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Evaluation of Knowledge Sharing and Its Role in Organizational Innovation Using Structural Equation Modelling: A Case Study of Civil Aviation Organization

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Abstract

With the expansion of competition among organizations, the key factor in their lives is organizational innovation, the proper management of which requires a strategic perspective. In addition, the growth of innovation in the organization depends on the tacit knowledge of the experts of that organization. This research empirically investigates the relationship between knowledge sharing and its role in organizational innovation in the Civil Aviation Organization (CAO). In this study, 12 main hypotheses related to knowledge sharing and organizational innovation in the questionnaires were considered and data were collected from 295 managers of CAO, and LISREL was used to validate data and examine the hypothesized relationships. The model presented in this study; Personality, expected results, mental norms, perceived behavioral control, structural characteristics, commitment, trust, organizational culture, organizational environment, information, and communication technology were considered as exogenous variables that will directly affect the voluntary sharing of knowledge and demand-based knowledge. Findings showed that personality, subjective norms, structural characteristics, commitment, trust, organizational culture, organizational environment, information, and communication technology positively influenced voluntary knowledge sharing. Moreover, personality, expected results, perceived behavioral control, structural characteristics, trust, organizational culture, information, and communication technology positively influence demand-based knowledge sharing. Finally, findings showed that voluntary knowledge sharing has a stronger influence on organizational innovation and is more important than demand-based knowledge sharing. The present study highlighted that voluntary and demand-based knowledge sharing significantly and positively influences organizational innovation, and knowledge sharing and organizational innovation appear to be key drivers for gaining competitive advantage.

Keywords: *voluntary, knowledge sharing, demand-based, innovation, strategy.*

1. Introduction

Organizational performance is the ability of organizations to use inputs and resources and produce products and services based on planning Has been done and takes into account the goals of the stakeholders (Abualoush et al., 2018). The motivation of people to share their knowledge in organizations is the most important priority of knowledge management practitioners around the world (Succi and Canovi, 2020). The main purpose of managers in using knowledge management in organizations is to improve knowledge sharing among people within an organization as well as between people and organization for competitive advantage (J.-C. Lee, Shiue, and Chen, 2016). Effective knowledge sharing among organizational members decreases costs of knowledge production and ensured the emission of the best working methods within the organization to enable the organization to solve its problems and more importantly to innovate (Zahedi and Khanachah, 2020). Knowledge sharing underlies many strategies of knowledge management of organizations as a complicated but valuable activity (McIver, Lengnick-Hall, Lengnick-Hall, and Ramachandran, 2013). Studies on knowledge sharing root in the literature on innovation, technology delivery, and strategic management. The power of people to exchange their knowledge, experiences, and skills adds to the growth of their productions and new services (Tidd and Bessant, 2020). Hence, knowledge sharing is considered a prerequisite to developing technology or new products (Islam, Jasimuddin, and Hasan, 2015). Nevertheless, employees of many current organizations do not tend to exchange knowledge with their coworkers and work teams. This can result from some problems which remain unsolved (Maqableh and Karajeh, 2014; Shen, Tang, and D'Netto, 2014; Santos, Goldman, and De Souza, 2015; de Geofroy and Evans, 2017; Pereira and Mohiya, 2021). In the strategic management area, knowledge sharing is of great importance as the most important strategic resource for organizational innovations (Ganguly, Talukdar, and Chatterjee, 2019). Knowledge sharing is important for it helps the development of skills, capabilities, value-added and innovative activities and strategies (Obeidat, Al-Suradi, and Tarhini, 2016). Additionally, knowledge is the most essential strategic resource of the organization from a resource-based point of view. Management of this resource is the most important challenge that organizations, particularly military ones, face. Moreover, little is known about effective factors on voluntary and demand-based knowledge sharing to improve organizational innovation.

BenMoussa (2009) developed a framework for knowledge management barriers. Under such a framework, barriers to KM success are related to the supply-oriented approach that describes knowledge management projects. Such an approach assumes that knowledge as an organizational asset is independent of the individual. And the mission of knowledge management is to make such assets more widely available to members of the organization (Keen, and Tan, 2007). Due to such an approach, several companies implementing quality management projects pay little attention to planning their knowledge management activities, for example, articulating useful KM goals, including end-users, selecting useful content, and so on. They also consider KM technology as their main capable KM application. As a result, they do not initiate motivational programs that motivate people to participate in knowledge management activities (Pereira and Mohiya, 2021). These organizational barriers create personal barriers where end-users feel that their companies' knowledge management initiatives are not useful. Thus, BenMoussa (2009) emphasized the need to set an IT-based KM goal/mission that integrates both the supply and demand sides of knowledge, that is, the needs of individuals. These include moving from the mantra "knowing power" to "having and using knowledge of power"(Lengnick-Hall, Beck, and Lengnick-Hall, 2011; M. R. Zahedi and Khanachah, 2019).

