Components of Innovative Work Behavior Among First-line Nurse Managers in Private Hospitals and Government Hospitals
องค์ประกอบของพฤติกรรมสร้างนวัตกรรมในการทำงานของผู้บริหารการพยาบาลระดับต้น ในโรงพยาบาลเอกชนและโรงพยาบาลของรัฐ

เพชรน้อย	สิงห์ช่างชัย*	Phechnoy	Singchungchai*
วรรณดี	สุทธิศักดิ์**	Wandee	Sutthisak**
บุปผา	กิจสหวงศ์***	Bubpha	Kitsahawong ***
เกษราวัลณ์	นิลวรางกูล****	Kessarawan	Nilvarangul ****

Abstract

The objective of this descriptive research was to determine the components of innovative work behavior among first-line nurse managers in private hospitals and government hospitals. The subjects were 400 first-line nurse managers: 200 from private hospitals and 200 from government hospitals recruited using stratified random sampling. The research instrument was a five-point rating scale questionnaire on innovative work behavior with a content validity index of 0.81 and a Cronbach's alpha coefficient of 0.86. Descriptive statistics, first-order CFA, and second-order CFA were employed.

The results revealed as the following:

1. The numbers of components of innovative work behavior among first-line nurse managers in both types of hospitals were the same (4 components). The construct validity of the instrument was tested and found to be congruent with the empirical data [(χ^2_{prvt} = 38.02, p-value = .970, GFI = 0.956, RMSEA = .000)] and χ^2_{govt} = 41.871, p-value = .971, GFI = .9737, RMSEA = .000).

2. The number of indicators of the private hospitals was 13 while that of the government hospitals was 12. Three components had the same number of indicators which were innovative idea exploration (3 indicators), innovative idea generation (3 indicators), and innovative idea implementation (3 indicators). For innovative idea championing, the government hospitals had 3 indicators while the private hospitals had 4 indicators.

* Corresponding Author, Professor, College of Nursing, Christian University; e-mail: phechnoy@gmail.com

** Lecturer, Faculty of Nursing, Christian University

*** Deputy Hospital Director of Nursing and Quality Improvement, Vichaiyut Hospital

**** Professor, Division of Establishing Faculty of Nursing, Chiang Rai Rajabhat University

Received 23 December 2021; Revised 6 January 2022; Accepted 12 January 2022

The research results indicate that nursing administrators should have a good quality tool with construct validity of innovative work behavior to assess qualifications in creative ideas and in the management of new activities for the development of innovative leadership.

Keywords: Innovative work behavior, First-line nurse manager, Private hospital, Government hospital

บทคัดย่อ

การวิจัยเชิงพรรณนานี้มีวัตถุประสงค์เพื่อศึกษาองค์ประกอบพฤติกรรมสร้างนวัตกรรมในการทำงานของผู้บริหารการพยาบาลระดับต้นในโรงพยาบาลเอกชนและโรงพยาบาลของรัฐ กลุ่มตัวอย่างคือ ผู้บริหารการพยาบาลระดับต้นรวม 400 คน แยกเป็นโรงพยาบาลเอกชนและโรงพยาบาลรัฐบาลอย่างละ 200 คน ใช้การสุ่มแบบแบ่งชั้น เครื่องมือวิจัยเป็นแบบสอบถามพฤติกรรมสร้างนวัตกรรมในการทำงาน ใช้มาตรวัดแบบประมาณค่า 5 ระดับ ได้ค่าดัชนีความตรงเชิงเนื้อหาเท่ากับ 0.81 และค่าความเชื่อมั่นสัมประสิทธิ์แอลฟาครอนบาคเท่ากับ 0.86 ใช้สถิติเชิงพรรณนาและสถิติการวิเคราะห์องค์ประกอบเชิงยืนยันอันดับหนึ่ง (First order CFA) และการวิเคราะห์องค์ประกอบเชิงยืนยันอันดับสอง (Second order CFA)

