing enhances the utilization of knowledge in innovation development. Moreover, creating and promoting a culture that values knowledge sharing and learning within the organization facilitates the perception and application of new knowledge. This, in turn, accelerates the development and improvement of innovations within the organization. So, the study emphasizes the significance of knowledge management in supporting and enhancing innovation management. Effective knowledge management enables organizations to effectively gather, utilize, and share knowledge, leading to the efficient development and improvement of innovations.

Hypothesis 3: Innovation culture has a significant influence on innovation management. This is consistent with the findings of Weerawut et al. (2020), as they identified that a strong innovation culture is crucial for effective innovation practices in organizations. A culture that promotes innovation inspires and stimulates creativity and fosters the development of innovation within the organization. Building an innovation culture within an organization leads employees to have high imagination and creative thinking, supporting the adoption of new technologies and ideas to enhance the value and excellence of products, services, and work processes. In practical terms, supporting an innovation culture involves creating an open and supportive environment that allows for trial and error to encourage independent work and the exploration of new ideas. Organizations also establish spaces that facilitate the sharing of knowledge and experiences derived from the application of technology and innovation. They promote and support the formation of diverse and capable teams for innovation and create an environment that encourages employees to progress and be ready to adapt to technological changes and market competition. Therefore, the hypothesis that innovation culture has an influence on innovation management is supported by the research findings of Weerawut et al. (2020which emphasize the importance of innovation culture in driving efficient and effective innovation practices within an organization.

Hypothesis 4: Innovation management has a significant influence on organizational performance. This is consistent with the findings of

Sanchai (2021) who highlighted that effective innovation management can enhance an organization's ability to adapt to rapid market and technological changes. Innovation management fosters flexibility and change within the organization, enabling it to adjust and respond quickly to evolving situations. Additionally, effective innovation management instills confidence in employees, promoting their progressive mindset and creative thinking, which supports the development of new innovations. Furthermore, it establishes frameworks and mechanisms that facilitate innovation creation and development within the organization, including processes for idea generation, experimentation, and implementation. Creating a culture that promotes and supports innovation at all levels of the organization creates an environment conducive to innovation and teamwork. This includes providing suitable spaces for innovation and teamwork, fostering collaborative work environments, and encouraging knowledge sharing and experiences among team members. Effective innovation management also contributes to knowledge management and sharing, as it involves collecting, organizing, and storing knowledge related to innovation. It promotes and supports the sharing of knowledge and experiences among employees and teams derived from innovation creation and implementation within the organization. Therefore, it can be concluded that innovation management plays a crucial role in organizational performance by fostering flexibility, promoting innovation, creating spaces for innovation and teamwork, and facilitating knowledge management and sharing. It enables organizations to efficiently develop and adapt innovations, effectively respond to market competition, and drive positive outcomes.

Hypothesis 5: Technological innovation has a significant influence on innovation management and organizational performance. This aligns with the findings of Busanad (2016), highlighting the importance of investing in intellectual capital and leveraging technology to manage knowledge and drive innovation. By integrating technology into knowledge management and innovation processes, organizations empower employees to utilize existing knowledge and intellectual resources to create new innovations and improve work processes. This enables organizations to enhance their efficiency, effectiveness, and adaptability to respond to competitive market and technological changes. Furthermore, the study emphasizes the significance of measuring financial and quantitative outcomes of innovation, which can be achieved through the integration of technology. This enables organizations to effectively measure their innovation performance in terms of both financial and quantitative aspects, facilitating analysis and continuous improvement of innovation initiatives according to the organization's needs. The study by Busanad (2016) provides valuable insights into the management of technological innovation, emphasizing the importance of intellectual capital and the application of technology to foster innovation. It supports the hypothesis that technological

innovation has a profound impact on innovation management and organizational performance by enabling organizations to be flexible and responsive to changing market conditions and competition. Therefore, the findings of Busanad's study support the hypothesis that technological innovation influences innovation management, leading to improved organizational performance.

