Psychometric Evaluation of Knowledge Sharing Behavior Scale in Academic Environment

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by

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Abstract

This study examined the psychometric properties of the Knowledge Sharing Behavior Scale (KSBS) using academicians at the University of Sargodha, Sargodha. The quantitative research design was adopted using a survey questionnaire to collect data from academicians. A 28-item KSBS was administered to 300 academicians, recruited through the convenient stratified process by visiting each department with permission. The researchers received 237 usable questionnaires indicating a response rate. The validity (e.g., construct validity, convergent validity, and discriminant validity) and reliability (e.g., internal consistency measure Cronbach Alpha) of the instrument was examined using partial least square structural equation modeling with SmartPLS. The results indicated that KSBS is not a valid measure for assessing knowledge sharing behavior in an academic context, specifically in the Pakistani environment. These results suggested the need for more investigation examining psychometric evaluation of KSBS in academic and other contexts before generalization of these results. This research would make an invaluable contribution to the existing research on knowledge sharing in general and knowledge sharing behavior in particular, as only a few such studies are available so far.
Keywords: Knowledge Sharing Behavior; KSBS, Academicians; Psychometrics; Pakistan.

Introduction

The recognition of knowledge as a critical resource has led to the development of knowledge management (KM) initiatives in modern organizations as it is vital to create a sustainable competitive advantage in the dynamic and competitive business environments (Davenport & Prusak, 1998; Foss & Pedersen, 2002; Yi, 2009). KM is a conscious effort to identify, create, capture, organize, store, retrieve, evaluate, share and use knowledge assets within an organization to improve the capability of an organization for making need-based, informed, timely, strategic, and innovative decisions against ever-changing market conditions (Davenport, 1994; Duhon, 1998). Among different KM aspects, knowledge sharing (KS) is a prerequisite and backbone for the success of knowledge management initiatives in organizations of the 21st century (Dutta et al., 2015; Wang & Noe, 2010; Yeşil & Dereli, 2013). KS has the potential to enhance organizational learning and effectiveness (Yang, 2007), innovation capability (Iqbal et al., 2011), organizational performance and competitive advantage (Davenport & Prusak, 1998; Fullwood, Rowley, & Delbridge, 2013; Kim, Lee, Paek, & Lee, 2013; Tseng & Lee, 2014).

Knowledge sharing has been extensively addressed in commercial environments using varied professional groups considering its potential benefits for employees and organizations. For

example, it involved medical practitioners (Razzaque, Eldabi, & Jalal-Karim, 2013), IT professionals (Teh & Sun, 2012), engineers (Zhen, Jiang, & Song, 2011), managers (Tangaraja, Rasdi, Ismail, & Samah, 2015), accountants (Phang & Foong, 2010) and employees of different industries (Tohidinia & Mosakhani, 2010; Yang, 2007; Zhang & Ng, 2012). There was a dearth of inquires focusing workforce of public sector organizations, mostly higher education institutions – the universities despite having knowledge-intensive environment and being recognized as knowledge industries (Farrukh, Sajid, Zreen, & Khalid, 2019; Fullwood & Rowley, 2017; Fullwood, Rowley, & McLean, 2019; Shahid & Naveed, 2020). Universities play a pivotal role in the sustainable socio-economic, psycho-social, and political development of any society through teaching, research, and knowledge dissemination through publications (Fullwood et al., 2013). Universities develop industrial linkages, collaborate with business organizations and socio-cultural enterprises for collaborative projects of knowledge creation and workforce training (Farrukh et al., 2019; Ramachandran, Chong, & Ismail, 2009; Shahid & Naveed, 2020). According to Fullwood et al. (2013), it is quite logical to expect universities to adopt a proactive approach towards knowledge management to maximize their knowledge assets, but in vain. However, most of the universities, especially from the developing world, adopt either a passive or inconsistent approach towards knowledge management initiatives, if any (Farrukh et al., 2019).

Thus, it is imperative that the administrative staff of universities need to pay due attention to knowledge management to elevate the ranking and standard of the university. The knowledge sharing intension, motivations, attitude, practices, channels, and behaviors of the academicians also need to be examined for fostering of KS behaviors in particular and development of knowledge management strategies in general. In the academic environment, KS is of substantial concern because academic institutions now experience increasing faculty demands to share quality resources and expertise (Seonghee & Boryung, 2008). Ramayah, Yeap, and Ignatius (2014) stated that knowledge needs to be continuously shared for justification of the existence of universities as academicians "strive for intellectual prowess, accumulation and dissemination of critical mass of knowledge" (p.3). The academicians are the significant constituencies that represent their institutions and have the responsibility for knowledge creation and its dissemination through teaching and research (Ramachandran et al., 2009; Seonghee & Boryung, 2008).

Literature Review

Knowledge sharing is the exchange of expertise, experiences, and skills among employees as part of social interaction of organizational culture (Hoegl, Parboteeah, & Munson, 2003). While knowledge sharing behaviour generally refers to a voluntary and deliberate act involving mutual exchange of knowledge and expertise among individuals within one's organization for personal as well as organizational benefits (Fullwood & Rowley, 2017; Hislop, 2013; Van den Hooff & de Leeuw van Weenen, 2004; Yi, 2009). In the academic context, it refers to academicians' sharing of their work-related knowledge and expertise with others within the University for Elevation of its ranking and standard (Ramayah et al., 2014).

