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Determinants for Open Innovation and Innovation Performance toward Value Creation and Organization Performance for Bureaucratic Personnel Development

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Abstract

The purpose of this study is to investigate the determinants of open innovation and innovation performance toward value creation, and organizational performance for bureaucratic personnel development in Chiang Mai, Thailand. The conceptual framework of this study is adapted from the theoretical study of open innovation, and previous studies open innovation, innovation performance, value creation, and organizational performance. The samples (n = 179) were collected using the stratified and cluster sampling methods via offline and online questionnaires. Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM) were used to confirm the goodness of fit model and test the hypotheses. According to the research results, the determinants for open innovation and innovation performance have a significant impact on value creation and organizational performance. As a result, there are no significant differences in the regression paths of each factor, and open innovation is clearly the most powerful predictor of organizational performance. In conclusion, the study suggests that open innovation determinants such as technological advances or IT through value creation, including innovation performance, can support organizational performance.

Keywords: open innovation, technology exploitation, organization performance, organization performance, bureaucratic organization.

Introduction

Globalization and technology have grown dramatically in this era, affecting a wide range of organizations. Many organizations have been concerned and taken advanced technology to support workplaces, as well as to raise capacity and competitiveness in all economic sectors with technologies in today's society. Technology is being used to drive a technological revolution in order to gain a competitive advantage in different sectors. The technological revolution is characterized by disruptive change, such as telecommunications

technology, the internet, or social media. Regarding the technological revolution, many organizations or bureaucratic organizations must be concerned with the disruptive change and should change their operating methods proactively, in accordance with technology and innovation. As a result, innovation can be defined as tools or creative ideas that assist and improve personnel potential and support organizational proficiency. An innovative organization focuses on developing operational procedures and creating and implementing managerial methods. Obviously, technology and innovation are always carried out concurrently. Even though technology and innovation are constantly evolving to make life easier in organizations, they can also bring about internal and external changes. As a result, all organizations should be concerned about and well-prepared for the changes. As a consequence of the use of advanced technology and innovation, working styles have also changed. The advancement of technology is involving innovation as a means of significantly approaching this goal. In this regard, technological advancement and innovative engagement primarily support organizations and, in particular, personnel potential. Organizations strive to adopt innovations in order to improve their performance and respond effectively to environmental demands (Damanpour & Schneider, 2006). Every organization must be concerned with human resources (HR) or employees in order to become effective. It is an essential resource for any organization, and HR management can assist an organization in achieving its goals and objectives (Abdul-Halim et al., 2014). To improve performance and potential, personnel will be provided with modern knowledge, training, or higher education, as well as new technology that will assist organizations in becoming more innovative and efficient. Under Thailand 4.0 strategy, the aforementioned technology and innovation development have the potential to transform bureaucratic organizations. Thailand 4.0 was created to foster innovation, creativity, R & D, higher technologies, and green innovations.

Technology and Innovation adoption in Thai Bureaucratic organization

Recently, technology has changed rapidly in our society. Thai bureaucratic organizations should adapt and incorporate technology and innovation to assist organizations to build value while remaining dynamic and vital to the development of Thai bureaucracy. In order to improve the efficacy of public service, government organizations use technology to improve information flows both inside and outside of the administration (Kankanhalli et al., 2017). Although Thai bureaucratic organizations will never have the same profit ratio as private businesses, their functions must be adjusted to adapt to disruptive developments. Thai bureaucratic organizations, on the other hand, must motivate themselves to perform at a high level. To transition to a high-performance organization, the bureaucratic organization must make an effort to educate all levels of personnel on the changes and implement a strategy to present visions or directions that can effectively lead the organization. As a result, leaders should be responsible for implementing the strategy throughout the process. Furthermore, to facilitate the organization, technology and innovation should be introduced into the organization, which will then create value in the form of tangible assets or services. The organization's management must alter the operations that are being carried out in accordance with Thai Strategy. This means that all government sectors and bureaucratic organizations need

to be prepared for change and adaptation. As a result, one of the keys to driving organizational development is innovation, which is important to emphasize because innovation is the creation of new products or inventions, including process and administration. In addition, innovation affects not just the private sector, but also the public sector or government agencies that take action to improve economic growth and people's lives. In the age of globalization, technology, in particular, plays an important role as a tool for global communication. Thailand must accelerate in order to compete on a global scale. Adoption of technology and innovation can influence the developmental process and facilitate the successful implementation of technology in organizations (Straub, 2009). Leaders' perspectives are critical in influencing personnel or employees to understand and prepare for changes. As a result, the method to adopt innovation in its process concerning individual knowledge to expose the productivity of functions and persuade with preferable or unfavorable opinions to make a decision and then implement it in the process (Rogers et al., 2019).