Hypothesis 6: Knowledge management has a significant impact on innovation management and organizational performance. This hypothesis is supported by the research conducted by Alosani et al. (2020), which found that an innovation culture mediates the relationship between quality improvement processes and organizational performance. The study highlights the crucial role of knowledge management in fostering innovation within an organization. By creating an environment that promotes knowledge sharing and innovation, organizations can operate more efficiently and achieve better results. The study also emphasizes the importance of effective quality improvement processes in driving organizational performance and development. Thus, the research by Alosani et al. (2020), confirms the positive influence of knowledge management on innovation management and organizational performance, while also establishing the link between quality improvement processes and organizational performance.

Hypothesis 7: The innovation culture has a significant influence on innovation management and its impact on organizational performance. This is supported by the research conducted by Ernst, Veen, and Kop (2021) in the context of police organizations. The study highlights the crucial role of an innovation culture in fostering and supporting technological innovation within police organizations. By creating a culture that emphasizes the recognition and support of technological innovation, organizations can achieve improved operational efficiency and better performance outcomes. Additionally, the research emphasizes the importance of researching and experimenting with new technologies within police organizations, specifically those related to police work, to enhance responsiveness to new forms of crime. Through research and experimentation with new technologies, organizations can promote innovation and development, while establishing a culture that supports and stimulates innovation through the adoption of new technologies. Consequently, this contributes to improved operational effectiveness and appropriate development within police organizations.

H8: The culture of innovation has an indirect influence on innovation management and its impact on organizational performance. This hypothesis is supported by the research conducted by Mohammed Busanad (2016), Alosani, Yusoff, and Al-Dhaafri (2020), as well as Ernst, Veen, and Kop (2021). The studies emphasize the importance of fostering an innovation culture within police organizations, as it plays a significant role in generating and supporting technological innovation.

By creating a culture that values and supports technological innovation, organizations can improve their operational efficiency and achieve better performance outcomes. Furthermore, the research highlights the significance of planning and introducing technological innovations within police organizations to enhance their responsiveness to new forms of crime. Ernst, Veen, and Kop's (2021) study provides insights and lessons on how to effectively integrate technology into police organizations through research, experimentation, and the development of suitable technological innovations. Additionally, Alosani et al. (2020) research emphasizes the relationship between quality improvement processes and organizational performance. It suggests that establishing a culture that supports and stimulates innovation contributes to improved operational effectiveness and appropriate development within organizations. In conclusion, by aligning with the findings of Busanad (2016), Alosani et al. (2020) and Ernst et al. (2021), effective innovation management practices that embrace and apply knowledge from these studies will have an indirect impact on organizational performance, leading to improved efficiency and effectiveness.

Hypothesis 9: Knowledge management has an indirect influence on organizational performance through the management of innovation. This is consistent with the findings of Weerawut et al. (2020) regarding the development of remote training systems for the technical competence of crime prevention unit supervisors in the 5th Regional Police Station. The study revealed that the developed remote training system is essential and has an impact on the organizational performance. By implementing innovation management through the development of remote training systems for technical competence in crime prevention, knowledge and skills of supervisors are enhanced, leading to effective performance in fulfilling their responsibilities. Additionally, the study by Sanchai (2021) on the management of knowledge in electromagnetic wave technology for stopping and preventing car theft demonstrated that the development and implementation of electromagnetic wave technology as a tool for stopping suspect vehicles is an innovative approach that influences organizational performance. The developed system helps law enforcement officers to effectively stop suspect vehicles, providing evidence that knowledge management and the development of innovative technologies have a significant impact on organizational performance. Therefore, effective knowledge management and the implementation of innovation management positively influence organizational performance, as supported by the research studies mentioned above.

Hypothesis 10: Knowledge management indirectly influences organizational performance through innovation management. This is supported by the findings of Kittithanatat Lewongrat (2015), who conducted a study on the development of closed-circuit television (CCTV) technology to support the administration of police stations at the