Despite the widespread recognition of knowledge sharing for enhancement of organizational benefits and competitive advantage, a limited amount of research appeared in the context of higher education intuitions. The available research on knowledge sharing in the

academic context primarily conducted in Asian countries such as Malaysia (Goh & Sandhu, 2013; Ramayah, Yeap, & Ignatius, 2013; Ramayah et al., 2014; Tan, 2016), Iran (Fahimeh & Kermani, 2011), and Pakistan (Baig, Khan, & Chaudhry, 2014; Baig & Waheed, 2016; Farrukh et al., 2019; Shahid & Naveed, 2020). It was followed by those studies conducted in Gulf countries such as Saudi Arabia (Alsuraihi, Yaghi, & Nassoura, 2016) and the United Arab Emirates (UAE; Skaik & Othman, 2015). Some studies have emerged from the Western countries such as United Kingdom (Fullwood & Rowley, 2017; Fullwood et al., 2013; Fullwood et al., 2019; Howell & Annansingh, 2013), and Australia (Dyson, 2004). Despite an increase in knowledge sharing research on higher education institutions, not much attention has been paid to the development and validation of a reliable and valid instrument precisely measuring the knowledge sharing behavior of academic staff. A perusal of published research addressing knowledge sharing in higher education institutions resulted in only a single study by Ramayah et al. (2014) that validated a Knowledge Sharing Behavior Scale, developed by Yi (2009), among academicians of Malaysia.

Knowledge Sharing Behavior Scale (KSBS)

KSBS was originally developed in the United States by Yi (2009) to measure knowledge sharing behavior using 120 business students and 92 working employees and validated 196 employees of a large high-tech American business organization. KSBS is a 28-item instrument structured into four dimensions, namely, written contributions (5 statements, CA= 0.458) organizational communication (8 statements, CA= 0.905), personal interactions (8 statements, CA= 0.723) and communities of practices (7 statements, CA= 0.934). Each statement is measured on a five-point choice frequency scale (e.g. 1= never, 2= rarely, 3= sometime, 4= often, and 5= always). Yi (2009) reported KSBS as a well-structured and standardized measure with sufficient dimensionality, reliability, and validity. The quality of standardized instruments is further established through repeated applications and psychometric evaluations (e.g., reliability and validity) among different professional groups in varied contexts and geographical locales (Kimberlin & Winterstein, 2008; Ramayah et al., 2014). Since the development of KSBS, it has been used, either full or part of it, in different work environments across different countries (Afolayan & Babalola, 2020; Aizpurúa, Saldaña, & Saldaña, 2011; Eaves, 2014; Gross & Kluge, 2012; Munir, Rasid, Jamil, & Aamir, 2019; Özbebek & Toplu, 2011; Palacios-Marqués, Peris-Ortiz, & Merigó, 2013; Ramayah et al., 2014) and evaluated several times for its psychometric properties (Othman, Isa, & Balozi, 2018; Palacios-Marqués et al., 2013; Ramayah et al., 2014). The validation studies reported that KSBS is generally a reliable and valid instrument to measure knowledge sharing behavior due to having good properties (e.g., factor-loading > .60 Cronbach alpha >.70, and model fit indices > .90). It has rarely been evaluated for its psychometric properties in the academic context apart from the study of Ramayah et al. (2014).

Ramayah et al. (2014) validated KSBS to measure the knowledge-sharing behavior of academics in higher education institutions. The data were collected from 447 faculty members of the ten public sector universities in Malaysia using a survey questionnaire. The questionnaire comprised of 28-items of KSBS and several other items captured from the other instruments in the existing literature on knowledge sharing. The survey questionnaire represented four KSBS dimensions, namely, written contributions, organizational communications, personal interactions, and communities of practice, along with three other dimensions such as organizational

commitment, organizational citizenship behavior, and tacit and explicit sharing. The focus was on four dimensions of KSBS, while the rest of the three dimensions were merely utilized to facilitate the validation process. Each item was measured on a 7-point Likert-type response scale ranging from never to always. The evaluation of KSBS was done by using different validity and reliability measures. The content validity was achieved through interviews with academics and based on literature review, construct validity with exploratory factor analysis, convergent validity through factor analysis, and discriminant validity through co-variance analysis. The predictive validity also established the correlation of academic knowledge sharing behavior with organizational commitment across KSBS with all four dimensions. The concurrent validity of KSBS for tacit and explicit knowledge sharing was also established through correlation analysis. However, the reliability was established through a measure of internal consistency- the Cronbach Alpha. The results validated a 25 items KSBS as three items (WC5, PI7, and PI8) were dropped due to low loadings (<.50) having sufficient internal consistency for each factor, namely, written contributions (4 items, CA= 0.784), organizational communication (8 items, CA= 0.942), personal interactions (6 items, CA= 0.905) and communities of practices (7 items, CA= 0.966). KSBS also predicted organizational commitment representing both tacit and explicit sharing holistically across all four dimensions.

An extensive search for literature on knowledge sharing indicated that no other study appeared to have been conducted investigating psychometric properties of KSBS to determine its suitability for the academic environment. Although the study of Ramayah et al. (2014) provided an incremental validity to KSBS, it is too early to generalize its suitability to measure the knowledge sharing behavior of academicians from other countries. The validation of a measure cannot be accomplished through merely a few studies (Cowles & Crosby, 1986; Heeler & Ray, 1972). Thus, repeated psychometric evaluations are needed for factorial, convergent, and discriminant validity of KSBS before concluding that it is psychometrically sound and stable when applied in cross-cultural academic environments from different geographical locales. Despite increasing interest in knowledge-sharing research in academia, not much attention has been paid neither for the development and validation of a reliable instrument nor validation of existing instruments to measure knowledge sharing behavior academics. This research is, therefore, intended to evaluate psychometric properties of the Knowledge Sharing Behavior Scale (KSBS), developed by Yi (2009), in an academic environment using academicians from Pakistan. This study geared towards answering precisely the following research questions:

   a) Would KSBS be able to measure knowledge sharing behavior of academicians in the academic environment of Pakistan?
   b) Would KSBS establish construct validity and internal reliability when test with culturally different academicians from Pakistan?