Open innovation in Bureaucratic organizations

The pace of technological will essentially accelerate further open innovation (OI) in Thai bureaucracy. Every organization should recognize the significance of organizational strategy and encourage personnel or employees to be aware of changes. It must include a leader's vision as well as a strategy for the open innovation process. As a result, creating a culture that supports innovative organizations by involving personnel and employees influences them to innovate. Focusing on OI effectiveness, the organizational structure is critical for accelerating the organization's adoption of new technologies and knowledge from within regarding process to collaboration with external sectors (Steiner et al., 2014). Furthermore, the structure should be flexible and adaptable to the environment. Open Innovation is a new trend for Thai bureaucratic organizations that is difficult to understand and apply in their organizations. Accordingly, the organization needs external resources, such as employees and organizational culture, to be integrated into innovation processes (Banerjee, 2021). Nonetheless, openness cannot work on its own. It is based on collaboration between internal and external organizations to share ideas and resources. Traditionally, Thai bureaucratic organizations have relied solely on internal resources and human resources to facilitate internal operations. To achieve high performance on OI, the Thai bureaucratic organization must focus on management process improvement, which includes strategy, internal and external knowledge, and appropriate technology acquisition. In conclusion, open innovation has a significant impact on personnel and culture in bureaucratic organizations. It might provide additional opportunities for staff or personnel to work proactively. For example, establishing infrastructure, developing creative procedures, enhancing working styles, or interacting with internal and external organizations to advance openness, including working network and technology acquisition, training, and sharing ideas. For significant results, Thai bureaucratic organizations should focus on the following: 1) upgrading technological infrastructure, 2) changing the organizational culture 3) persuading officers to appreciate the benefits and drawbacks of transparency. This study investigates the effect of open innovation, value creation, and innovation performance in technology exploitation toward organizational

performance for bureaucratic personnel development. It also aims to use a case study to identify the positive effect of open innovation on the personnel development of Thai bureaucratic organizations in order to improve their performance.

Literature Review and Hypotheses Development

Open innovation

Open innovation is a new concept that allows leaders to access an organization's external capabilities as well as internal ones in order to develop their own technologies. Open innovation is a driving force and a stimulant for organizations to integrate technology management and innovation management (Lichtenthaler, 2010). Open innovation is also a model to use internal and external ideas or knowledge and implement them to use internally (Morgan et al., 2011). Therefore, sharing technical knowledge and ideas with external organizations is a key to achieving open innovation. The open innovation strategy is concerned with a tactic in which an organization attempts to use innovation to improve its performance as well as to open the boundary and perceive external knowledge and technology into an organization while also improving internal knowledge and potentially challenging to manage all the variable factors. Similarly, the goal of open innovation strategy is to drive technology into an organization and improve innovation performance. Accordingly, innovation strategy is a function or plan to determine the levels that try to exploit innovation and improve organization performance (Gilbert & Von Glinow, 2015). Furthermore, innovation acceptance is necessary for changing and improving the level of performance or effectiveness. Regard to Phakdiburut (2018), supported that innovation as a key making changes significantly to organizations, both in public and private sectors. It also creates a new value and growth for an organization, especially to increase the competitive advantage. The process of open innovation is broad, and it is characterized by a steady flow of ideas and resources between internal and external parties (Banerjee, 2021). However, open innovation should be resource-based and consider knowledge-based insights, with knowledge being a special case of resource-based insights (Vanhaverbeke & Cloodt, 2014). Besides, employee development is a key in open innovation since it may stimulate increased creativity and new ideas in an effort to meet performance expectations. These will have an immediate effect on their performance and furthermore, value creation may provide benefits and advantages to an organization. Moreover, open innovation has the ability to improve organizational performance dramatically. Based on the concept of value creation, which is a creative and innovative phenomenon that supports their performance with regard to the organization's goal. Thus, the following hypotheses were formulated:

Hypothesis 1. *Open innovation has significant impact on Value creation*
Hypothesis 2. *Open innovation has significant impact on organization performance*

Innovation Performance

The level of achievement of the firm in terms of management and processes is characterized as innovation performance (Mazur & Zaborek, 2016). The innovation performance demonstrates the company's progress as well as its innovative skills. Then, innovation performance related to training, education and innovation capacity which is to create the innovative output (SÖZBİLİR, 2018). Accordingly, innovation capacity is a factor and positively supported to innovation performance because Innovation performance was defined as knowledge and skill of workers to perform a great job (Nzeru et al., 2015). In fact, innovation performance focused on knowledge and performance of the individuals which involve innovative strategy and outcome (Kamasak, 2015). Innovation performance is an assessment of organizational learning and innovation that assists employees in understanding how organizations absorb and apply external knowledge (Ahuja & Katila, 2013). Likewise, an organization's innovation activities should be linked to its innovation performance (Birchall et al., 2011). Moreover, innovation skills will enhance innovative performances that rely on open innovation. The outcome of innovative skills related to processing implementation and change is referred to as "innovation performance". It involves level of knowledge, training and acquiring technology to conduct the performance appraisal base on innovation strategy. It is understandable that, in order to achieve organizational performance, innovation performance can be improved through creative processes and strategies. Thus, the following hypotheses were formulated:

Hypothesis 3. *Innovation performance has significant impact on organization performance*

Value Creation

Value creation is likely involved in the resource combination and technology usage that help workers create potential value. By creating and developing output such as products or services, value creation is a component of open innovation. Many innovative organizations always integrate value creation in the organization process to measure the long-term effectiveness and development as well as improve innovative capacities and achieve performance (Moran, 1934). Value creation is the benefits of usage combine with resources and technologies practically to enhance innovation capacities (Kristensson, 2019). This study defines value creation as a critical process that relies on technology, knowledge sharing, and experiences, all of which can lead to value creation. As a matter of fact, it is obvious that environmental conditions, resources, and activities are required to create value and profit by expanding capabilities and achieving high performance (Zanjirchi et al., 2019). Furthermore, value creation refers to the creative work done to assist or support an organization by utilizing technology and innovative new ideas in order to achieve organizational goals.

Organization Performance

Because of a global movement, numerous firms and public organizations have attempted to build innovative capacities for attaining organizational performance in this

decade. Organizational performance may be described as the attainable achievement of the practices and measured by the outcome of the practices (Neely et al., 2005). Thus, organization performance is about the system and resources, including the personnel attempting and performing well. According to Taouab and Issor (2019) discovered that organizational performance is defined as an organization's success, which demonstrates an organization's ability to fulfill its goals. In order to achieve excellent performance, an organization's innovative capacity must be stimulated. Moreover, organizational success is dependent on an organization's strategy, internal procedures, and organizational capacities such as training and human resource development, as well as an innovation system. In the Oslo Manual (OECD, 2005) mentioned organizational innovation that includes practices, workplace and external relations to implement the new method and enable to improve organization performance.

Organizational performance is defined as an organization's potential and capacity to achieve its goals through good administration and governance (Suhag et al., 2017). Concerning the achievement of organizational performance to support this study, innovation performance is part of the key to driving toward its goals, and innovation management aligns decisions with process implementation. As a result, the fact that innovation performance is a type of process for approaching the effectiveness of organizational performance can explain it. Furthermore, innovation performance includes knowledge, training, and the capacity of the innovation organization, which all play an important role in performance because it determines how well organized the organization is. Clearly, focusing on innovation, which is a process of implementing new resources to improve an organization will have a positive impact on both innovative performance and organizational performance (Nguyen et al., 2018). An open innovation strategy can be extremely beneficial to an organization if properly implemented. When technology reaches a mature stage, the dynamics of open innovation from the perspective of technology entrepreneurs can be the effects of changing their open innovation strategies. According to Yun et al. (2017) examined the dynamics of open innovation and developed a dynamic model of innovation and tested the multidimensional aspects of enterprises and their values in relation to different sizes of organization. Furthermore, value creation is based on acquiring new technology and knowledge in an organization that may successfully increase employee performance by sharing and practicing, which has an impact on organizational productivity, innovation, and performance.