ผลการวิจัยพบว่า

1.จำนวนองค์ประกอบพฤติกรรมการสร้างนวัตกรรมในการทำงานของผู้บริหารการพยาบาลระดับต้นทั้ง 2 แห่ง มีจำนวนเท่ากัน คือ มี 4 องค์ประกอบ เมื่อทดสอบความตรงเชิงโครงสร้างของเครื่องมือวิจัยนี้ พบว่ามีความสอดคล้องกลมกลืนตามแนวคิดกับข้อมูลเชิงประจักษ์ (χ^2_{prvt} =38.02, p-value=.970 GFI = 0.956, RMSEA = .000; χ^2_{govt} = 41.871, p-value=.971 GFI = .9737, RMSEA = .000)

2. จำนวนตัวชี้วัดสำหรับโรงพยาบาลเอกชนมี 13 ตัวชี้วัด โรงพยาบาลรัฐมี 12 ตัวชีวัด โดยมีจำนวนตัวชี้วัดเท่ากัน 3 องค์ประกอบคือ พฤติกรรมการสำรวจความคิดด้านนวัตกรรม (3 ตัวชี้วัด) พฤติกรรมการเกิดความคิดด้านนวัตกรรม (3 ตัวชี้วัด) พฤติกรรมการนำความคิดด้านนวัตกรรมสู่การยอมรับ(3 ตัวชี้วัด) และ พฤติกรรมการใช้นวัตกรรมในการทำงาน (3 ตัวชี้วัด) แต่ตัวชี้วัดพฤติกรรมการนำความคิดด้านนวัตกรรมสู่การยอมรับของโรงพยาบาลรัฐมีเพียง 3 ตัวชี้วัด โรงพยาบาลเอกชนมี 4 ตัวชี้วัด

การวิจัยนี้ชี้ให้เห็นว่า ผู้บริหารทางการพยาบาลควรมีเครื่องมือที่มีคุณภาพด้านความตรงเชิงโครงสร้างของพฤติกรรมสร้างนวัตกรรมในการทำงานเพื่อประเมินคุณลักษณะด้านความคิดสร้างสรรค์ การบริหารสิ่งใหม่เพื่อพัฒนาเป็นผู้นำองค์กรด้านนวัตกรรม

คำสำคัญ: พฤติกรรมสร้างนวัตกรรมในการทำงาน ผู้บริหารการพยาบาลระดับต้น โรงพยาบาลเอกชน
โรงพยาบาลรัฐบาล

* ผู้เขียนหลัก ศาสตราจารย์ คณะพยาบาลศาสตร์ มหาวิทยาลัยคริสเตียน; e-mail: phechnoy@gmail.com
** อาจารย์ มหาวิทยาลัยคริสเตียน
*** รองผู้อำนวยการฝ่ายพัฒนาการคุณภาพทางการพยาบาล โรงพยาบาลวิชัยยุทธ
**** ศาสตราจารย์ โครงการจัดตั้งคณะพยาบาลศาสตร์ มหาวิทยาลัยราชภัฏเชียงราย

วันที่รับบทความ 23 ธันวาคม 2564 วันที่แก้ไขบทความ 6 มกราคม 2565 วันที่ตอบรับบทความ 12 มกราคม 2565

Background and Significance

Innovative work behavior (IWB) is opportunity exploration, ideas generation, ideas search, ideas communication, promotion of ideas, ideas championing, application, and overcoming obstacles (De Jong & Hartog, 2010). Managers and practitioners focus on the significance of individual employees' IWB for organizational success. In nursing organizations in the new era, nurse managers at all levels manage changing situations to drive organizations to be innovative and to change nursing staff mindsets to create innovation (Asurakkody & Shin, 2018). First-line nurse managers (FNMs) are the major group working close to staff nurses, and they have very significant roles to manage, monitor and control nurses to provide effectiveness, efficiency, and nursing service quality to meet the vision and mission of nursing organizations (Marquis & Huston, 2016). FNMs in nursing organizations, especially first- line nurse managers, are important in creating innovative work behavior among professional nurses. Contreras, Espinosa, Dornberger, & Acosta (2020) found that to increase IWB among staff, leadership by itself was sufficient to promote IWB. Therefore, it is important for nursing managers to understand IWB components because they can be used to evaluate and develop FNMs' IWB abilities in creating innovation in their departments (Kitsahawong, Singchungchai, & Sritoomma, 2020).