The case study of this article is the projects of the Civil Aviation Organization (CAO), and Finally, this study empirically explores how Voluntary knowledge sharing and Demand-based knowledge sharing integrates knowledge sharing and organizational innovation to reinforce competitive advantage (i.e CAO). This proposed conceptual model adds value to the body of knowledge and provides insights for industrial managers to provide some policy implications that should be considered in other developing organizations with similarities to CAO for understanding better and managing knowledge sharing and organizational innovation to expand competitive advantage.

2. A literature review and conceptual framework

2.1. Literature review

2,1,1. Voluntary Knowledge Sharing and Demand-based Knowledge Sharing

Malik and Kanwal (2018) defined knowledge management as "an exchange of experiences, facts, knowledge, and skills all through the organization". Davenport and Prusak (1998) assert that knowledge sharing occurs when people demand knowledge from others to solve their problems (Pauleen, 2017). Therefore, knowledge sharing starts with a 'demand' and ends by 'meeting a demand' (others' agreement on responding to that demand) (Kiparsky, Milman, and Vicuña, 2012). Empirically studying knowledge sharing among 'strangers' (employees of large global companies in a far distance), Constant et al found that knowledge sharing behaviors were based on demand and response cycle (Wiewiora, Murphy, Trigunarsyah, and Brown, 2014). In most cases, as Tsai et al, it was assumed that there was only one knowledge-sharing process based on the demand and response cycle (Al Ahbabi, Singh, Balasubramanian, and Gaur, 2019). Undoubtedly, people sometimes voluntarily share their knowledge without any demand by others who in turn share their knowledge with us; therefore, knowledge sharing also involves delivering knowledge to others without any initial demand (Williams and Baláž, 2014). This type of knowledge sharing is called voluntary knowledge sharing which is against demand-based knowledge sharing (Massingham, 2019). Teng and Song differentiated voluntary knowledge sharing and demand-based knowledge sharing (Chae, Seo, and Lee, 2015). Demand-based knowledge sharing is defined as sending and receiving a demand for knowledge by people and satisfying the demand. On the other hand, voluntary knowledge sharing refers to sending and receiving knowledge without any primary and obligatory demand by people (Takkinen, 2004). Teng and Song believed that much advancement has been achieved concerning knowledge sharing; nevertheless, lack of complete attention to knowledge sharing phenomenon and mere attention to one part of it disturbed more advancements in this area (Teng and Song, 2011).

2,1,2. Effective Factors on Voluntary Knowledge Sharing and Demand-Based Knowledge Sharing

Kim and Lee (2013), Shen et al. (2014), Massingham (2019), and Bessant (2020) emphasized that The most important *personal characteristics* include adaptation, conscientiousness, acceptance, need for learning, and competitiveness influence knowledge sharing behavior. Lengnick-Hall et al. (2011), McIver et al. (2013), and Obeidat et al.(2016) found that *Subjective norms* (A kind of perceived syntax norm) are an element of reasoned action and planned behavior theory referring

to the extent to which people think important people need to approve certain behavior. Teng and Song (2011), McIver et al.(2013), Shen et al. (2014), and Massingham (2019) added that Expected results are the estimation of an individual that a certain behavior will lead to certain outcomes including: (1) expected rewards, (2) expected communication, (3) expected mutual benefit. Santos et al. (2015) argued that Perceived behavioral control "Shows the simplicity or difficulty of a behavior". Experience of the individual and obstacles which he expects is reflected by this factor. It states that among two people with similar intentions for behavior the one who is more confident in his abilities is potentially more successful than the one who doubts his abilities. Islam et al. (2015), Pauleen (2017), and Zahedi and Khanachah (2020) emphasized that Commitment Identification of people with their organization or participation in the organization, including: affective commitment, continuance commitment, and normative commitment.

Williams and Baláž (2014), Islam et al. (2015), Park and Kim (2015), Obeidat et al. (2016), Pauleen (2017), and Ganguly et al. (2019) added that Another important factor is Organizational climate which is expressed as follows: the feeling which appears in an organizational group by physical locating, interacting, and communicating among organization members including clarity of organizational goals, flexibility, innovation, and reflectivity. organizational climate can be measured through supporting knowledge sharing by senior management, open communication, motivating to create new ideas, and reward systems related to knowledge-sharing. Song (2011) recognized that Organizational structure that means: indicates the internal properties of an organization. They provide a basis on which organizations can be measured and compared. Structural dimensions include recognition, specialty, the hierarchy of authority, complexity and, centralization; is an important factor influencing voluntary and demand-based knowledge sharing. Chae et al. (2015), Lee et al., 2016, and de Geofroy and Evans (2017) emphasized that ICT infrastructure helps the knowledge-creating process and helps people to gain required knowledge related to expressing ideas and integrating ideas. Collective tools of IT include organizational intranets, databases and, document management influencing voluntary and demand-based knowledge sharing.