Metropolitan Police Headquarters. The study demonstrated that the integration and improvement of CCTV technology at police stations, specifically through the use of motion detection and recording technology, enhances security measures and enables effective incident response. Additionally, Yuthana and Klaengkao (2019) conducted a study on the development and enhancement of CCTV technology to improve security and support police station administration. The study found that the implementation of the "Miracle Eyes" project, which involved the installation of CCTV technology at police stations in Bangkok, was effective in crime suppression and aligned with the organization's needs. Furthermore, studies have emphasized the importance of police officers' motivation and the adoption of new technologies to increase operational efficiency and address emerging forms of crime. By examining innovations and technologies implemented in police organizations in other countries, adaptations can be made to suit the specific needs and circumstances of Thai police organizations. Collaboration with academic institutions and technology experts is essential in order to effectively develop and utilize technology within police organizations. In summary, knowledge management indirectly influences organizational performance through innovation management in police organizations. The integration of new technologies, such as CCTV systems, plays a vital role in enhancing crime suppression efforts and improving organizational management. Additionally, continuous exploration and implementation of innovative technologies, along with collaborations with academic institutions and technology experts, are necessary to ensure effective development and utilization of technology within police organizations.

Contribution

This research study makes significant contributions to the field of innovation management and organizational innovation within police departments, particularly in relation to the utilization of technology. The findings of the study reveal that the introduction of technological innovations has a notable influence on the management of innovation within police departments. By integrating new technologies into their workflows, police departments can enhance the efficiency of their command operations. Modern technology can improve observation, investigation, and crime prevention, thereby increasing the effectiveness of law enforcement efforts. Knowledge management emerges as a crucial component in supporting innovation management within the police force. Effective knowledge management involves gathering, sharing, and utilizing knowledge within the organization. By enabling police officers to access relevant information and expertise, innovation can be fostered. It is essential to establish processes and systems that facilitate knowledge sharing and collaboration among police organizations. Furthermore, the study emphasizes the significance of

cultivating an innovation culture within police departments. By creating an organizational culture that values and nurtures innovation, police officers are encouraged to be creative, adapt to new situations, and embrace technological advancements. Establishing an environment that promotes risk-taking, experimentation, and learning from failure can foster a culture of innovation among police officers. The impact of these measures on organizational performance is a critical aspect discussed in this study. Effective management and implementation of innovation can enhance the efficiency of police operations, thereby strengthening their ability to respond to incidents and maintain law and order. Additionally, it can lead to improved crime prevention, enhanced public safety, and increased public confidence and trust in the police. However, the study acknowledges that external factors influencing the adoption and support of innovation within police organizations remain unclear. Therefore, police organizations should consider reshaping their organizational environment to foster continuous utilization and support of innovation. Developing a framework that facilitates innovation and change within the organization is crucial.

In conclusion, this study underscores the importance of technological innovation and knowledge management in supporting and improving the efficiency of police operations. By cultivating an innovation culture and leveraging technology to enhance their practices, police departments can make significant strides in crime suppression and gain public trust and confidence in their abilities.

Implication

The implications of the research results and models obtained from this study are manifold. These implications can guide decision-making, strategic planning, performance improvement, foster innovation and creativity, and contribute to organizational learning within police organizations following:

1. Decision-making

The research findings and models provide executives with a deeper understanding of the factors influencing innovation performance. This enables them to make more informed and confident decisions by considering the impacts associated with various choices. The research results can help assess the risks and benefits of different strategies or actions more efficiently.

2. Strategic planning

The research results offer valuable insights into strategic planning. Executives can incorporate the findings into the planning process to identify opportunities, set goals, and develop strategies that align with the organization's objectives. The research findings can inform the

formulation of effective strategies to enhance innovation management and organizational performance.

3. Performance improvement

The research findings and models can identify areas of improvement within the organization. Executives can analyze the results to identify errors, nonstandard practices, or process-related problems. With this knowledge, they can adopt targeted improvement plans to increase efficiency and productivity in police operations.

4. Innovation and creativity

The research findings and models can foster innovation and creativity within the organization. Executives can leverage the understanding gained from the latest trends, best practices, and emerging technologies to create a culture of innovation. They can allocate resources to support innovation activities and provide an environment that encourages creativity among police officers.

5. Organizational learning

The research results and models contribute to organizational learning. Executives can utilize the knowledge gained from the research to develop training programs, training activities, or knowledge-sharing platforms. These initiatives can enhance the skills and abilities of employees, enabling them to stay updated with advancements and effectively implement innovative practices.

Thus, the application of research results and models obtained from this study can have far-reaching implications for decision-making, strategic planning, performance improvement, innovation, and organizational learning within police organizations. By leveraging the insights provided by the research, executives can drive positive change, enhance efficiency, and strengthen the overall effectiveness of police operations.