Moreover, business organizations with leaders who have a high level of innovative work behavior can grow and maintain their status for a long time. Various studies have recommended researchers to conduct more studies about the assessment of IWB among managers of organizations other than business-related ones (De Jong & Hartog, 2010; Tung, Akkadechanunt & Chontawan, 2014). Due to the fact that IWB is rather new for most nursing organizations, literature related to IWB in healthcare and nursing organizations is still limited, particularly for literature on studies related to measures of IWB that are reliable in construct validity based on international concepts. Consequently, the evaluation or measurement of IWB among nursing administrators remains unclear (Kaya, Turan & Aydin, 2016). The contexts of private and government nursing organizations are the same in some aspects but different in others. They are the same in terms of the nursing standards that are controlled by the Thailand Nursing and Midwifery Council; however, they are different in terms of administration. Private hospitals select head nurses based on qualifications emphasizing ability in implementing policy, efficiency in supervising, marketing orientation, and innovation capability for competitiveness in the nursing marketing. A significant role for FNMs in both government and private hospitals is to act as a role model inculcating an IWB mindset among staff in the nursing organization. For the administration of government nursing organizations in Thailand, the emphasis is on following government policy. For example, the focus is presently on the development of innovations that correspond with the Thailand 4.0 policy (Nursing Division, 2018; Singchungchai, 2019). Thus, managers of nursing organizations play an important role in creating a work atmosphere with innovation to build and develop innovations to enhance the quality of nursing services at the ward, as well as the organization level (Thomas, Seifert & Joyner, 2016). There are various concepts concerning innovative work behavior. According to Janssen (2000), there are three components of innovative work behavior: idea generation, coalition building, and imple-

mentation. Similarly, De Jong and Hartog (2008; 2010) state that there are four components: innovative idea exploration, innovative idea generation, innovative idea championing, and innovative idea implementation. Therefore, it is necessary to employ these concepts in developing a reliable measurement tool for both private and government hospitals in Thailand. Furthermore, the researchers realize the importance of extending knowledge from the empirical data, related to validation of the measures of IWB, to first-line nurse managers who work closely with professional nurses that FNMs can inspire and encourage based on the concept of transformational leadership (Bass & Riggio, 2006). This present research explored the construct validation of the reliability of indicators and determined the number of components which would be useful for controlling the potential or competency of first-line nurse managers in terms of innovative leadership in nursing organizations.

Objective

To determine the components of innovative work behavior of first- line nurse managers in private and government hospitals.

Methodology

This research is descriptive research.

Population and Sample

The population was comprised of first-line nurse managers in private and government hospitals. There were 1,050 FNMs in 63 private hospitals and 2,966 FNMs from 679 mid- sized and large-sized government hospitals.

Stratified random sampling was applied and the sample size was determined with principles of measurement that were used to test construct validity using factor analysis based on Hair, Back, Babin, and Anderson (2010). That is, the number must be at least 10 times the number of question items or observable variables but not lower than 100 samples to ensure that the coefficient obtained is not too low. The present study used an IWB questionnaire which was constructed based on De Jong and Hartog (2008; 2010), so the questionnaire was not new, and it had 17 items. Hence, the questionnaire needed translation and validation again to ensure that the meanings were equal in terms of culture, language, content, and concept. Back translation with a monolingual test based on Brislin (1986) was employed as this is a technique widely accepted for nursing research. Accordingly, the sample size should not be smaller than 170. To prevent problems with the drop-out rate and an incomplete number of samples, 5 percent was added to the calculated sample size (Gupta, Attri, Singh, Kaur, & Kaur, 2016). As a result, the sample size recruited from private hospitals and government hospitals was the same, at 210 from each type, totaling 420 samples. The return rate for the questionnaire was 96.40 % (400 FNMs).

Research Instrument

The questionnaire for collecting data had two parts.

Part 1 included socio-demographic data.