2,1,3. Innovation, Voluntary Knowledge Sharing and Demand-Based Knowledge Sharing

Organizational innovation refers to the development or admittance of an idea or behavior in a business that is new to the organization; that is, placing value by new technologies or new administrative activities in terms of new products or processes (Shen et al., 2014; M. Zahedi et al., 2020). There are many studies conducted on the effect of knowledge sharing organizational innovation (Abdi et al., 2018; Chang, Liao, and Wu, 2017); they all suggest that knowledge sharing positively influence organizational innovation(Abbas et al., 2019; Nham, Tran, and Nguyen, 2020; M. Zahedi et al., 2020). Table 1 lists a summary of these studies.

Table 1: summary of studies conducted on the relationship between innovation and knowledge sharing

Researchers	Year	Methodology	Results
Zahedi et al.	*2020*	Path analysis	The higher the quality and quantity of knowledge sharing, the more innovative performance will improve.
Abdi et al.	*2018*	Multivariate regression	Knowledge sharing positively influences organizational innovation.
Chang et al.	*2017*	Pearson correlation	Knowledge sharing strategies positively influence organizational orientation to innovation.
Noruzy et al.	*2013*	Regression	Strategies of organizational knowledge management directly influence organizational innovation.

2.2. Conceptual framework

Argoteand Ingram (2016); claims that the most important factors for successful knowledge sharing within an organization include people, technology, and tasks. Based on the model developed by Leavitt (2015); organizational actors (people), goals, technology, structure, and setting can be considered as constituents of the organization. According to other authors, organizational dimensions can also be divided into two categories: structural and content. Structural dimensions indicate the internal characteristics of an organization.

 They provide a basis by which organizations can be measured and compared. Content dimensions refer to the position and entity of an organization (Johnson and Leavitt, 2001; Lips-Wiersma and Hall, 2007; Teng and Song, 2011; Y.-J. Lee, 2011; Hodgkinson, 2014; Alvesson and Sveningsson, 2015; Healey and). Reviewing literature on knowledge sharing and organizational dimensions of Leavitt , Hall and Daft models, the present study developed its suggested model considering personal and structural factors, technology, organizational culture and climate, voluntary and demand-based knowledge sharing.

As noted above, the conceptual model of the study was developed by reviewing the literature. In this model, exogenous variables included personality, expected results, subjective norms, perceived behavioral control, structural characteristics, commitment, trust, organizational culture, organizational climate, information and communication technology (ICT) each directly influencing voluntary and demand-based knowledge sharing. Both voluntary and demand-based knowledge sharing also directly influences organizational innovation. Therefore, according to more extensive research, the 12 hypotheses of this research can be expressed as follows and according to the theoretical background.

- ▪ *Hypothesis 1: Personality influences voluntary and demand-based knowledge sharing.*

 According to the Schniederjans and Hales (2016) finding among the dimensions related to personality include: extraversion, adaptability, conscientiousness, neuroticism, openness to

experience; Behavioral factors are very effective in implementing the process of voluntary knowledge sharing in the organization.

Research shows that people in a traditional economy place more emphasis on their power and interests, and are usually reluctant to share the knowledge and information of an organization's employees as individual capital (Beech (2020). as follows: Expected results influence voluntary and demand-based knowledge sharing. Also, relying on the research done by Feinberg and Malur (2020) the third and fourth hypotheses can be expressed as follows:

- *Hypothesis 2: Expected results influence voluntary and demand-based knowledge sharing.*
- *Hypothesis 3: Subjective norms influence voluntary and demand-based knowledge sharing.*
- *Hypothesis 4: Perceived behavioral control influences voluntary and demand-based knowledge sharing.*

Human resource systems can be divided into two types: control-oriented systems and commitment-centered systems. Employees' psychological dependence on the organization. The control-oriented human resources system focuses on purchasing the required human capital from outside the organization and creating short-term interaction with employees, while the human resources system focuses on developing and maintaining human resources and creating long-term interaction with employees(Kim, 2012). Also, considering the great impact of the committee discussion on knowledge sharing and study results of Sgaier et al. (2015) the fifth hypothesis can be expressed as follows:

- *Hypothesis 5: Commitment influences on voluntary and demand-based knowledge sharing.*

According to Gillespie and Dietz (2009), the perception of organizational trust refers to employees' beliefs about the positive intentions and future actions of the organization and has three dimensions: ability, altruism, and cohesion. Ability to refer to the competencies and expertise of the individual or organization. It enables him to perform his duties well and achieve his goals. Friendship refers to the real and esoteric attention of the individual or organization to the desires and well-being of the other person (Ghorbani and Khanachah, 2020). Cohesion means continuous adherence to accepted moral principles. Employees regardless of circumstances and requirements. Trust requires accepting risk because the trustee exposes the other party to the expectation that the other party will at least consider it helpful to do so. Whether the contractor can control the other side or not. The actions of the organization can affect the level of trust, including trust between employees with each other and trust between employees and the organization, although the degree of trust also depends on the individual characteristics of employees. Therefore the sixth hypothesis, according to the results of the study by Beech (2020) and with emphasis on personal aspects, is proposed as follows:

- *Hypothesis 6: Trust influences voluntary and demand-based knowledge sharing.*

According to Ellinas et al,.(2017) to the research, the common denominator of all these definitions of organizational culture is the existence of a series of common beliefs, convictions, and values among the members of an organization. It is only by examining, changing, and creating an appropriate and flexible organizational culture that the pattern of interaction between people in the organization can be gradually changed and knowledge management can be used as a competitive advantage (Zahedi, 2021). Organizations must therefore create an environment for knowledge sharing, transfer, and interaction among members, and train individuals to make sense of their interactions. Also, according to the research conducted by Nold (2011) on organizational factors affecting knowledge sharing, the seventh and eighth hypotheses are considered as follows:

- *Hypothesis 7: Organizational culture influences voluntary and demand-based knowledge sharing.*
- *Hypothesis 8: Organizational climate influence voluntary and demand-based knowledge sharing.*

The development of information and communication technology has put human society in general and commercial-industrial organizations in particular in a situation where in order to survive, they must seek new tools and solutions tailored to the prevailing conditions with astonishing capabilities of knowledge (Ravetz, 2020). To serve and use it in the direction of competitive advantage. Managers of knowledge-based organizations use information technology as a driving force and effective factor in the development and success of knowledge management and overcoming challenges (Edquist and Zabala-Iturriagagoitia, 2015).

Knowledge management, which is the production of wealth and value using intellectual and knowledge-based assets, needs a system that can support this. Information technology, as the most important enabling factor of knowledge management, has been able to improve knowledge management with high speed and accuracy to a great extent, and in today's competitive environment, where any change brings one opportunity and eliminates another, Play a key role. Considering the role of infrastructures affecting knowledge sharing in our organization and the results of studies Edquist and Zabala-Iturriagagoitia (2015) the Ninth and tenth Hypotheses are proposed as follows:

- *Hypothesis 9: Structural characteristics influence voluntary and demand-based knowledge sharing*
- *Hypothesis 10: ICT influences on voluntary and demand-based knowledge sharing.*

In educational organizations, in addition to the fact that such an atmosphere should be available for professors and administrators, professors should also provide the necessary ground for a favorable atmosphere for students. A professor who works in such an environment can create an environment in which the student can explore, invent and innovate using the opportunities and freedom of action. The educational environment should pay attention to the body and mind of learners, cultivate their mental exudations and turn their potential abilities into action. Finally,

according to the factors affecting organizational innovation and knowledge sharing and based on the study conducted by Romero and Molina (2011) the Eleventh and twelfth Hypotheses are proposed as follows:

- *Hypothesis 11: Voluntary knowledge sharing influences on organizational innovation*
- *Hypothesis 12 : Demand-based knowledge sharing influences on organizational innovation.*

3. Analysis

3.1. Methodology

3.1.1. Qualitative analysis

Based on a review of the literature and discussions, we developed a primary scale for measuring knowledge sharing activity interest, voluntary knowledge sharing, invention reputation, participation, investment income, or investment opportunities resulting from inventions and the inventor's motivation. Initial scales were then developed with qualitative analysis. We conducted 12 in-depth personal interviews with 10 well-known CAO's managers in the field of knowledge management (i.e. those who received national or international awards for their knowledge management and were widely recognized by experts in their field). Participants varied in age (48 to 70), level of education (from master to phD), technical and work disciplines (independently or for the organization). The findings of the multifactorial analysis fully support the initial scales as well as offer some additional cases. Next, the 29-item scale was carefully reviewed by three independent patent experts to assess their content validity. Representation, uniqueness, and clarity of items in each scale were considered by experts. Each item was rated on a 5-point Likert scale from 1 (totally disagree) to 5 (totally agree) and subjected to further refinement.

3.1.2. Quantitative analysis
3.1.2.1. Samples

Participants included all managers of the Civil Aviation Organization (CAO). Different parts of the organization were sampled by stratified sampling method by which 315 managers were selected as a sample to which questionnaire was administered. By conducted follow-ups, 300

