Innovation behaviour improvement strategy through knowledge-sharing behaviour based on knowledge-oriented leadership and knowledge-sharing climate

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Abstract: Strategies to improve innovation behaviour of employees are important to create new opportunities and sustainability. Knowledge-oriented leadership and knowledge-sharing climate are two pivot factors to set up employee innovation behaviour. This study aims to analyse the effect of knowledge-oriented leadership and knowledge-sharing climate on innovation behaviour through knowledge-sharing behaviour. The respondents of this study were 90 educational staff of private universities in Central Java, Indonesia and the data was then analysed by using partial least square. The results showed that knowledge-oriented leadership had a positive and significant effect on knowledge-sharing behaviour and innovative behaviour, but knowledge-sharing climate had a positive and significant effect on Knowledge sharing behaviour but had no significant effect on innovative behaviour. Knowledge-sharing behaviour can mediate the relationship between knowledge-oriented leadership and innovative behaviour; and knowledge-sharing climate and innovative behaviour. The implication of these results will be presented in discussion section.

Keywords: innovation behaviour; knowledge-oriented leadership; knowledge-sharing climate; knowledge-sharing behaviour.

Reference to this paper should be made as follows: Nurhidayati and Zaenuri (xxxx) 'Innovation behaviour improvement strategy through knowledge-sharing behaviour based on knowledge-oriented leadership and knowledge-sharing climate', *Int. J. Knowledge Management Studies*, Vol. X, No. Y, pp.xxx–xxx.

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1 Introduction

The current global business era puts the world at hand, especially in the all-digital era, an organisation must be able to innovate to improve its products and service quality. These conditions encourage services to be presented in digital form so that they can be accessed anywhere in various conditions. Universities have an important role in realising the welfare of the community through the sustainability of the nation's economy. Filho et al. (2019) have highlighted that universities have been integrating sustainability into curricula, management and operational systems, and community outreach efforts over the years. The role and contribution of the university to the socio-economics of a nation is manifested through the work of its graduates who work in the community or whose graduates create living laboratories in collaboration with stakeholders (Filho et al., 2019). Thus, to improve the quality of graduates, several aspects can be carried out, for example providing training and capacity building for academic staff and members, providing a working climate that supports the sharing of information and insights, and the type of leadership with innovation and problem-solving perspective (UNESCO, 2018). In this digital era, an organisation, including a university, is expected to be able to innovate to provide higher quality services. The rapidly changing dynamics of the university's business environment encourages service innovation, including digital services to make it easier for stakeholders to access data, thus innovation behaviour of the university members should be increased.

Innovation behaviour directs organisations to develop innovations continuously to respond to a changing and unpredictable market environment. Therefore, the company's ability to innovate is the most important factor for competitive advantage in highly volatile market conditions (Rajapathirana and Hui, 2018). Innovation behaviour is now a major problem for organisations because global competition is very tight, and information is available everywhere, making organisations face a dynamic environment. So, market and customer demand must be fulfilled with innovation. The innovation issue is the key to the growth and survival of a company. So, efforts to increase company productivity through individual and group innovation focus on innovation behaviour. The variable that influences innovation behaviour is knowledge sharing. If employees often share knowledge with colleagues, new ideas will emerge that instil behaviour in individuals.

Knowledge-sharing behaviour is a process in which an individual provides his expertise, insight, or understanding to another individual so that the recipient has the potential to acquire and use knowledge to perform their duties better. This process is an important part of effective knowledge management (Wasko and Faraj, 2005). Knowledge

sharing is the tacit and explicit exchange of experiences, skills, and knowledge among employees as part of the organisation's social interaction culture so that the organisation considers knowledge sharing an important resource. Knowledge sharing is a very effective policy for companies to reduce production costs or provide services that contribute to the organisation's success. Knowledge sharing has an important role in building organisational success, which is often considered a survival strategy in this knowledge-intensive era. In addition, knowledge sharing is also an active creation of employees based on individual intelligence as seen in tasks, systems, organisational culture, all of which are very difficult to imitate (Hussein et al., 2015). Successful knowledge sharing will enable an organisation to improve its innovation behaviour in response to a changing market environment. Several variables that influence knowledge-sharing activities are knowledge-oriented leaders and a knowledge-sharing climate that supports employees to innovate.