Part 2 was a Thai translation of the IWB scale (De Jong & Hartog, 2008; 2010). After gaining permission from the authors, the scale was translated into Thai using forward and backward translation (Brislin, 1986). The questionnaire had 17 items covering 4 indicators for each of these dimensions: innovative ideas exploration, ideas championing, and ideas implementation; innovative ideas generation had 5 indicators. Par-

ticipants responded to 5- point, Likert- scale questions (5 = strongly agree, 4 = agree, 3 = neither agree/nor disagree, 2 = disagree, and 1 = strongly disagree). The content validity of the instrument was tested by five experts for the item content validity index and the scale content validity index (I-CVI = 0.96, S-CVI = 0.81, ACP or Average Congruency Percentage = 0.89). The CVI was higher, as recommended by Burns and Grove (2001). The questionnaire was pilot-tested for reliability with 30 FNMs who had similar characteristics to the sample group and the Cronbach's alpha reliability coefficient was 0.86.

Ethical Considerations

This study was reviewed and approved by the Human Ethics Committee of Christian University, Thailand (CUT.02/2563). Before giving written consent, all participants were were informed about the objectives and methods of the study. Their involvement was voluntary, and they were able to withdraw at any time without any restrictions. All information was kept confidential and anonymous.

Data Collection

Four hundred and twenty questionnaires were sent to participants by post with a consent form and an information sheet explaining the objectives and method of the study, and a hard copy of the questionnaire. The information sheet contained the head of the research project's contact details in case participants had questions or any concerns to discuss with the researcher.

Data Analysis

1. Descriptive statistics were employed to analyze basic data with percentage, mean and standard deviation.

2. First-order confirmatory factor analysis (first-order CFA) and second-order confirmatory factor analysis (second-order CFA) were employed to test the curve of the normal distribution using the Kolmogorov-Smirnov test. It was found that the data distribution was normal. The factor analysis model was tested for congruence with empirical data using LISREL. Statistical values used for testing were set and they revealed the congruence between the model and the empirical data consisting of p-value > .05, χ^2/df < 3, GFI > 0.95, NFI > 0.95, CFI > 0.95, and RMSEA < 0.05 (Hair, Back, Babin, & Anderson, 2010).

Results

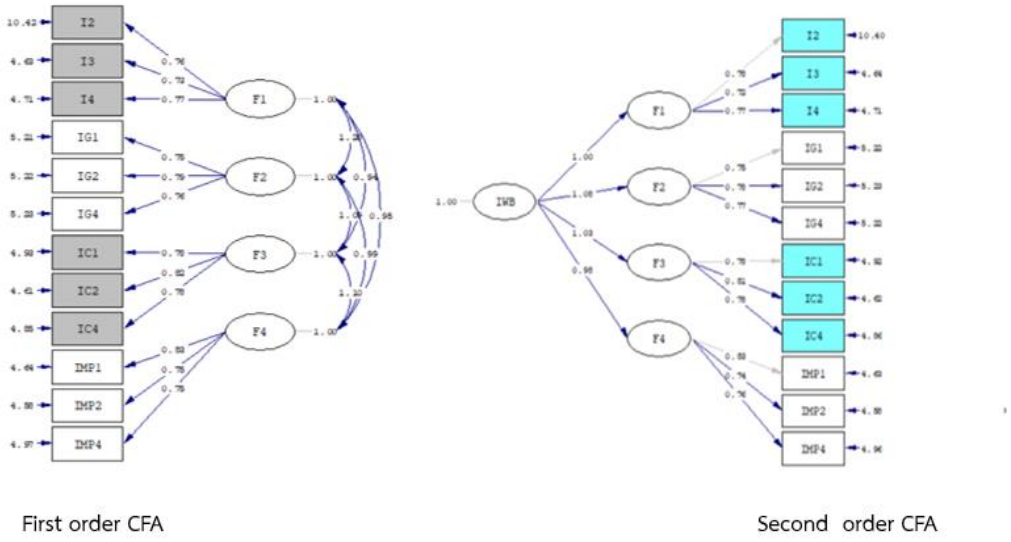
1. Demographic characteristics

The overwhelming majority of participants in both government and private hospitals were females (96.5% and 95%). The majority of ages ranged between 31-40 years of age (61% and 62%) and their average age was similar ($\bar{x}$ = 37.31, SD = 9.5; $\bar{x}$ = 39.45, SD = 4.25). Over 57% of the participants in government hospitals were married compared with 58% in private hospitals. The highest education level of the participants in both hospitals was a bachelor's degree (97.5% and 75%).