completed questionnaires were gathered of which 295 questionnaires were selected for the following analysis by reviewing and discarding incomplete ones.
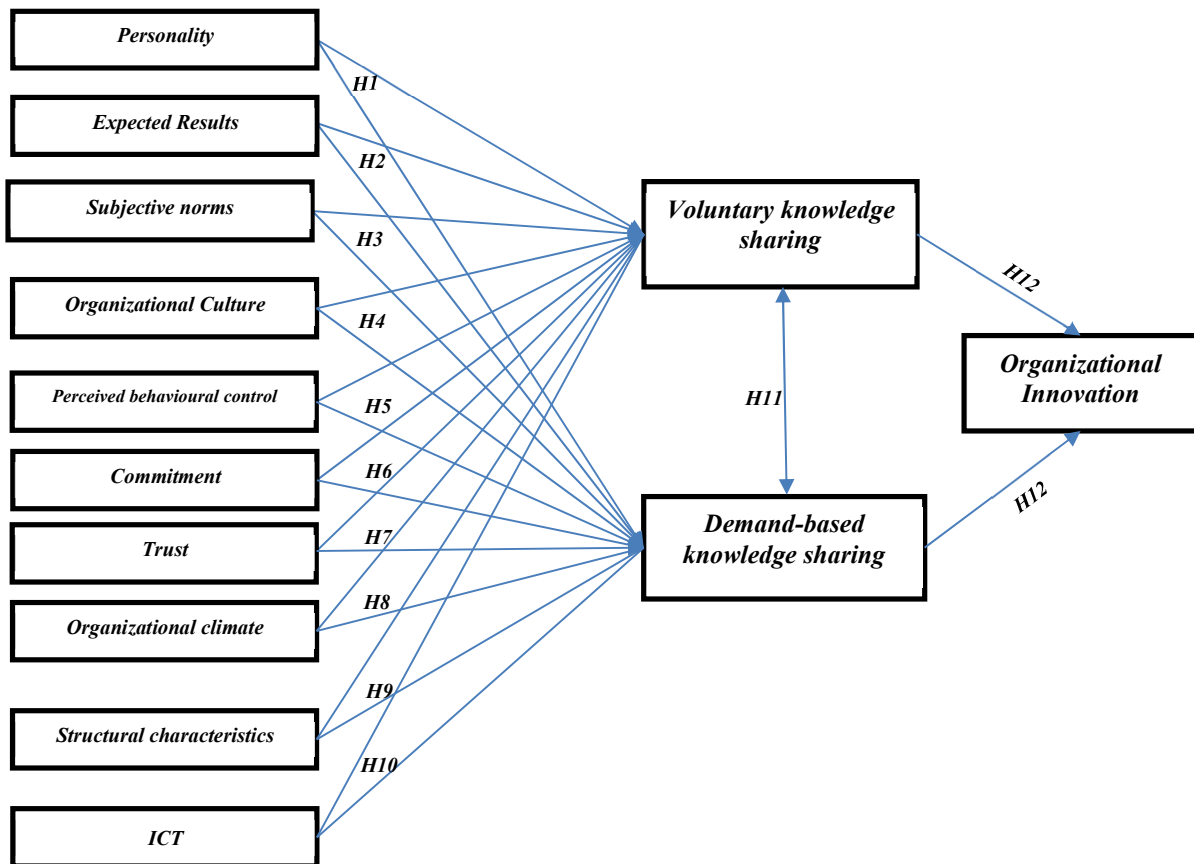

Figure 1: conceptual model

3.1.2.2. Measures

A questionnaire was developed to collect data following a literature review considering selected variables. The questionnaire includes 13 variables including voluntary knowledge sharing, demand-based knowledge sharing, personality, expected result, subjective norms, perceived behavioral control, structural characteristics, commitment, trust, organizational culture, ICT, and organizational innovation as well as 95 items. Table 2 shows findings from calculating reliability.

Table 2: calculated α for questionnaire

Row	Items	Cronbach α
1	Voluntary knowledge sharing	0.78
2	personality	0.87
3	Expected results	0.83
4	Subjective norms	0.75
5	Perceived behavioral control	0.81
6	Structural characteristics	0.87
7	Commitment	0.71
8	Trust	0.74
9	Demand-based knowledge sharing	0.71
10	Organizational culture	0.75
11	Organizational climate	0.80
12	ICT	0.74
13	Organizational innovation	0.77

Obviously, α calculated for voluntary knowledge sharing, personality, expected results, subjective norms, perceived behavioural control, structural characteristics, commitment, trust, demand-based knowledge sharing, organizational culture, organizational climate, ICT and organizational innovation was 0.78, 0.87, 0.83, 0.75, 0.81, 0.87, 0.71, 0.74, 0.71, 0.75, 0.80, 0.74 and 0.77, respectively. Calculated α indicated that the used questionnaires were reliable. Both content analysis and confirmatory factor analysis were used to examine the validity of the material. Results from confirmatory factor analysis showed that developed materials were valid and well fitted.