Hypothesis 4. *Value creation has significant impact on organization performance*

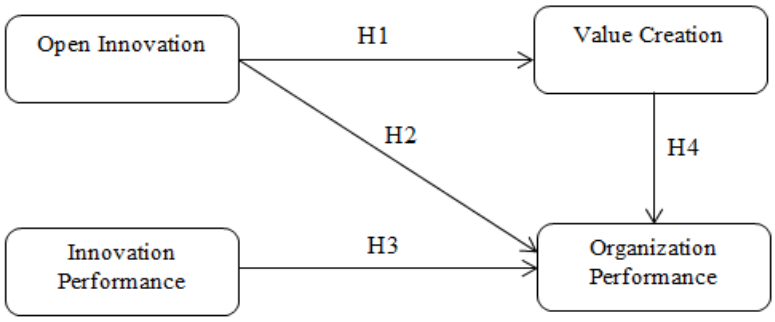
Research Framework

The conceptual framework was adopted based on two previous research models. Firstly, Zanjirchi et al. (2019) adapted open innovation (OI) using the regression approach and then examine the amount of the impact of open innovation on organizational performance (OP) and value creation (VC). Secondly, Tajudeen et al. (2019) identified the open innovation (OI) and an integrated approach towards investigating the impact of OI strategies, technology scouting

through social media, and digitalization vision on innovation and firm performance. As a result, the conceptual framework of this study is established as in Figure 1.

Figure 1

Research Framework



Source: *authors*

Methods and Materials

The research methodology used is a quantitative approach to distribute offline and online questionnaires to 180 participants. The questionnaire was designed in three parts. Firstly, screening questions were used to qualify the target group. Secondly, a five-point Likert Scale was applied to measure items used in this study. Lastly, the demographic questions were used to describe the characteristics of the sample group. The questionnaire was also translated to Thai for the best understanding among Government officers. Before collecting the data, the Item Objective Congruence (IOC) validity test with three experts' ratings and Cronbach's Alpha reliability pilot test of 71 participants were deployed, and the results were 0.95 and 0.96. IOC results showed that no items were removed out of the questionnaire from the total of 13 items from four variables. The acceptable value of the alpha coefficient for each structure must be greater than or equal to 0.60 (Sekaran, 1992), resulting in 13 items reserved as show in Table 1. Later, the both online and offline questionnaire were distributed to the target group. The sampling technique was applied by probability sampling including cluster sampling, and simple random. The data analysis has ensured the normality of data and was preceded to confirmatory factor analysis (CFA) and structural equation model (SEM), using SPSS and AMOS statistical software.

Table 1

Content Validity and Cronbach's Alpha reliability pilot test (n=71)

Variables	Item	Content Validity (IOC)	Cronbach's Alpha
Open Innovation (OI)	OI1	1	.95
	OI2	1	.95
	OI3	1	.96

Innovation Performance (IP)	IP1	1	.95
	IP2	0.6	.95
	IP3	1	.95
	IP4	1	.95
Value Creation (VC)	VC1	0.6	.95
	VC2	1	.95
	VC3	0.6	.95
Organization Performance (OP)	OP1	0.6	.95
	OP2	1	.95
	OP3	0.6	.95

Source. *Authors*

Population and Sample Size

The target population of this study was Government officers who are working at Royal Thai Air Force and Chiang Mai Provincial Administrative Organization. After inputting all necessary information into the statistical software of Soper (2021), the expected effect size (0.2), the expected level of statistical power (0.8), the number of latent variables (4), the number of observed variables (13), and the probability scale (0.05), the recommended minimum sample size for the model structure showed 166. However, the researchers consider sample size of this study to be 180 participants.