2. Components and indicators of IWB of FNMs in government and private hospitals

In government hospitals, the CFA IWB MODEL was congruent with the empirical data because the first- order CFA followed the goodness of fit model (χ^2 = 17.96, df = 48, p-value = 0.99, RMSE = 0.00). The second-order CFA was also consistent with the goodness of fit model (χ^2 = 18.97, df = 50, p-value = 0.99, RMSEA = 0.00). Finally, the components of the IWB CFA model were comprised of four factors (innovative ideas exploration, ideas generation, ideas championing, and ideas implementation) with 12 indicators. The component of innovative

ideas exploration included factors related to opportunities to improve things (I2), considering innovative opportunities (I3), and wondering how things can be improved (I4). Innovative ideas generation consisted of searching out new working methods, techniques, or instruments (IG1); creative problem solving (IG2); creating new ideas (IG3), and finding new approaches to execute tasks (IG4). Innovative ideas implementation was comprised of mobilizing support for innovative ideas (IC1); acquiring approval for innovative ideas (IC2); making important members of organizations enthusiastic for innovative ideas (IC3); and attempting to convince people to support ideas innovation (IC4). The last factor was innovative ideas implementtation related to transforming innovative ideas into useful applications (IMP1), systematically introducing innovative ideas into work practices (IMP2), contributing to the implementation of new ideas (IMP3), and putting effort into the development of new things (IMP4). Figure 1 shows first and second-order CFA in government hospitals.



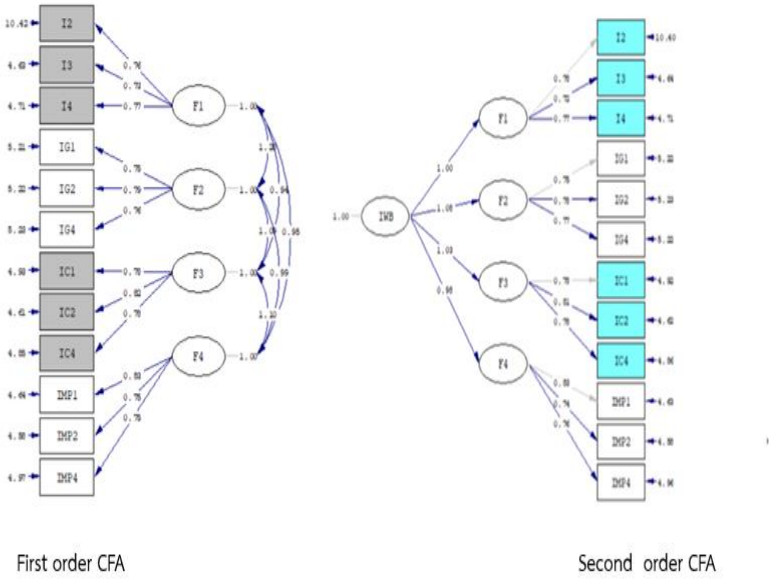
(χ^2_{first} = 17.96, df = 48, p-value = 0.99, RMSEA = 0.00)

($\chi^2_{secound}$ = 18.97, df = 50, p-value = 0.99, RMSEA = 0.00)

Figure1 First and second-order CFA in government hospitals

The results were different for private and overnment hospitals. The private hospital IWB CFA model was congruent with the empirical data because the first and second- order CFA conformed to the goodness of fit model (χ^2 = 42.04, df = 61, p-value = 0.96, RMSEA = 0.00; χ^2 = 38.26, df = 59, p-value = 0.98, RMSEA = 0.00). The private hospital IWB CFA model had the same four factors as government hospitals, but with 13 indicators. The first factor was innovative ideas exploration related to paying attention to issues that are not part of his/her daily work (I1), looking for opportunities to improve things (I2), and exploring new products or services (I5).