4. Results

Path analysis was used to test the conceptual model. Path analysis is a developed regression and, in fact, a multivariate regression. Path analysis quantitatively estimates causal relationships between a series of variables. The relationships between variables flow in a direction; they are considered as separate paths. Concepts of path analysis are best explained by its major characteristic, path diagram which reveals potentially causal links between variables. To depict the path diagram, a variable is arrowed to the other variable which is under influence of the former. If A and B are correlated, A may be the cause of B and B may be the cause of A, or both may be an effect of C. For research purposes, causal modeling refers to causal inferences resulted from data correlations that guarantee the relationships between observables (variables or pointers, in terms of LISREL) or actors (constituents). Path analysis may assert which paths are more important (more significant); this may indicate valid pre-determined causal hypotheses. The final model, as depicted in Figure 1, was tested by path analysis. Table 4 lists general, direct, and indirect effects related to them.
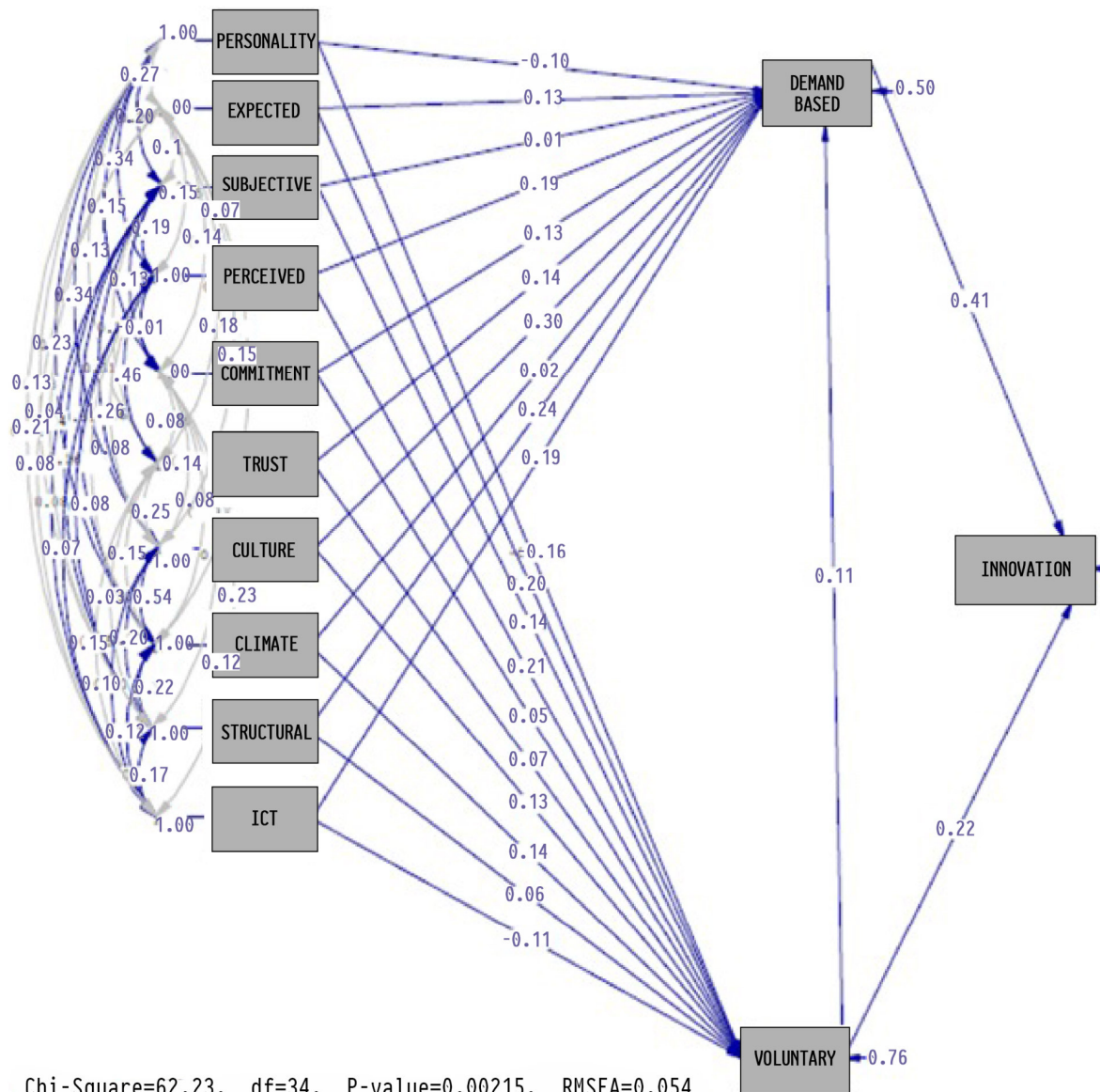
Chi-Square=62.23, df=34, P-value=0.00215, RMSEA=0.054

Figure 2: test of the model

Table 3 shows results from hypotheses. Hence, according to the first hypothesis that personality influences voluntary and demand-based knowledge sharing, results showed that personality significantly influenced voluntary knowledge sharing (0.10) and demand-based knowledge sharing (0.16); therefore, the first hypothesis was supported. According to the second hypothesis that expected results influence voluntary and demand-based knowledge sharing, results showed that personality insignificantly influenced voluntary knowledge sharing (0.01) and significantly influenced demand-based knowledge sharing (0.14); therefore, expected results only influence demand-based knowledge sharing. According to the third hypothesis that subjective norms influence voluntary and demand-based knowledge sharing, results showed that subjective norms significantly influenced voluntary knowledge sharing and insignificantly influenced demand-based knowledge sharing.