Knowledge-oriented leadership is a leader who is concerned with employee motivation and considers which elements can encourage knowledge behaviour. The nature of leadership that develops in the knowledge era requires a combination of leadership styles that are adapted to the requirements of a knowledge-intensive industry (Sun and Anderson, 2012). Therefore, the contribution of leadership to the company's success must motivate employees to always prioritise their knowledge in facing the company's challenges in the future. One of them is continuous innovation through an atmosphere of knowledge sharing. Then the next variable that affects knowledge sharing is the climate of knowledge sharing.

Knowledge-haring climate is defined as the atmosphere of an organisation that promotes knowledge-sharing activities (Hoegl et al., 2004). Meanwhile, Kim and Lee (2013) define d knowledge-sharing climate as employees' perceptions of a climate that encourages employees' social interactions to share knowledge and experiences within the organisation. Based on this definition illustrates that the knowledge sharing climate is strongly influenced by knowledge sharing behaviour (Naqshbandi, et al., 2019; Naqshbandi and Tabche, 2018; Jasimuddin and Naqshbandi, 2019). So, further investigation is needed to examine the relationship between these variables.

Based on previous studies, Donate and Pablo (2015) showed knowledge-oriented leadership has an indirect effect on innovation. While Sadeghi and Rad (2018) revealed that knowledge-based leadership and innovation performance have a direct and statistically significant effect. Sadeghi and Rad (2018) mentions Knowledge-oriented leadership is positively related to knowledge management behaviour and innovation performance. Rehman and Iqbal (2020) finding show that innovation mediates the positive effect of knowledge-oriented leadership on organisational performance. However, other findings are different, such as Sakerani et al. (2019) stated that the transformational leadership style on innovation had an insignificant effect in a positive direction. Fayzhall et al. (2020) revealed in their research that transactional leadership has no significance to innovation capability. In addition, Donate and Pablo (2015) also suggested that knowledge-oriented leadership has an indirect effect on innovation, so a mediating variable is needed.

2 Literature review

2.1 Knowledge-oriented leadership, knowledge-sharing behaviour, and innovation behaviour

Donate and Guadamillas (2011) define knowledge-oriented leadership as a style in which a leader plays the role of facilitator of knowledge and role model that recognises and values knowledge sharing, then promotes trust and learning that emphasises staff empowerment. While Mohsenabad and Azadehdel (2016) provide the view that knowledge-oriented leadership is a shared or individual, observed or charged attitude or action that stimulates some of the newest and most important knowledge to be shared, created, and used in such a way as to bring about change in collective thinking and outcomes. Shamim et al. (2019) provide his opinion that knowledge-oriented leaders with an understanding of transactional leadership will value creation.

Meanwhile, according to Zhang and Cheng (2015), knowledge-oriented leadership is a leader who cares about employee motivation and considers which elements can encourage knowledge behaviour. The nature of leadership that develops in the knowledge era requires a combination of leadership styles that are adapted to the requirements of a knowledge-intensive industry (Sun and Anderson, 2012). Knowledge-oriented leadership involves facilitating, encouraging, and guiding knowledge acquisition, sharing, and application. The knowledge version of leadership develops a suitable environment for knowledge behaviour, promotes learning, facilitates knowledge-seeking, values knowledge sharing and application, guides employees throughout the knowledge process, and tolerates mistakes (Farrell and Coburn, 2017).

Donate and Pablo (2015) argue that to manage knowledge effectively, leaders are required to adopt a combination of leadership styles and not just adopt a single leadership style. These researchers explore the role of a particular type of leadership, knowledge-oriented leadership, combining transactional and transformational leadership elements. Some of the definitions above can be concluded that Knowledge-oriented leadership is a leadership style that inspires employees to manage, empower, and promote knowledge in achieving company goals.