The second factor, innovative ideas generation, consisted of searching out new working methods, techniques, or instruments (IG1) ; generating original problem solutions (IG2), and creating new ideas (IG3). Factor three, innovation ideas championing, was similar in indicators to the government hospitals. The fourth factor, innovative ideas implementation, consisted of the first to third indicators (IMP1-IMP3) similar to government hospitals and the putting effort into the development of new things indicator (IMP4). Figure 2 shows first and second- order CFA in private hospitals.



(χ^2_{first} = 38.26, df = 59, p-value = 0.98 96 และ RMSEA = 0.00)
(χ^2_{second} = 42.04, df = 61, p-value = 0.96 และ RMSEA = 0.00)

Figure 2 First and second-order CFA in private hospitals.

Comparing the indicators of IWB among FMNs in government and private hospitals, it was found that both types of hospital had the same four IWB factors but had different numbers of indicators. There were 12 IWB indicators for government hospitals, with factor loadings ranging from 0.61 to 0.77 ($\lambda 1$ = 0.61-0.77). In private hospitals, the number of IWB indicators was 13 with factor loadings ranging from 0.63 to 0.75 ($\lambda 2$ = 0.63-0.75). In private hospitals, the additional IWB was attempting to convince people to support innovative ideas (IC4).

Table 1 shows that private hospitals had 13 indicators while government hospitals had 12. Three components had the same number of indicators: innovative idea exploration (3), innovative idea generation (3), and innovative idea implementation (3). However, innovative idea championing for government hospitals had 3 indicators while for private hospitals had 4, with the indicator that made them different being: make important organizational members enthusiastic for innovative ideas.

Table 1 Comparison of the IWB indicators between FMNs in government and private hospitals

IWB indicators	Indicator Frequency		Govt. hosp. 12 indicators	Pvt. Hosp. 13 indicators
	Govt. Hosp.	Pvt. Hosp.	Factor Loading ($\lambda 1$)	Factor Loading ($\lambda 2$)
1. Innovative idea exploration	3	3		
1.1 Pay attention to issues that are not part of his/her daily work (I1)			-	0.75
1.2 Look for opportunities to improve (I2)			0.76	-
1.3 Consider innovative opportunity (I3)			0.72	0.63
1.4 Wonder how things can be improved (I4)			0.77	-
1.5 Explore new products or services (I5)			-	0.63
2. Innovative idea generation	3	3		
2.1 Search out new working methods, techniques, or instruments? (IG1)			0.75	0.65
2.2 Generate original solutions to problems (IG2)			0.76	0.66
2.3 Create new ideas (IG3)			-	0.66
2.4 Find new approaches to executing tasks (IG4)			0.77	-
3. Innovative idea championing	3	4		
3.1 Mobilize support for innovative ideas (IC1)			0.76	0.63
3.2 Acquire approval for innovative ideas (IC2)			0.61	0.74
3.3 Make important organizational members enthusiastic for innovative ideas (IC3)			-	0.75

Table 1 Comparison of the IWB indicators between FMNs in government and private hospitals (continue)

IWB indicators	Indicator Frequency		Govt. hosp. 12 indicators	Pvt. Hosp. 13 indicators
	Govt. Hosp.	Pvt. Hosp.	Factor Loading (λ_1)	Factor Loading (λ_2)
3.4 Attempt to convince people to support an innovative idea (IC4)			0.74	0.66
4. Innovative idea implementation	3	3		
4.1 Transform innovative ideas into useful applications (IMP1)			0.63	0.67
4.2 Systematically introduce innovative ideas into work practices (IMP2)			0.74	0.68
4.3 Contribute to the implementation of new ideas (IMP3)			-	0.69
4.4 Put effort into the development of new things (IMP4)			0.76	-
Total	12	13		