Table 3: direct, indirect, total effects and explained variance of variables

Path	Direct effect	Indirect effect	General effect	Explained variance
Organizational innovation				
Voluntary knowledge sharing	0.41**	-	0.41**	
Demand-based knowledge	0.22**	0.05*	0.37**	
sharing	-	0.09**	0.09**	
personality	-	0.04	0.04	
expected results	-	0.05	0.05	
subjective norms	-	0.05	0.05	0.28
perceived behavioural control	-	0.07**	0.07**	
commitment	-	0.11**	0.11**	
trust	-	0.16**	0.16**	
Organizational culture	-	0.07**	0.07**	
Organizational climate	-	0.13**	0.13**	
Structural characteristics	-	0.11**	0.11**	
ICT				
Organizational innovation				
Voluntary knowledge sharing	0.11*	-	0.11*	
Demand-based knowledge	0.10*	0.02	0.12*	
sharing	0.01	0.02	0.03	
personality	0.12**	0.02	0.15**	
expected results	0.02	0.01	0.03	
subjective norms	0.14**	0.01	0.15**	0.50
perceived behavioural control	0.13**	0.01	0.14**	
commitment	0.30**	0.01	0.31**	
trust	0.24**	0.01	0.25**	
Organizational culture	0.19**	0.02	0.21**	
Organizational climate	0.19**	0.02	0.21**	
Structural characteristics				
ICT				
Organizational innovation				
Voluntary knowledge sharing	0.16**	-	0.16**	
Demand-based knowledge	0.14*	-	0.14*	
sharing	0.05	-	0.05	
personality	0.14*	-	0.14*	
expected results	0.07	-	0.07	
subjective norms	0.20**	-	0.20**	
perceived behavioural control	0.13*	-	0.13*	0.24
commitment	0.06	-	0.06	
trust	0.21*	-	0.21*	
Organizational culture	-0.11	-	-0.11	
Organizational climate				
Structural characteristics				
ICT				

** $p<0.01$, * $p<0.05$

According to the fourth hypothesis that perceived behavioral control influences voluntary and demand-based knowledge sharing, results showed that perceived behavioral control influenced demand-based knowledge sharing (0.14) and insignificantly influenced voluntary knowledge sharing. The fifth hypothesis also showed that organizational commitment significantly influenced voluntary knowledge sharing (0.14) and insignificantly influenced demand-based knowledge

sharing. On the other hand, the sixth hypothesis showed that trust positively influenced voluntary knowledge sharing (0.31) and demand-based knowledge sharing (0.20); therefore, the sixth hypothesis was supported. Findings showed that organizational culture positively influenced voluntary knowledge sharing (0.30) and demand-based knowledge sharing (0.13). Findings related to organizational climate showed that it positively influenced voluntary knowledge sharing (0.24) and insignificantly on demand-based knowledge sharing. However, the hypothesis related to the influence of structural characteristics on voluntary and demand-based knowledge sharing showed that structural characteristics positively influenced both knowledge-sharing processes. Therefore, the hypothesis was supported. ICT significantly influenced voluntary (0.19) and demand-based knowledge sharing (0.11). Also voluntary knowledge sharing positively and significantly influenced organizational innovation (0.41). Moreover, demand-based knowledge sharing positively influenced organizational innovation (0.22); while, voluntary knowledge sharing had more influence on organizational innovation than demand-based knowledge sharing. Fitness indices obtained for the tested model of Table 5 showed that RMSEA was reasonable (0.071) and other fitness indices including CFI, GFI, NFI, NNFI and, AGFI were reasonable (0.95, 0.95, 0.94, 0.92, and 0.94, respectively); therefore, data used for the current study were properly fitted.

Table 4: properties of model fitness

Index	NFI	NNFI	AGFI	GFI	CFI	RMSEA	x/df
Reasonable value	≥0.90	≥0.90	≥0.90	≥0.90	≥0.90	≤0.08	≤5.00
Estimated value	0.94	0.92	0.94	0.95	0.95	0.071	5

5. Discussion and Conclusion

The first hypothesis claimed that personality influenced voluntary and demand-based knowledge sharing. Findings showed that personality significantly influenced voluntary and demand-based knowledge sharing; therefore, the first hypothesis was supported. It is noteworthy that knowledge sharing is a certain form of contribution, cooperation, and collaboration in working place and builds relationships between co-workers and leaders. Behaviors related to knowledge sharing are entirely involved in a better knowledge-sharing process combined with adaptation, conscientiousness, need for learning, and competitiveness (Hao, Yang, and Shi, 2019; Wang, Noe, and Wang, 2014; M. Zahedi et al., 2020).

The second hypothesis claimed that expected results influenced voluntary and demand-based knowledge sharing. Findings showed that expected results insignificantly influenced voluntary and significantly influenced demand-based knowledge sharing; therefore, expectations to achieve desirable results positively influence intentions to share knowledge (Nham et al., 2020). Thus, the stronger understanding of expected results including expected rewards, expected communications, and mutual interests, the more tendency for demand-based knowledge sharing.

The third hypothesis claimed that subjective norms influenced voluntary and demand-based knowledge sharing. Findings showed that subjective norms significantly influenced voluntary and insignificantly influenced demand-based knowledge sharing. Employees show more interests to share knowledge voluntarily when real or perceived acceptance of behavior, such as knowledge sharing, is higher. Because, people are internally simulated to share knowledge (Schniederjans and Hales, 2016).