Regarding leadership styles, Ribière and Sitar (2003) suggested that to increase companies' innovation, knowledge leaders must incorporate different behaviours, depending on the demands of each situation. Nonaka and Takeuchi (1995) model of knowledge creation proposes that one of the foundations of knowledge creation and innovation in organisations is leadership that puts knowledge into a central position. Knowledge-oriented leaders can communicate the company's innovative strategies and clarify role expectations to their followers (Singh, 2008). They assign goals and roles to followers appropriately that enhance the company's innovative performance (Rosing et al., 2011). They also motivate their followers to exploit the company's knowledge resources by identifying the motivational modes adopted depending on the nature of the activity they wish to promote in followers (Chang et al., 2012). Such leaders encourage their followers through intellectual stimulation and empowerment to take risks to take advantage of new ideas that result in the effective diffusion and commercialisation of knowledge (Williams and Sullivan, 2011).

One of the main reasons why organisations tend to exhibit knowledge-based leadership problems is that this type of leadership leads to more productivity than human capital, identifying deficiencies in organisational knowledge, more efficient and effective staff, product delivery, and more value, additional services, customer and employee satisfaction, preventing repeated mistakes, reducing rework, saving time, updating and developing creativity, encouraging and innovating (Yang et al., 2014). Therefore, we can hypothesise some opinions as follows:

H1 Knowledge-oriented leadership has a positive effect on innovation behaviour.

H2 Knowledge-oriented leadership increases, knowledge-sharing behaviour increases.

2.2 Knowledge-sharing climate, knowledge-sharing behaviour, and innovation behaviour

There are two types of knowledge-sharing climate: organisational climate and knowledge sharing. The organisational climate is defined as practices, procedures, beliefs, and shared value systems that are felt and followed by members of the organisation (Denison, 1996). Organisational climate is also related to employees' perceptions of their work environment and atmosphere (Denison, 1996). According to Kim and Lee (2013), a knowledge-sharing climate is an employee's perception that encourages employees' social interactions to share knowledge and experiences within the organisation. While knowledge sharing is defined as providing task information and knowledge to help others and collaborate with others to solve problems, develop new ideas, or implement policies and procedures (Wang and Noe, 2010). Hoegl et al. (2004) also stated that knowledge-sharing climate is defined as the atmosphere of an organisation that promotes knowledge-sharing activities. Some definitions from the experts above can be concluded that knowledge-sharing climate is an atmosphere of social interaction and organisational perceptions that encourage and promote their knowledge sharing which is structured in a procedure and policy to develop new ideas (Dehaghi, 2022).

A strong organisational knowledge-sharing climate will promote knowledge sharing at the individual level (Radaelli et al., 2014). The atmosphere of knowledge sharing at the individual level will affect employees' innovative behaviour. An organisation can create and share knowledge by having a consensus culture, respecting organisational coherence, and maintaining a harmonious atmosphere through discussion, participation, and knowledge sharing (Yu et al., 2013). Cabrera and Cabrera (2005) suggest organisations that offer employees a sense of security and create an atmosphere where employees are not criticised without reason will benefit employees' innovative thinking skills. In an organisational climate where they feel comfortable employees can be encouraged to create and share knowledge (Schwaer et al., 2012; Ahmad et al., 2018).

An organisation can create and share knowledge by having a culture of consensus, respecting organisational coherence, and maintaining a harmonious atmosphere through discussion, participation, and knowledge sharing. On related research results also suggest that the environment itself and interactions between departments can create positive effects on knowledge and resource exchange, product innovation, and value creation (Wang et al., 2017). Based on the opinion above, it can be hypothesised as follows:

H3 Knowledge-sharing climate has a positive effect on knowledge-sharing behaviour.

H4 Knowledge-sharing climate has a significant effect on innovation behaviour.