Discussion

The results of the study revealed that both private and government hospitals had the same number of components (4 components) corresponding to those found by De Jong and Den Hartog (2010). This is probably because nowadays, business and healthcare organizations have similar visions, strategies, and goals focusing on being innovative organizations. Therefore, executives and administrators place importance on the promotion of creativity and innovation and transfer visions to all departments, not only at the organizational level but also work team and individual levels (Adair, 2007). Furthermore, De Jong and Den Hartog (2008, 2010) state that innovative work behavior is a characteristic of individuals who have new ideas and want to develop new things. Due to the fact that FNMs work closely with staff members or professional nurses who provide services in the organization, administrators must be determined to develop and encourage them to have creativity in thinking of new ideas in giving healthcare services in terms of product innovation, process innovation, and service innovation to enhance healthcare services (Kaya, Turan, & Aydin, 2016). Nevertheless, there is a different indicator in Component 3 which is Innovative idea championing. This component of government hospitals contains 3 indicators while, as a component of private hospitals, it contains 4 indicators. The indicator that government hospitals do not have, but which private hospitals do is: make important organizational members enthusiastic for innovative ideas. For private hospitals, FNMs focus on health business

management and implementing policy for professional nurses to practice. Head nurses are responsible for the improvement of work efficiency among nurses in the team and for building the team' s various types of IWB according to the cultural context of the organization. Because private hospitals are healthcare businesses, head nurses are required to work with marketing strategies and create innovations to achieve competitive advantages. For FNMs in government hospitals, the emphasis is on driving the work according to the policy of the Ministry of Public Health focusing on performance to meet the required indicators. In other words, they need to be evaluated based on the results of innovations that must meet the criteria required by the Ministry of Public Health (Nursing Division, 2018).

Additionally, another concept of IWB states that IWB is an individual's creativity crated according to the cultural context of the organization. Thus, development and creation of innovative work behavior of individuals are different depending on their capabilities in thinking of new ideas and creating new things that produce different results for individual performance based on the context and culture of the organization (Xerri, 2013; Ahmed, Ata, & Abd- Elhamid, 2019). However, some studies specify that IWB is an activity that leaders must have by creating personal interactions with members and colleagues who are all different (Hammond, Neff, Farr, Schwall, & Zhao, 2011; Kelley, Brandon, & McGrath, 2018). FNMs are important in implementing policies for nurses to practice and in improving the work efficiency of the team (Anderson, Dreu & Nijstad, 2004). Therefore, it is necessary for them to develop an innovative team to create a variety of innovations in line with the cultural context of the organization focusing on making profits (Hammond, Neff, Farr, Schwall, & Zhao, 2011). On the contrary, government hospitals place importance on work development in line with government policies focusing on benefits rather than profits. Therefore, head nurses must play a role in innovation management to keep up with changes and to promote the process of innovation management for the best results. Needless to say, the goals of private hospitals are management and healthcare services with more emphasis on business growth and competitiveness than government hospitals. Hence, for private hospitals, making profits for the hospital shows that they have effective leaders who can develop personnel to have creativity and new ideas continually, and that the leaders are competent in solving problems with new methods (Wuttirakkajon, 2017).

Therefore, it is evident that innovative work behavior is essentially required as part of the qualifications of first- line nurse managers or head nurses in order to manifest the significant signs of the ability to play a role as effective leaders. Moreover, the innovative work behavior of managers also shows personal behaviors connected between leader behavior and transformational leadership (Bass & Riggio, 2006).

Conclusions and Recommendations

In conclusion, this study demonstrates that the IWB components in government and private hospitals include the same four components or factors, but the numbers of indicators are different. Government hospitals

have 12 indicators while private hospitals have 13 indicators which depend on their different contexts and goals. First-line nurse managers are a major group in both government and private hospitals. Thus, the results of this study could be used to increase IWB among these groups. Hospitals should recruit smart FNMs and use a talent management system to further increase FNMs' ability to create suitable innovations in nursing organizations. The results of this study could also be used to control and evaluate FNMs' IWB abilities. It is recommended that future research should develop standardized instruments for the evaluation of IWB among FNMs**.** Researchers should also study relationships or structural equation models related to variables that affect IWB among FNMs which are the major group of nurse managers in nursing organizations.

Acknowledgments

The authors would like to thank all FNMs who participated in this study. We also extend our thanks to Christian University of Thailand for its financial support.

References

Adair, J. (2007). *Leadership for innovation: How to organize team creativity and harvest ideas*. London: Kogan Page.

Ahmed, K., Ata, A., & Abd-Elhamid, N. (2019). Relationship between the leadership behaviors, organizational climate and innovative work behavior among nurses. *American Journal of Nursing Research*, *7*(5), 870-878.