Research Methods

This quantitative study deployed a cross-sectional survey research method as it is appropriate and commonly used to approach a larger and geographically dispersed population by studying a small sample recruited systematically (Gay, Mills, & Airasian, 2003; Powell & Connaway, 2004). Besides, this method was successfully used to investigate academics knowledge sharing behavior

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by several studies in the literature (Ramayah et al., 2013; Ramayah et al., 2014; Yeon, Wong, Chang, & Park, 2016; Yi, 2009).

Population and sampling

The population for this research consisted of all the academicians at the University of Sargodha, Sargodha, Pakistan, as it was not feasible to include all public sector universities of Pakistan. Therefore, one public sector university was purposively selected as a research setting. There were about 700 academicians, including 279 PhDs in 23 Departments, at the selected university. The sample size for this study was 258 based on a 95% confidence interval and a 5% margin of error. A stratified convenient sampling technique was carefully applied to cover all academic positions such as professors, associate professors, assistant professors, and lecturers. The selection of the survey participants using a convenient sampling was made due to the non-availability of a list of faculty members for random selection.

Measurement and data collection

The questionnaire comprised of 28-items of KSBS developed by Yi (2009) were administered personally by visiting each department with permission for data collection. KSBS is structured into four dimensions, namely, written contributions, organizational communications, personal interactions, and communities of practice. Each statement was measured on a five-point Likert-type response scale ranging from never to always (e.g., 1=never, 2=rarely, 3=sometime, 4=often 5=always). The academicians were requested to fill the administered questionnaire within a few weeks. The data were collected from both males and females without any discrimination. The researchers received a total of 253 responses indicating an excellent response rate, that is, 90.3%.

Results and Discussion

Before data analysis, the received responses were screened for completion and accuracy of information. The screening process excluded 16 cases due to incomplete information resulting in 237 responses loaded into SPSS for data analysis. KSBS was evaluated psychometrically for validity and reliability. The confirmatory factor analysis, in general, was performed for the construct validity of KSBS. The formative constructs were reported after analysis of redundancy, collinearity, indicator weights, and statistical significance. The reliability of KSBS was also evaluated through its internal consistency of measures.

Content validity

Content validity is the property of an instrument to cover the content it intends to measure. It refers to the relevance, clarity, simplicity, and ambiguity of an instrument; and helps ensure the construct validity (Yaghmaie, 2003). The concern of content validity begins with developing an instrument and its judgment (Shrotryia & Dhanda, 2019). Content validity can be obtained from literature, experts, or target population representatives (Burns & Grove, 1993). This study performs the psychometric analysis of the 'knowledge sharing behavior scale' (KSBS), originally developed and tested by Yi (2009). He tested this scale through the online collected data from a sample of 212 respondents in the USA; most of them were MBA students besides the corporate employees. Later, Ramayah et al. (2014) validated this scale through the data collected from 447 academics

of science and arts in Malaysia. Based on the credible references from the literature, we decided to deploy KSBS in its original form, thereby forgoing the need for content validity.

Construct validity

Construct validity refers to an instrument property for being "related to similar concepts and not related to dissimilar concepts" (Mayo, DNSc, CNS, & FAAN, 2015). It is the extent to which the observed variables measure that construct (or latent variable) (Souza, Alexandre, & Guirardello, 2017). KSBS comprises of two formative constructs (written communication and personal interaction) and two reflective constructs (organizational communication and communities of practices) at first order or the outer model (Figure 1). While it is a formative second-order scale at the inner model level (Yi, 2009). According to Hair, Risher, Sarstedt, and Ringle (2019), different measures are required to gauge the validity of formative and reflective constructs. The formative constructs are accessed through readings of redundancy analysis (r≥0.7), collinearity (VIF≤3), indicator weights, and statistical significance (p≤0.05). The reflective constructs are measured through indicator loading (≥0.708), internal consistency reliability (alpha, Rho b/w 0.70-0.90), convergent validity (CR≥0.7; AVE≥0.5), and discriminant validity (AVE>MSV; HTMT<0.85). The simultaneous presence of formative and reflective constructs in the KSBS model makes it suitable for confirmatory factor analysis using PLS-SEM (Hair, Hult, Ringle, & Sarstedt, 2017; Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014) through SmartPLS.
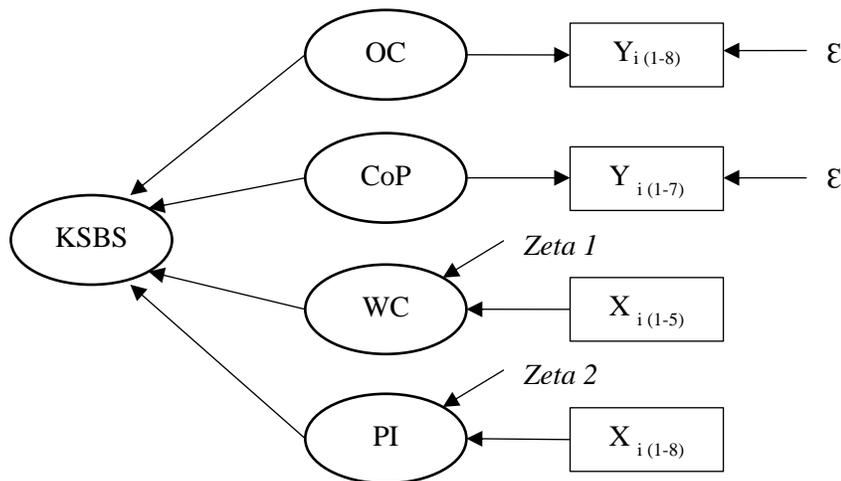

Figure 1: KSBS Model Specifications [Source: (Yi, 2009)]

Besides, the characteristics of the data also coincide with the preliminary considerations for using PLS-SEM. Firstly, the sample of 237 is adequate as the minimum required sample size for analysis of KSBS would be 80 (i.e., ten times the number of highest observed variables of a construct in the model). Secondly, the distributional assumptions are also satisfactory as SmartPLS does essentially require normalized data. Lastly, PLS-SEM is statistically more powerful than CB-SEM (Co-variance Based SEM) (Hair et al., 2019). The following sections present the partial least square structural equation modeling to perform the confirmatory factor analysis to estimate the KSBS model's validity in SmartPLS 3.2.2.