2.3 Knowledge-sharing behaviour and innovation behaviour

Knowledge-sharing behaviour is defined as a process in which an individual imparts his expertise, insight, or understanding to another individual so that the recipient has the potential to acquire and use knowledge to do their job better. It is an important part of effective knowledge management (Bock and Kim, 2002). Knowledge-sharing behaviour is the exchange of experience, skills, tacit and explicit knowledge among employees (Hoegl et al., 2003). Van Den Hooff and Ridder (2004) define knowledge-sharing behaviour as a process whereby individuals exchange implicit (tacit) and explicit knowledge to create new knowledge. Meanwhile, according to Wiewiora et al. (2008), knowledge-sharing behaviour is the ability to transfer framed expert experiences, information, and insights into practice. Meanwhile, in a broader sense, knowledge-sharing behaviour is a process of transferring organisational experience and knowledge to business processes through communication channels between individuals (Oyemomi et al., 2016). Some of the definitions above can be concluded that knowledge-sharing behaviour is a process of transferring and exchanging insights, expertise, understanding, experience, and knowledge either individually or in groups to gain new knowledge through communication (Islam et al., 2018).

The factor that drives innovation is knowledge sharing. Innovation cannot occur without knowledge sharing (Kremer et al., 2019). The importance of knowledge sharing has been emphasised in the existing literature. Currently, companies are focusing on human resources and a knowledgeable workforce to improve organisational performance (Huang et al., 2015). Knowledge sharing enables innovative behaviour, namely employee actions, to realise, promote, and create new knowledge useful for the organisation (Akram et al., 2018). Knowledge sharing refers to activities by which individuals send or receive knowledge from others Schwaer et al. (2012), which play an important role in generating new ideas (Grant, 1996). In particular, by sharing knowledge, individuals can learn and recombine knowledge sharing and maybe better able to translate new ideas into innovations (Mura et al., 2013). Therefore, knowledge sharing is a key influencing factor and prerequisite that can encourage individual innovation behaviour.

Innovation behaviour is an individual's behaviour intended to initiate useful new ideas related to processes, products, or procedures in work roles, groups, or organisations (De Jong and Den Hartog, 2007). Innovation behaviour is also considered as the implementation of new ideas adopted from others to be introduced and implemented in the workplace (Bos-Nehles et al., 2017). West and Farr (1989) stated that innovation behaviour is all employee behaviour aimed at the production, presentation, or utilisation of ideas, procedures, products, or new techniques for the unit to be adopted and provide significant benefits.

Scott and Bruce (1994) define innovation behaviour as the capacity of employees to generate and implement new and valuable ideas in the workplace. Innovative behaviour is described as how new ideas are generated, created, developed, implemented, promoted, realised, and modified by employees to benefit the performance of their roles in the (Thurlings et al., 2015). Tsai and Kao (2004) define innovative behaviour as an overall behavioural process that begins with innovative employee inspiration, establishment, and implementation of new products, techniques, and manufacturing processes. Then it proceeds to the successful implementation of the innovation and finally to the production of a product or service.

Existing studies have demonstrated the importance of knowledge sharing in supporting and enhancing innovation. For example, Kim and Lee (2013) argue that knowledge sharing is positively related to individual creativity, and individual knowledge sharing is significantly related to service innovation. In the same vein, Park et al. (2004) assume that knowledge sharing is significantly associated with innovative behaviour in a sample of employees in six Korean firms. Chi and Holsapple (2005) support that an important function of knowledge sharing is to sustain innovation. Based on this argument, the following hypothesis can be proposed:

H5 Knowledge-sharing behaviour is positively related to innovation behaviour.