Sampling Technique

The sampling techniques were employed, using the probability-sampling method. Firstly, the cluster sampling is accounted to selecting Government officers in two groups from Royal Thai Air Force (Wing 41 Base) and Chiang Mai Provincial Administrative Organization. Secondly, simple random sampling was applied based on a random table from the HR department.

Results and Discussion

Descriptive Analysis of Demographic Data

The demographic data of the 179 target respondents is given following. The majority of respondents were male 60.9%, whereas females representing 39.1%. For the education of the respondents in the large amount is Bachelor degree representing 46.5%, below bachelor's degree is 38.5%, Master degree is 12.8% and Higher education is 2.2% accordingly. The majority of respondents' organizations were Chiang Mai Provincial Administrative Organization with 112 respondents (62.6%), follow by Royal Thai Air Force (Wing 41) with 50 respondents (27.9%), Chiang Mai Municipality with 13 respondents (7.3%), and Forest Resource Management Office (No.1) Chiang Mai with 4 respondents (2.2%). Most of respondents' jobs were Administration combines with technology 48%, Information Technology 31%, and Operations 20.2%. They had a variety of work experiences, with the

majority of them having 6-10 years of experience, 28.5%, having less than 1-5 years of experience, 7.8%, having 11-15 years of experience, and 6.1% having more than 20 years of experience.

Confirmatory Factor Analysis (CFA)

CFA was used prior for analyzing the measurement model with structural equation model (SEM). The result of CFA indicated that all items in each variable were significant and had factor loading to prove discriminant validity. Hair et al. (2006) is also employed in defining the significance of factor loading of each item and acceptable values in defining the goodness of fit. Factor loadings were higher than 0.50 and p-value of lower than 0.05. Furthermore, in case of Average Variance Extracted (AVE) was less than 0.5 but Composite Reliability (CR) was higher than 0.6, the convergent validity of the construct was still adequate (Fornell & Larcker, 1981) as shown in Table 2. The square root of average variance extracted is determined that all the correlations are greater than the corresponding correlation values for that variable as of Table 3.

Table 2

Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Construct/Indicators	Factor loadings (t-values) >0.60	Mean	Standard deviation	Cronbach's α 0.60-0.90	CR	AVE
Open Innovation (OI)				**.859**	**.807**	**.586**
OI1: The open innovation strategy is documented.	.794	3.73	.783			
OI2: Responsibilities for open innovation are evaluated periodically.	.639	3.68	.869			
OI3: There are written procedures and rules on open innovation.	.848	3.77	.784			
Innovation Performance (IP)				**.821**	**.876**	**.638**
IP1: Your organization tries to develop innovative capability.	.814	3.79	.837			
IP2: Your organization focuses on using innovative techniques.	.745	3.75	.802			
IP3: The effort invested in the development of new products/services, taking into consideration the number of hours, people, teams and trainings	.805	3.73	.781			
IP4: Pioneering newly introduced processes (you've been one of the first to introduce new processes)	.829	3.72	.764			
Value Creation (VC)				**.834**	**.850**	**.653**

VC1: A variety of features, products and services are bundled to create value	.854	3.72	.826			
VC2: Value is created by combination of multiple technologies.	.782	3.79	.891			
VC3: Value is created through a combination of online and offline capabilities.	.787	3.76	.793			
Organization Performance (OP)				**.841**	**.821**	**.606**
OP1: Your organization is always developing its quality.	.804	3.82	.812			
OP2: Your organization has modern technologies to facilitate the working process.	.738	3.68	.875			
OP3: Your organization has an improvement in competing for the position or support training.	.791	3.78	.802			

Source. *Authors*

Table 3

Discriminant Validity

	OI	IP	VC	OP
Open Innovation (OI)	**0.765**			
Innovation Performance (IP)	0.660	**0.799**		
Value Creation (VC)	0.600	0.667	**0.808**	
Organization Performance (OP)	0.548	0.679	0.670	**0.778**

Note. *The diagonally listed value is the AVE square roots of the variables*

Source. *Authors*

Structural Equation Model (SEM)

Measurement model was tested using the fit model including CMIN/DF = 1.715, GFI = 0.934, AGFI = 0.875, NFI = 0.931, CFI = 0.969, RMR = 0.027, and RMSEA = 0.063. It has been suggested that RMSEA values less than 0.05 are good, values between 0.05 and 0.08 are acceptable, values between 0.08 and 0.1 are marginal, and values greater than 0.1 are poor (Fabrigar et al., 1999). Therefore, the RMSEA value of 0.074 in this sample indicates an acceptable fit. All estimates were acceptable with no model adjustment required. Therefore, the convergence validity and discriminant validity were ensured. All results are shown in Table 4.