Anderson, R., Dreu, W., & Nijstad, A. (2004). The reutilization of innovation research: A constructively critical review of the state-of-the-science. *Journal of Organizational Behavior*, *25*(2), 147-174.

Asurakkody, A., & Shin, Y. (2018). Innovative behavior in nursing context. *Asian Nursing Research*, *12*(4), 237-224.

Bass, B. M., & Riggio, R. E. (2006*). Transformational leadership*. Mahwah, NJ: L.I Lawrence Erlbaum.

Brislin, W. (1986). The wording and translation of research instruments. In W. Lonner. & J. Berry *(Eds.), Field methods in cross-cultural research*. Newbury Park, CA: SAGE.

Burns, M., & Grove, K. (2001). *The practice of nursing research, conduct, critique, and Utilization* (4th ed.). Philadelphia: W. B. Saunders.

Contreras, F., Espinosa, C., Dornberger, U., & Acosta, C. (2017). Leadership and employees' innovative work behavior: Test of a mediation and moderation model. *Asian Social Science 13*(9), 9-25.

De Jong, J., & Hartog, D. (2008). *Innovative work behavior: Measurement and validation.* Zoetermeer: Amsterdam Business School.

De Jong, J., & Hartog, D. (2010). Measuring innovative work behavior. *Creativity and Innovation Management, 19*, 23-36.

Gupta, K., Attri, P., Singh, A., Kaur, H., & Kaur, G. (2016). Basic concepts for sample size calculation: Critical step for any clinical trial. *Saudi Journal of Anesthesia, 10*(3), 328–331.

Hair, F., Black, C., Babin, J., & Anderson, E. (2010). *Multivariate data analysis: A global perspective*. New Jersey: Pearson Prentice Hall.

Hammond, M., Neff, L., Farr, L., Schwall, R., & Zhao, X. (2011). Predictors of individual-level innovation at work: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts, 5* (1), 90–105.

Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behavior. *Journal of Occupational and Organizational Psychology, 73*(3), 287-302.

Kaya, N., Turan, N., & Aydin, G. O. (2016). Innovation in Nursing: A concept analysis. *Journal of Community & Public Health Nursing*, 1: 108. doi: 10.4172/2471-9846.1000108

Kelley, T., Brandon, D., & McGrath, J. (2018). Work arounds as a catalyst toward a culture of innovation. *Advances in Neonatal Care 18*(3), 163-164.

Kitsahawong, B., Singchungchai, P., & Sritoomma, N. (2020). The development of an innovative work behavior scale for first-line nurse managers in Private Hospitals. *Ramathibodi Nursing Journal*, *26* (2), 203-216.

Marquis, B. L., & Huston, C. J. (2017). *Leadership role and management function in nursing theory and application* (9th ed.). Philadelphia, PA: Lippincott William & Wilkins.

Nursing Division, Ministry of Public Health. (2018). *Strategic Plans for National Nursing Services 2017-2021 according to the 20-Year National Strategic Plans (Public Health).* Bangkok: Suetawan Publishing. (in Thai)

Nursing Division, Ministry of Public Health. (2018). *Roles and duties of Registered Nurses.* Bangkok: Suetawan Publishing. (in Thai)

Pakokthom, B., & Vorathongchai, K. (2020). Thailand 4.0 competencies for professional nurses working in community hospitals level F1-F3. *Journal of Nursing and Health, 38*(3), 110-118. (in Thai)

Singchungchai, P. (2019). Innovative leadership in nursing management. *The Southern College Network Journal of Nursing and Public Health, 6*(1), 260-266. (in Thai)

Thomas, W., Seifert, C., & Joyner, C. (2016). Registered nurses leading innovative changes. *The Online Journal of Issues in Nursing, 21*(3), 3.

Tung, V., Akkadechanunt, T., & Chontawan, R. (2014). Factors related to innovation behavior among nurses in Tertiary General Hospitals, the Central Region, The Socialist Republic of Vietnam. *Nursing Journal 41*(2) 117-132.

Xerri, M. (2013). Workplace relationships and the innovative behavior of nursing employees: A social exchange perspective. *Asia Pacific Journal of Human Resources, 51*(1), 102-123.