The fourth hypothesis claimed that perceived behavioral control influenced voluntary and demand-based knowledge sharing. Findings showed that perceived behavioral control insignificantly influenced voluntary and influenced demand-based knowledge sharing (Massingham, 2019).

The fifth hypothesis showed that organizational commitment significantly influenced voluntary and insignificantly influenced demand-based knowledge-sharing; therefore, employees voluntarily involve in knowledge sharing when they feel commitment and attachment to the organization and believe its values (Ogunleye, 2020). Employees who have more commitment to their organization have more participation in knowledge sharing activities. Higher levels of organizational commitment are related to positive attitudes of employees to knowledge sharing. Positive attitudes and behaviors of knowledge sharing result from a positive psychological agreement due to actions of human resource management, culture, and organizational climate.

Other findings show that trust positively influences voluntary and demand-based knowledge sharing. Trust within an organization and among its members directly influence communications; as a result, it influences the size of shared knowledge within and between organizational units (Kim and Lee, 2013; Y.-J. Lee, 2011; Park and Kim, 2015; Schniederjans and Hales, 2016; Nham et al., 2020). Most people do not share their knowledge without a sense of trust. Trust includes two aspects:1) mistrust of knowledge-holder in people due to misuse or illegal credibility of shared knowledge, 2) mistrust of knowledge-receiver in the validity of the knowledge and information as well as competency of knowledge-holder. Informal networks make people trust each other and voluntarily share their knowledge and insight.

Findings related to the next hypothesis regarding the influence of organizational culture on voluntary and demand-based knowledge sharing show that organizational culture positively influences voluntary and demand-based knowledge sharing. Organizational culture is the most important factor in the successful knowledge-sharing process. Because culture not only characterizes the valued knowledge but also determines the knowledge which needs to be shared to maintain competitive advantage. Generally, knowledge-centered culture highly values knowledge and encourages generating, sharing, and applying knowledge (RIBUTHI, 2020; M. R. Zahedi and Naghdi Khanachah, 2020). Therefore, leaders of CAO need to identify the start point of knowledge management, modify organizational culture, and plan to eliminate cultural obstacles. The above strategies are connected by an open shared culture in which employees collaborate and forgive mistakes.

Findings related to the influence of organizational climate on voluntary and demand-based knowledge sharing show that organizational climate significantly and positively influences

voluntary knowledge sharing; on the other hand, organizational climate insignificantly influences on demand-based knowledge sharing. Organizational climate considerably influences on implementing, sharing, and publishing knowledge within an organization which emphasizes employees, flexibility, procedures, and innovative strategies. In a desirably open organization, employees are highly satisfied with their jobs and sufficiently motivated for knowledge sharing. In addition, they are stimulated to do tasks and maintain the mobility of the organization.

In an open organizational climate, employees honor their collaboration with the organization and participate in the knowledge-sharing process; however, the hypothesis based on the influence of structural characteristics on voluntary and demand-based knowledge sharing shows that structural characteristics positively influence both voluntary and demand-based knowledge sharing. The other key aspect of knowledge sharing is a proper organizational structure; that is, to create a series of roles and teams and to design a proper structure to implement knowledge-related tasks. Non-concentrated structures are essential for a climate in which employees can participate in the voluntary knowledge-sharing process. Harrington (2012) believes that horizontal organizations are more suitable for the communication era(Harrington and Lucia, 2012; Nham et al., 2020). It is a flat organizational structure in which it is possible to gain and share knowledge at all organizational levels.

ICT significantly influences voluntary and demand-based knowledge sharing. IT enables knowledge management. IT supports knowledge sharing and allows the connection of various information sources (internet, intranet, databases, newsgroups, etc.). More advanced systems even provide opportunities to create new apparent knowledge by analysis and integration of current knowledge in a smart form. Technology supports people to gain, restore, share and communicate knowledge. Existing data include inconsistent data and structures as well as inflexible and heterogeneous systems which are not able to adapt to increasingly changing business conditions. On the other hand, technology expands knowledge and allows knowledge to generate and grow. Technology codifies and delivers assets; this promotes processes related to knowledge within an organization.

Findings show that voluntary and demand-based knowledge sharing significantly and positively influences organizational innovation. It is noteworthy that knowledge is a reliable source of sustainable innovation. Organizational knowledge is largely hidden in the brains of employees. Access to this hidden knowledge requires complicated mechanisms of knowledge sharing.

6. limitations and future research directions

Future studies that seek to investigate the application of the theoretical model proposed in other cases in order to promote comparisons and validation are welcome. The use of a single case is a limitation of this study, but the method was justified by the search for the depth of results. Other case studies in different business environments at different times may contribute to the improvement of the proposed integration model between knowledge management and dynamic

capabilities in agile organizations. In addition, quantitative approach studies that identify the main variables of each construct of the theoretical framework will also be fundamental for the solidification of the model.

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