Table 4

Goodness of Fit

		Statistical values obtained from analysis	
Index	**Acceptable Values**	**Before adjustment**	**After adjustment**
χ^2/df (CMIN/df)	< 3.00 (Hair et al., 2006)	3.584	1.715
GFI	≥ 0.90 (Hair et al., 2006)	0.857	0.934
AGFI	≥ 0.80 (Segars & Grover, 1993)	0.779	0.875
NFI	≥ 0.90 (Bentler & Bonett, 1980)	0.824	0.931
CFI	≥ 0.90 (Hair et al., 2006)	0.864	0.969
RMR	< 0.05 (Hair et al., 2006)	0.041	0.027
RMSEA	≤ 0.07 (Fabrigar et al., 1999)	0.120	0.063
Model summary		**Not Fit**	**Fit**

Note. *CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, IFI = Incremental Fit Indices, CFI = comparative fit index, RMR = root mean square residual, and RMSEA = root mean square error of approximation.*

Source. *Authors*

Research Hypothesis Testing Result

The regression weights and R^2 variance verified significant relationship as displayed in Table 5 when p-value is equal to 0.05. Open innovation had the strongest significant effect on value creation at the value of β = 0.600 and t-value = 9.982. Secondly, Innovation performance had significant effect on organization performance at the value of β = 0.386 and t-value = 5.090. Lastly, there was a significance influence between value creation had significant effect on organization performance at the value of β = 0.364 and t-value = 5.078. Nevertheless, open innovation had no significant effect on organization performance at the level of β = 0.074 and t-value = 1.051. Therefore, in sum up, the significance influence was confirmed H_1, H_3, and H_4, whereas H_2 was illustrated not supported.

Table 5.

Hypothesis Result of the Structural Model

Hypotheses	Paths	Standardized Path Coefficients (β)	t-value	Result
H_1	Open Innovation (OI) → Value Creation (VC)	0.600	9.982*	Supported
H_2	Open Innovation (OI) → Organization Performance (OP)	0.074	1.051	Not Supported
H_3	Innovation Performance (IP) → Organization Performance (OP)	0.386	5.090*	Supported
H_4	Value Creation (VC) → Organization Performance (OP)	0.364	5.078*	Supported

Note. **p<0.05*

Direct, Indirect, and Total Effects of Relationships

Table 6 illustrated direct, indirect and total effect for this study. Open innovation had a direct effect on value creation at 0.600. For the direct effect on organization performance, open innovation was 12.626 and indirect effect was -12.552, hence, resulting total effect at 0.074. Innovation performance direct effect on organization performance was 0.386, followed by value creation was 0.364. Also, the results of structural model were presented in Figure 2.

Table 6.

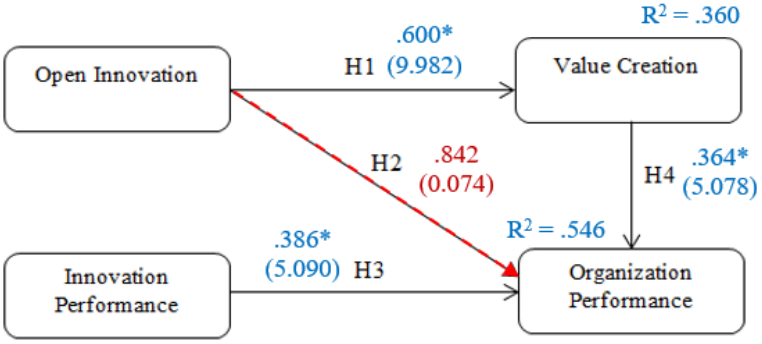
Direct, Indirect, and Total Effects of Relationships