Further research

The recommendations for further research in the field of innovation management and organizational innovation within police departments.

1. Ethical implications of emerging technologies, investigate the ethical considerations associated with the use of emerging technologies in law enforcement, such as artificial intelligence, IoT data analytics, and facial recognition systems. Assess the potential impact of these technologies on privacy, civil liberties, and bias in policing practices.

2. Community engagement and trust-building, explore the role of community engagement and public awareness in fostering innovation within police departments. Investigate strategies and initiatives that improve community trust, encourage collaboration between the police

and the public, and involve community members in the co-creation of innovative practices. Assess the impact of these programs on community perceptions, social media platforms, and mechanisms for public opinion.

3. Leadership and organizational culture, examine the influence of leadership styles and organizational culture on fostering a culture of innovation within police departments. Investigate how leadership practices, empowerment of employees, and organizational structures can promote creativity, risk-taking, and knowledge sharing among police officers. Assess the role of leadership in overcoming resistance to change and creating an environment conducive to innovation.

These research recommendations aim to further our understanding of the implications of emerging technologies, the importance of community engagement, and the role of leadership and organizational culture in promoting innovation within police organizations. By addressing these areas, future research can contribute to the development of effective strategies, policies, and practices that enhance the effectiveness, efficiency, and public trust in police departments.

Bibliography

Alosani, M., Yusoff, R., & Al-Dhaafri, H. "The effect of innovation and strategic planning on enhancing organizational performance of Dubai Police." Innovation & Management Review, vol. 17, no. 1, 2020, pp. 2-24. ISSN 2515-8961.

Busanad, Abdulla Mohammed. "Implementing KM in a Public Organization: The Case of the Dubai Police Force." Dissertation, University of Portsmouth, 2016.

Chaichanamonkol, W., Sangsri, S., Kulpont, W., & Supawan, S. "Development of Remote Training System for Technical Competence in Counterterrorism for Police Station Supervisors in Region 5." Journal of Interdisciplinary Research Methodology: Graduate Edition, vol. 9, no. 1, 2024, pp. 12-22.

Ernst, Veen, and Kop. "The role of innovation culture in enhancing technological innovation in police organizations." Journal of Police Science & Management, vol. 1-20, 2021.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. Multivariate Data Analysis. 7th ed., Prentice Hall, 2010.

Kapuria, Monica, and Edward R. Maguire. "Performance Management and the Police Response to Women in India." Social Sciences, vol. 11, no. 2, 2022, pp. 58.

Kittitathantat, L. "Development Guidelines for Enhancing the Efficiency of Closed-Circuit Television (CCTV) Technology in Supporting Police Station Operations: A Case Study of the Provincial Police Bureau." Journal of Dispute Resolution Processes, vol. 8, no. 2, 2015, pp. 79-96.

Laufs, J., & Borrion, H. "Technological innovation in policing and crime prevention: Practitioner perspectives from London." International Journal of Police Science & Management, 2021, pp. 1-20.

Ratnasuwanchart, N., Rakkachuchip, K., & Wongthongdee, S. "Management Innovation." Journal of Politics, Administration, and Law, vol. 11, no. 3, 2019, pp. 543-554.

Royal Thai Police Office. Report on the Status of Contracted and Enlisted Police Officers, Rank of Sergeant (Sor.2), in February 2022. Police Strategy Office, 2022.

Sanchai, P. "Knowledge Management of Electric Magnetic Wave Technology in Vehicle Immobilization and Car Theft Prevention." Philosophical Journal, vol. 26, no. 1, 2021, pp. 101-108.

Weerawut, C., Sumalee, S., Veerapong, K., and Sariphan, S. "Development of Remote Training System based on Competency in Tactical Techniques for Police Station Chiefs in Region 5." Journal of Interdisciplinary Research Methodology, vol. 9, no. 1, 2020, pp. 12-22.

Yuthana, K., & Klaengkao, V. "Motivation in the Work Performance of Investigative Police Officers at Bangna Police Station." Journal of Humanities and Social Sciences, Loei Rajabhat University, vol. 1, no. 3, 2019, pp. 6-16.