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Validity of the reflective constructs (OC and CoP in KSBS Model)

Two widely accepted forms of construct validity are the convergent and discriminant for the reflective constructs. Convergent validity is the level of correlation, whereas discriminant validity is the distinction between two latent variables referring to the same construct (Hair, Black, Babin, & Anderson, 2009). Convergent and discriminant validity of an instrument can be estimated through confirmatory factor analysis (CFA) (Lowry & Gaskin, 2014).

Convergent validity: Convergent validity refers to the level of correlation between two latent variables belonging to a construct (Hair et al., 2009). The higher correlation among the latent variables means higher convergent validity (Spector, 1992). According to Kaushik (2018b) and Kaushik (2018a) the convergent validity of a scale is acceptable if its construct reliability (CR) or Cronbach Alpha (CA) is greater than 0.7, average variance explained (AVE or r2) is greater than 0.5, and the composite reliability is greater than AVE. The CFA applied to KSBS model returned the indicator loading values of the reflective constructs as exhibited in Table 1.

Table 1
Indicator Loading

Observed Variables	CoP	Observed Variables	OC	Observed Variables	PI	Observed Variables	WC
CoP1	0.619	OC1	0.554	PI1	0.455	WC1	**0.711***
CoP2	0.598	OC2	0.647	PI2	0.386	WC2	0.336
CoP3	0.524	OC3	0.588	PI3	0.520	WC3	0.055
CoP4	0.627	OC4	0.313	PI4	0.645	WC4	0.503
CoP5	0.528	OC5	0.341	PI5	**0.704***	WC5	**0.703***
CoP6	0.362	OC6	0.631	PI6	0.686		
CoP7	0.508	OC7	0.589	PI7	0.555		
		OC8	0.417	PI8	0.493		

CoP=Communities of Practices, OC=Organizational Communication, PI=Personal Interactions, WC=Written Contributions; *acceptable loading strength

Table 2
Construct reliability and validity

Construct	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
CoP	0.747	0.754	0.742	0.297
OC	0.747	0.766	0.742	0.276

CoP=Communities of Practices; OC=Organizational Communication

Table 2 indicated that the Cronbach Alpha (α) for both CoP and OC is above 0.708 exhibiting significant indicator loading. Internal consistency reliability (rho_A) for CoP 0.754 and OC 0.766 falls within the acceptable range of 0.70-0.90, which shows the items are non-repetitive. Composite reliability of both CoP and OC equals and is 0.742, which is acceptable as above 0.7. However, the average variance extracted (AVE) for both CoP and OC are below the acceptable level of 0.5, i.e., 0.297 and 0.276, respectively. Figure 2 exhibits the SEM model of KSBS. This model contains both reflective and formative constructs, but here it is used for analyzing the

reflective validity constructs, OC and CoP, only. Both constructs showed nominal inner loading values (<0.708) and significant values.
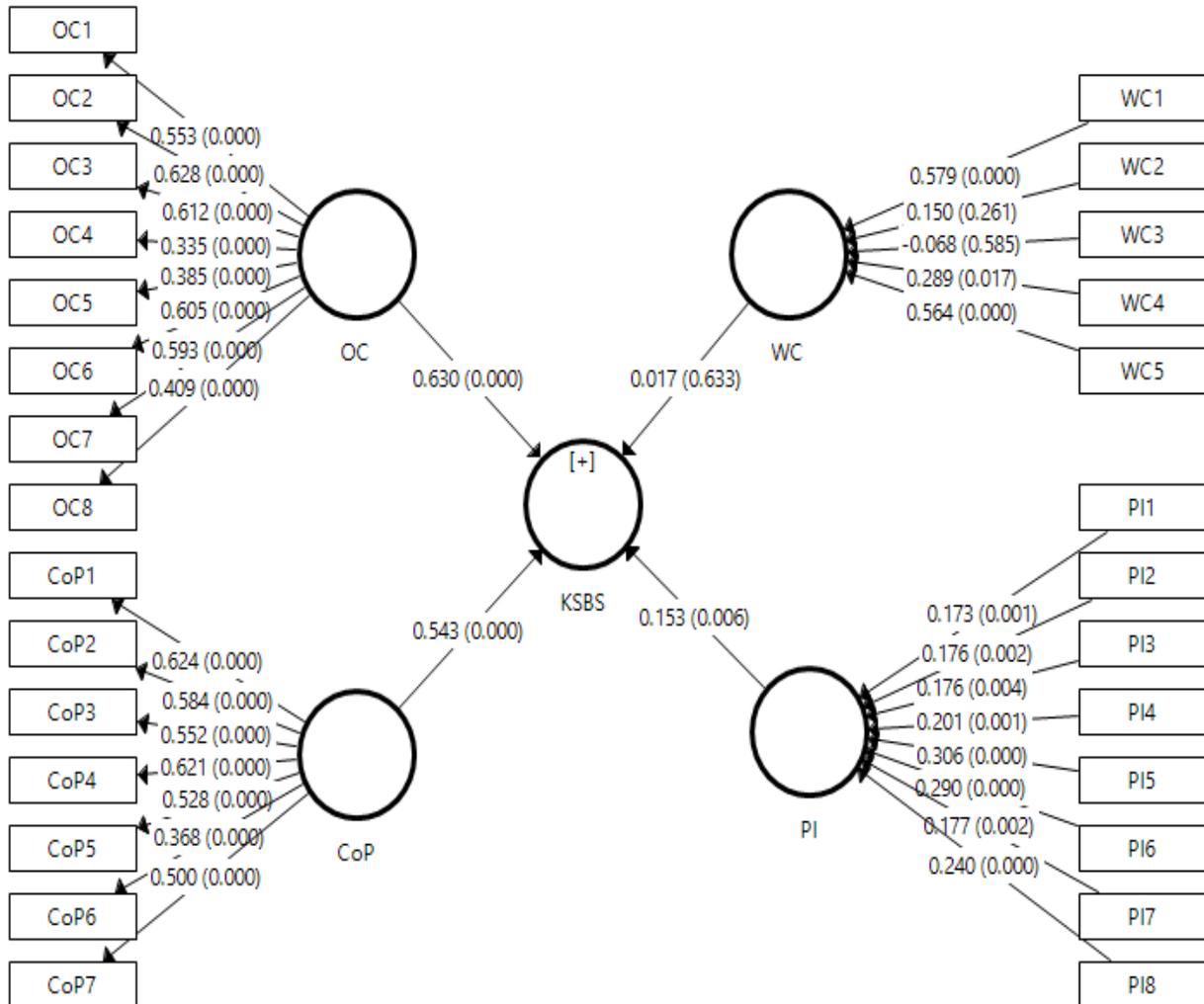