Variables	**Value Creation (VC)**			**R^2**
	Direct Effect	**Indirect Effect**	**Total Effect**	
Open Innovation (OI)	0.600*	-	0.600*	0.360
Variables	**Organization Performance (OP)**			**R^2**
	Direct Effect	**Indirect Effect**	**Total Effect**	
Organization Performance (OP)	12.626	-12.552	0.074	0.546
Innovation Performance (IP)	0.386*	-	0.386*	
Value Creation (VC)	0.364*	-	0.364*	

Note: **p<0.05.*

Figure 2

The Results of Structural Model



Source. *Authors*

Discussion

This study aims to test an integrated model that investigated the factors of open innovation and innovation performance toward value creation and organizational performance for bureaucratic personnel development in Chiang Mai, Thailand. The data has been analyzed to determine the factors that influence the development of bureaucratic personnel. The Confirmatory Factor Analysis (CFA) was used to measure the reliability and validity of the research model based on the collected data. Accordingly, the Structural Equation Model (SEM) was used to test direct and indirect of all variables.

To identify open innovation has a significant effect on value creation as described in hypothesis 1 (H_1) in Table 5. The coefficient of the path between open innovation and value creation (H_1) was 0.600. In addition, the assessment result in Table 2 showed the mean and the highest value of standard deviation in open innovation (OI) was expressed in *"Responsibilities for open innovation are evaluated periodically."* ($\bar{x}$ = 3.68, SD = 0.869). The mean and highest value deviation for value creation (VC) was expressed in *"Value is created by combining multiple technologies."* ($\bar{x}$ = 3.79, SD = 0.891). In this regard, it can demonstrate that if an organization is dedicated to open innovation on a regular schedule, it can increase the value of its work by utilizing a variety of advanced technologies. According to H_1 confirmation, it is related to the previous study, indicated by Zanjirchi et al. (2019), that if organizations approach internal and external knowledge and technology, which is the foundation of open innovation, they can create value in order to improve workers' capabilities.

To identify open innovation has no significant effect on organization performance, refers to hypothesis 2 (H_2) showed in Table 5. The coefficient of the path between open innovation and organization performance (H_2) was 0.074 and the t-value was 1.051 which less than 1.96. As the result, the relationship between open innovation and organization performance was not significant regard to t-value illustrated in Table 5. In addition, the assessment result in Table 2 showed the mean and the highest value of standard deviation in open innovation (OI) was expressed in *"Responsibilities for open innovation are evaluated periodically."* ($\bar{x}$ = 3.68, SD = 0.869)**.** The mean and highest value deviation for organization performance (OP) was expressed in *"Your organization has modern technologies to facilitate the working process."* ($\bar{x}$ = 3.68, SD = 0.875)**.** As a result, it can be explained that open innovation cannot directly help or support organizational performance, but it can be an indirect determinant of support. According to the result, it is consistent with Bigliardi et al. (2020) that in term of open innovation, there is some scope for more study to define the relationship between open innovation and organization performance which includes more than just acquiring internal and external knowledge and technology. It should be more concerned with management in order to achieve the organization performance.

To identify innovation performance has a significant effect on organization performance, related to hypothesis 3 (H_3) in Table 5. The coefficient of the path between innovation performance and organization performance (H_3) was 0.386. Furthermore, the assessment result in Table 2 showed the mean and the highest value of standard deviation in innovation performance (IP) was presented in *"Your organization tries to develop innovative capability*." ($\bar{x}$ = 3.79, SD = 0.837) and the mean and the highest value of standard deviation of organization performance (OP) was presented in *"Your organization has modern technologies to facilitate the working process."* ($\bar{x}$ = 3.68, SD = 0.875). As a consequence, it is possible to conclude that innovation performance based on the use of modern technologies can significantly support personnel performance while also improving organizational performance. The conclusion is consistent with previous research by Tajudeen et al (2019). It was revealed that great innovation performance can encourage organizations to improve their organizational performance. Finally, it can be presented in the study that there is a significant relationship between innovation performance and organizational performance.