Figure 2: KSBS Model PLS-SEM

Discriminant validity: Discriminant validity refers to the levels of dissimilarity between two observed variables belonging to a construct (Hair et al., 2009). The dissimilarity of observed variables is tested to ensure that they measure a distinct dimension of the construct (Souza et al., 2017). According to Kaushik (2018b) and Kaushik (2018a), the discriminant validity of a scale is acceptable if its average variance explained (AVE or r2) is greater than maximum shared variance (MSV) as well as average shared variance (ASV). CoP and OC, based on their values on the Fornell-Larcker Criterion given in Table 3 are valid discriminately. Besides, the value of Heterotrait-Monotrait (HTMT) ratio of CoP and OC returned is 0.477, which being lesser than 0.85 is acceptable as well.

Table 3
Fornell-Larcker Criterion Values

Latent Variable	Average Variance Extracted (AVE)	CoP	OC
CoP	0.297	0.545	
OC	0.276	0.466	0.525

CoP=Communities of Practices; OC=Organizational Communication

Validity of the formative constructs (WC and PI in KSBS Model)

The validity of formative constructs is measured through the redundancy analysis (r≥0.7), indicator weights, statistical significance (p≤0.05), and collinearity (VIF≤3) values (Hair et al., 2019). The redundancy of PI and WC was calculated using the single-item analysis method guided by Cheah, Sarstedt, Ringle, Ramayah, and Ting (2018). The single-item used in the analysis was computed from all observed variables. The logic for using the computed variable was the difficulty in stating a broad statement that could comprehensively cover the formative constructs. Figures 3 and 4 exhibit the models for single-point redundancy analysis of PI and WC, respectively.
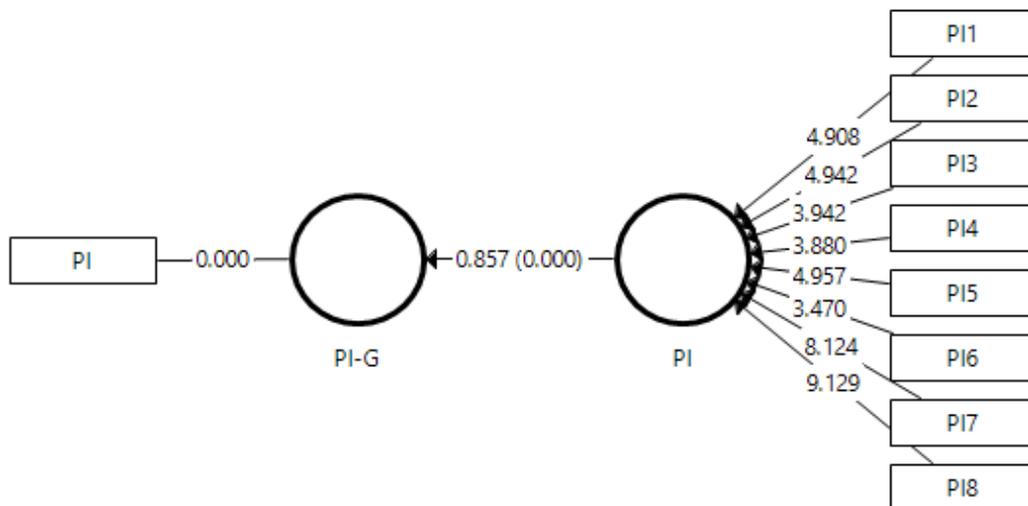

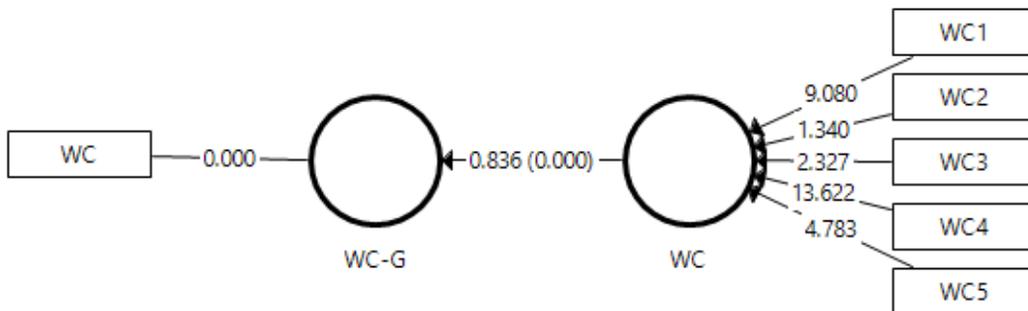*Figure 3:* Single-Item Redundancy Analysis of PI

Figure 4: Single-item Redundancy Analysis of WC

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Table 4 shows the readings of redundancy and VIF for PI and WC, besides the decision based on them. PI returned 0.857 (≥0.7) for redundancy and 1.000 (≤ 3) for collinearity (VIF). Therefore, it is valid. WC shows redundancy 0.836 (≥0.7) and collinearity (VIF) 1.483 (≤ 3), which makes it a valid construct.

Table 4

Single-item Redundancy Analysis and VIF Values

Construct	Redundancy (r)	VIF	Decision
PI	0.857	1.000	Valid
WC	0.836	1.483	Valid

PI=Personal Interactions; WC=Written Contributions

Table 5 shows the path coefficients, the sample mean, standard deviation, inner weights, and P-values for PI and WC based on the bootstrapping algorithm computation in SmartPLS 3.2.2. All P-values are significant, and the inner weights are above 0.7, which means that both PI and WC are valid constructs of KSBS.

Table 5

Path Coefficients, Sample Mean, Std. Deviation and P-Values

Paths	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Indicator Weights	P Values
PI -> PI-G	0.857	0.861	0.066	0.845	0.000
WC -> WC-G	0.836	0.841	0.022	0.836	0.000

PI=Personal Interactions; WC=Written Contributions; KSBS=Knowledge Sharing Behavior Scale; KSBS-G=Knowledge Sharing Behavior Scale – Global (with Single-Item)

Conclusion

The quality measurement instruments are assessed in terms of their psychometric properties as the exact knowledge of the psychometric characteristics of measurement scales is essential to decide whether that particular scale is reliable and valid. Psychometrics is a science of evaluation, enabling researchers to judge the quality of measurement scales to assess a particular phenomenon. Therefore, this research evaluated the psychometric properties of the Knowledge Sharing Behavior Scale (KSBS) in an academic context. A closer look at the analysis indicated that KSBS is not a valid instrument for measuring knowledge sharing behavior within an academic environment, especially in Pakistani settings as the values of loading strength of most of the items (less than 0.70) and the average variance extracted (AVE < 0.5) do not meet the standard criterion (Hair et al., 2017; Hair et al., 2019). This finding appeared to disagree with that of Ramayah et al. (2014), who reported KSBS is a reliable and valid measure for the academic environment in Malaysia. The possible reasons might be due to the differences in the academic culture, organizational type, and analysis tools and methods adopted for psychometric evaluation of KSBS. KSBS were also tested for reliability using internal consistency measures such as Cronbach Alpha, exhibiting reliability of KSBS. Although the current validation methods were thorough, the present research was limited to the academic context. Therefore, more investigations are needed examining psychometric properties of KSBS in the academic environment of other countries so that an improved decision may be made about its reliability and validity for academicians. Future studies

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should be conducted with larger samples drawn from different contexts before KSBS generalization. Also, future research should explore the knowledge sharing behavior of academicians using qualitative methods so that more patterns of knowledge sharing behavior be sought.

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References

Afolayan, O. T., & Babalola, Y. T. (2020). Knowledge Sharing Behavior, Mentoring and Motivation as Determinants of Employee Performance in Selected New Generation Banks, Lagos, Nigeria. *International Journal of Knowledge-Based Organizations (IJKBO), 10*(2), 57-68.

Aizpurúa, L. I., Saldaña, P. E. Z., & Saldaña, A. Z. (2011). Learning for sharing: an empirical analysis of organizational learning and knowledge sharing. *International Entrepreneurship and Management Journal, 7*(4), 509-518.

Alsuraihi, M. D., Yaghi, K., & Nassuora, A. B. (2016). Knowledge sharing practices among Saudi academics: A case study of King Abdulaziz University. *Journal of Current Research in Science, 4*(1), 63.

Baig, N. U. A., Khan, A. W., & Chaudhry, B. (2014). Role of demographic diversity in online knowledge sharing. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 8*(2), 279-304.

Baig, N. U. A., & Waheed, A. (2016). Significance of factors influencing online knowledge sharing: A study of higher education in Pakistan. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 10*(1), 1-26.

Burns, N., & Grove, S. K. (1993). *The Practice of Nursing Research Conduct, Critique, and Utilization*. Philadelphia: WB Saunders Company.

Cheah, J.-H., Sarstedt, M., Ringle, C. M., Ramayah, T., & Ting, H. (2018). Convergent validity assessment of formatively measured constructs in PLS-SEM. *International Journal of Contemporary Hospitality Management, 30*(11), 3192-3210. doi: doi.org/10.1108/IJCHM-10-2017-0649

Cowles, D., & Crosby, L. A. (1986). Measure validation in consumer research: A confirmatory factor analysis of the voluntary simplicity lifestyle scale. *North American Advances in Consumer Research, 13*, 392-397.

Davenport, T. H. (1994). Saving IT's soul: Human-centered information management. *Harvard business review, 72*(2), 119-131.

Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Cambridge, MA: Harvard Business School Press.