To identify value creation has a significant effect on organization performance, refers to hypothesis 4 (H_4) showed in Table 5. The coefficient of the path between value creation and organization performance (H_3) was 0.364. Additionally, the assessment result in Table 2 showed the mean and the highest value of standard deviation in value creation (VC) was presented in *"Value is created by combining multiple technologies."* ($\bar{x}$ = 3.79, SD = 0.891). Then, the mean and the highest value of standard deviation of organization performance (OP) was presented in *"Your organization has modern technologies to facilitate the working process."* ($\bar{x}$ = 3.68, SD = 0.875). Thus, it can be explained that implementing modern technologies in an organization can create value by directly improving personnel capabilities and organizational performance. It is undeniable that modern technology is essential for going forward with open innovation, which is beneficial for assisting officers or employees in improving their abilities. Open innovation, on the other hand, cannot directly affect an organization's performance, but it can create value that can benefit the organization. This indicates that value creation has a significant impact on organizational performance, as well as innovation performance, which has a significant direct impact on organizational performance. Additionally, value creation and innovation performance have a considerable influence on organizational performance, but open innovation has no significant impact on organizational performance but can support it in some ways. Regard to The H_4 confirmation result is consistent with the previous study by Nuryakin et al. (2018). It was investigated that value creation has a mediating influence on organization performance. Similarly, an innovation capability facilitates the value creation ability that can enhance organization performance.

Additionally, the findings indicate that fostering an innovation performance will ensure that everyone in the organization works to improve the firm's procedures, efficiency, and performance. Moreover, greater competitiveness — offering higher-quality products more efficiently and at a lower cost – is included in innovation performance. Increased staff retention — employees prefer occupations that require collaboration and problem-solving. Proactive organization approach - organization is equipped to adapt to developments in their sectors. More stakeholders - offering new or enhanced works or services, or initiating a new mode of operation. Finally, more efficient utilization of all organizational resources.

Conclusion and Suggestions

In this study, the researchers have developed and tested an integrated model that investigated the determinants for open innovation and innovation performance toward value creation and organization performance for bureaucratic personnel development in Chiang Mai, Thailand. The objectives of this study are to examine open innovation, innovation performance and value creation has a significant effect on organization performance for bureaucratic personnel development. The questionnaires were distributed to bureaucratic organizations in Chiang Mai based on the use of modern technologies, information technology, and MIS systems. For the reliability and validity of the research framework, the data were analyzed using Confirmatory Factor Analysis (CFA). Besides that, the determinants of improving organization performance were analyzed by using Structural Equation Model (SEM). The following finding will be discussed.

To begin with open innovation, it has significant effect on value creation which associated with using modern technologies. According to open innovation, it is a driving force and a stimulant for organizations to integrate technology management and innovation management. Furthermore, value creation is a result of open innovation and is most likely involved in resource combination and technology utilization that assists employees in developing potential value.

Whereas the open innovation has no significant effect on organizational performance, it can indirectly help or support through value creation by assisting an organization to improve its performance. Organization performance is impossible to accomplish without open innovation. Therefore, open innovation is one of the factors that contribute to organizational performance and personnel development.

Moreover, innovation performance has significant effect on organization performance. Innovation performance is an evaluation of organizational learning and innovation that helps employees understands how organizations acquire modern technologies to achieve success. The quality of innovation performance and the use of technology represent greater organization performance.

Eventually, the creation of value has an effect on organizational performance. Value creation is the process of improving practices or the achievement of an open innovation strategy that personnel attempt to develop and support their work in order to achieve organizational performance.

In summary, organizational performance is described as an organization's capacity to achieve its goals and objectives with the support of decent management, an effective approach, and a consistent determination to succeed. Organizational performance, in some ways, comprises of the evident actions that personnel conduct in their work that associate with an organization's goals.

Further Study

This study has some limitations because it focuses on open innovation in some bureaucratic organizations using modern technologies, information technology, and management information systems in Chiang Mai, which has a small number of organizations. In this regard, a future study may consider more bureaucratic organizations in order to investigate the impact of open innovation on innovation performance in greater depth. Future research could also consider the indirect variable as well as the effect relationship between open innovation and organizational performance. In order to improve the performance of the organization in terms of bureaucratic personnel development in accordance with the national strategy.

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