Duhon, B. (1998). It's all in our heads. *Inform (Silver Spring), 12*(8), 8-13.

Dutta, B., Madalli, D. P., Tangaraja, G., Rasdi, R. M., Ismail, M., & Samah, B. A. (2015). Fostering knowledge sharing behaviour among public sector managers: a proposed model for the Malaysian public service. *Journal of Knowledge Management, 19*(1), 121-140.

Dyson, L. E. (2004). Barriers to sharing and creating knowledge in higher education. *International Conference of the Information-Resources-Management-Association*, Idea Group Publishing.

Eaves, S. (2014). Middle management knowledge by possession and position: a panoptic examination of individual knowledge sharing influences. *The Electronic Journal of Knowledge Management, 12*(1), 67-82.

Fahimeh, B., & Kermani, Z. J. (2011). Knowledge sharing behaviour influences: a case of Library and Information Science faculties in Iran. *Malaysian Journal of Library & Information Science, 16*(1), 1-14.

Farrukh, M., Sajid, M., Zreen, A., & Khalid, R. (2019). Knowledge sharing in higher education institutes. *Journal of Applied Research in Higher Education, 12*(2), 311-329.

Foss, N. J., & Pedersen, T. (2002). Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context. *Journal of International Management, 8*(1), 49-67.

Fullwood, R., & Rowley, J. (2017). An investigation of factors affecting knowledge sharing amongst UK academics. *Journal of Knowledge Management, 21*(5), 1254-1271.

Fullwood, R., Rowley, J., & Delbridge, R. (2013). Knowledge sharing amongst academics in UK universities. *Journal of Knowledge Management, 17*(1), 123-136.

Fullwood, R., Rowley, J., & McLean, J. (2019). Exploring the factors that influence knowledge sharing between academics. *Journal of Further and Higher Education, 43*(8), 1051-1063.

Gay, L. R., Mills, G. E., & Airasian, P. W. (2003). *Educational research: Competencies for analysis and application (7th ed.)*. NJ: Prentice-Hall.

Goh, S. K., & Sandhu, M. S. (2013). Knowledge Sharing Among Malaysian Academics: Influence of Affective Commitment and Trust. *Electronic Journal of Knowledge Management, 11*(1), 38-48.

Gross, N., & Kluge, A. (2012). *"Why should I share what I know?"-Antecedents for enhancing knowledge-sharing behavior and its impact on shared mental models in steel production.* Paper presented at the Proceedings of the Human Factors and Ergonomics Society Annual Meeting.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate Data Analysis* (7th ed.). Upper Saddle River, NJ: Pearson Prentice Hall Publishing

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modelling (PLS-SEM)*: Sage publications.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2-24. doi: doi.org/10.1108/EBR-11-2018-0203

Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM): An emerging tool in business research. *European Business Review, 26*(2), 106-121.

Heeler, R. M., & Ray, M. L. (1972). Measure validation in marketing. *Journal of Marketing Research, 9*(4), 361-370.

Hislop, D. (2013). *Knowledge Management in Organizations*. Oxford: Oxford University Press.

Hoegl, M., Parboteeah, K. P., & Munson, C. L. (2003). Team-level antecedents of individuals' knowledge networks. *Decision Sciences, 34*(4), 741-770.

Howell, K. E., & Annansingh, F. (2013). Knowledge generation and sharing in UK universities: A tale of two cultures? *International Journal of Information Management, 33*(1), 32-39.

Iqbal, M. J., Rasli, A., Heng, L. H., Ali, M. B. B., Hassan, I., & Jolaee, A. (2011). Academic staff knowledge sharing intentions and university innovation capability. *African Journal of Business Management, 5*(27), 11051-11059.

Kaushik, N. (Producer). (2018a, 12 Nov 2020). PLS-SEM (using SmartPLS 3.0) Part-3.4 Reporting PLS SEM Results. *PLS-SEM (using SmartPLS 3.0)*. [YouTube.com] Retrieved from https://www.youtube.com/watch?v=x5VttnPhSuY&list=PLzUJUtTJcj8SS71HovHrU2HI joRW7L4sm&index=7

Kaushik, N. (Producer). (2018b, 13 Nov 2020). PLS-SEM (using SmartPLS 3.0) Part-5.1 Analysing Measurement Model Reflective Constructs. *PLS-SEM (using SmartPLS 3.0)*. [YouTube.com] Retrieved from https://www.youtube.com/watch?v=e_RdZvC5MBg&list=PLzUJUtTJcj8SS71HovHrU2 HIjoRW7L4sm&index=10

Kim, T. T., Lee, G., Paek, S., & Lee, S. (2013). Social capital, knowledge sharing and organizational performance. *International Journal of Contemporary Hospitality Management, 25*(5), 683-704.

Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments used in research. *American journal of health-system pharmacy, 65*(23), 2276-2284.

Lowry, P. B., & Gaskin, J. (2014). Partial Least Squares (PLS) Structural Equation Modeling (SEM) for Building and Testing Behavioral Causal Theory: When to Choose It and How to Use It. *IEEE Transactions on Professional Communication, 57*(2), 123-146.

Mayo, A. R., DNSc, CNS, & FAAN. (2015). Psychometric instrumentation: reliability and validity of instruments used for clinical practice, evidence-based practice projects and research studies *School of Nursing and Health Science: Faculty Scholarship*. San Diego, USA: School of Nursing and Health Science, University of San Diego.

Munir, S., Rasid, S. Z. A., Jamil, F., & Aamir, M. (2019). Impact of Knowledge Sharing Behavior on Perceived Performance of Big 4 and Non-Big 4 Audit Firms in Pakistan. *Open International Journal of Informatics (OIJI), 7*(2), 88-94.

Othman, S. Z., Isa, M. F. M., & Balozi, M. A. (2018). *The Role of Subjective Norms in the Relationship between Personal Values, Organizational Climate and Knowledge Sharing Behavior*. Paper presented at the Knowledge Management International Conference (KMICe), Miri Sarawak, Malaysia. http://www.kmice.cms.net.my/ProcKMICe/KMICe2018/pdf/CR83.pdf

Özbebek, A., & Toplu, E. K. (2011). Empowered Employees' Knowledge Sharing Behavior. *International Journal of Business and Management Studies, 3*(2), 69-76.

Palacios-Marqués, D., Peris-Ortiz, M., & Merigó, J. M. (2013). The effect of knowledge transfer on firm performance. *Management Decision, 51*(5), 973-985.

Phang, M. M., & Foong, S. Y. (2010). Information communication technologies (ICTs) and knowledge sharing: The case of professional accountants in Malaysia. *World Journal of Science, Technology and Sustainable Development, 7*(1), 21-35.

Powell, R. R., & Connaway, L. S. (2004). *Basic Research Methods for Librarians* (4th ed.): Libraries Unlimited.

Ramachandran, S. D., Chong, S. C., & Ismail, H. (2009). The practice of knowledge management processes: A comparative study of public and private higher education institutions in Malaysia. *VINE Journal of Information and Knowledge Management Systems, 39*(3), 203-222.

Ramayah, T., Yeap, J. A., & Ignatius, J. (2013). An empirical inquiry on knowledge sharing among academicians in higher learning institutions. *Minerva, 51*(2), 131-154.

Ramayah, T., Yeap, J. A. L., & Ignatius, J. (2014). Assessing Knowledge Sharing Among Academics: A Validation of the Knowledge Sharing Behavior Scale (KSBS). *Evaluation Review*, 1-28. doi: http:doi.org/10.1177/0193841X14539685

Razzaque, A., Eldabi, T., & Jalal-Karim, A. (2013). Physician virtual community and medical decision making: Mediating role of knowledge sharing. *Journal of Enterprise Information Management, 26*(5), 500-515.

Seonghee, K., & Boryung, J. (2008). An analysis of faculty perceptions: Attitudes toward knowledge sharing and collaboration in an academic institution. *Library & Information Science Research, 30*(4), 282-290.

Shahid, Q., & Naveed, M. A. (2020). Knowledge Sharing Behavior of Academicians in Pakistan. *Library Philosophy and Practice (e-journal)*.

Shrotryia, V. K., & Dhanda, U. (2019). Content Validity of Assessment Instrument for Employee Engagement. *SAGE Open*. doi: https://doi.org/10.1177/215824401882175

Skaik, H. A., & Othman, R. (2015). Investigating academics' knowledge sharing behaviour in United Arab Emirates. *Journal of Business and Economics, 6*(1), 161-178.

Souza, A. C. d., Alexandre, N. M. C., & Guirardello, E. d. B. (2017). Psychometric properties in instruments evaluation of reliability and validity. *Applications of Epidemiology, 26*(3). doi: https://doi.org/10.5123/S1679-49742017000300022

Spector, P. E. (1992). *Summated Rating Scale Construction*. Newbury Park, CA: Sage Publications.

Tan, C. N.-L. (2016). Enhancing knowledge sharing and research collaboration among academics: the role of knowledge management. *Higher education, 71*(4), 525-556.

Tangaraja, G., Rasdi, R. M., Ismail, M., & Samah, B. A. (2015). Fostering knowledge sharing behaviour among public sector managers: a proposed model for the Malaysian public service. *Journal of Knowledge Management, 19*(1), 121-140.

Teh, P. L., & Sun, H. (2012). Knowledge sharing, job attitudes and organisational citizenship behaviour. *Industrial Management & Data Systems, 112*(1), 64-82.

Tohidinia, Z., & Mosakhani, M. (2010). Knowledge sharing behaviour and its predictors. *Industrial Management & Data Systems, 110*(4), 611-631.

Tseng, S.-M., & Lee, P.-S. (2014). The effect of knowledge management capability and dynamic capability on organizational performance. *Journal of Enterprise Information Management, 27*(2), 158-179.

Van den Hooff, B., & de Leeuw van Weenen, F. (2004). Committed to share: commitment and CMC use as antecedents of knowledge sharing. *Knowledge and process management, 11*(1), 13-24.

Wang, S., & Noe, R. A. (2010). Knowledge sharing: A review and directions for future research. *Human resource management review, 20*(2), 115-131.

Yaghmaie, F. (2003). Content validity and its estimation. *Journal of Medical Education, 3*(1), 25-27.

Yang, J. t. (2007). The impact of knowledge sharing on organizational learning and effectiveness. *Journal of Knowledge Management, 11*(2), 83-90.

Yeon, K., Wong, S. F., Chang, Y., & Park, M.-C. (2016). Knowledge sharing behavior among community members in professional research information centers. *Information Development, 32*(3), 655-672.

Yeşil, S., & Dereli, S. F. (2013). An empirical investigation of the organisational justice, knowledge sharing and innovation capability. *Procedia-Social and Behavioral Sciences, 75*, 199-208.

Yi, J. (2009). A measure of knowledge sharing behavior: scale development and validation. *Knowledge Management Research & Practice, 7*, 65-81.

Zhang, P., & Ng, F. F. (2012). Attitude toward knowledge sharing in construction teams. *Industrial Management & Data Systems, 112*(9), 1326-1347.

Zhen, L., Jiang, Z., & Song, H.-T. (2011). Distributed knowledge sharing for collaborative product development. *International Journal of Production Research, 49*(10), 2959-2976.

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