2.4 Mediation role of knowledge-sharing behaviour

Knowledge oriented-leadership contributes to open the mindset of members in a positive way and continues to influence employee innovation behaviour in two ways. First, through the role models played by leaders and building the leader's brand as a renewed leader. This can allow the participation of subordinates who work in an atmosphere of exchange of information which is an important resource or asset of the organisation. Previous studies on knowledge-oriented leadership toward innovation behaviour of their employees found varies results. For example, there is positive significant relationship between knowledge-oriented leadership with innovation behaviour (Donate and Pablo, 2015; Sadeghi and Rad, 2018; Rehman and Iqbal, 2020), contrary with studies of Fayzhall et al. (2020). Second, a work atmosphere that promises togetherness, mutual trust will make someone have the will, volunteerism to share resources and information. This will further make individuals relatively easy to identify, accessible to other members, which then leads to a high level of mutual trust, which in turn opens up opportunities for employees to dare to express themselves and apply knowledge through novelty and innovation (Radaelli et al., 2014). This study is based on the hypothesis that knowledge-sharing behaviour can play a mediating role between knowledge-oriented leadership and innovation behaviour and knowledge-sharing behaviour can play a mediating role between knowledge-sharing climate and innovation behaviour. Based on this argument, the following hypothesis can be proposed:

H6a Knowledge-sharing behaviour mediates the relationship between knowledge-oriented leadership and innovation behaviour.

H6b Knowledge-sharing behaviour mediates the relationship between knowledge-sharing climate and innovation behaviour.

3 Methodology

3.1 Research setting

The objective of this study is to analysis knowledge-oriented leadership, knowledge sharing climate and knowledge sharing behaviour toward innovation behaviour among the academic staff from a private university in Kudus, Central Java, Indonesia. There are two reasons for undertaking research in such a setting. First, to assure quality of the university performance, thus dynamic changes almost facing by the all academics

members including the employees. Participation of the staff in term of encourage new initiative as well as innovation behaviour is crucial. Second, attention to behave innovate among the staff is relatively low, as the mindset of them as supporting department they just work in daily routine. Thus, it needs to consider the performance of employees of university in serving stakeholders, namely students and lecturers. In one side the staff, experience extra services, this is due to the number of students increasing drastically every year, and just doing the daily routine. Therefore, a special strategy is needed to overcome this problem

3.2 Sample

This research was conducted on employees at the State Islamic Religious College in Kudus, Central Java Province, Indonesia. The data was collected by distributing 90 questionnaires to the employees. This study uses purposive sampling; namely, the sample is taken based on certain considerations or criteria that have been determined. Hair et al. (2019) stated the size of the research sample is the number of indicators multiplied by 5–10. Hence, the minimum number of samples for this research is 18 × 5 = 90 respondents, representing the total population. The primary data for this study was obtained by distributing questionnaires. From the distributed questionnaires, 90 questionnaires were collected which could be processed, consisting of general questions such as gender, age, tenure, educational background, and specific questions about each variable.

Table 1 Respondent's profile

Category	*Criteria*	*N*	*Percentage*
Gender	Male	57	63%
	Female	33	37%
Total respondent		*90*	*100%*
Age	< 25	11	12%
	26–35	38	42%
	36–45	25	28%
	> 45	16	18%
Total respondent		*90*	*100%*
Educational background	High school	30	33%
	Bachelor	55	61%
	Post-graduate	5	6%
Total respondent		*90*	*100%*
Tenure	< 1 year	10	11%
	1–2 year	6	7%
	2–3 year	11	12%
	> 3 year	63	70%
Total respondent		*90*	*100%*

The majority of respondents in this study were male (63%). This indicates that the male gender still dominates in leadership positions. In terms of educational background, the bachelor's degree dominates the educational level of the educational workforce at the university. This shows that the competencies possessed by the respondents have met the qualifications and knowledge of academics in order to improve services for students and lectures. Judging the age range, the majority of respondents are 36–35 years old (42%). This shows that this age for employees in showing creativity and innovation in the workplace. Furthermore, in terms of tenure, the majority of respondents have a tenure of > 3 years, indicating that the experience and knowledge education personnel still has many employees who can guide new employees to be more focused in completing their work.

3.3 Measurement

The variables in this study are knowledge-oriented leadership, knowledge-sharing climate, knowledge-sharing behaviour, and innovation behaviour, with a total of 18 questions using a Likert scale of 1 for strongly disagree to 7 for strongly agree. After the data is collected, it is processed using partial least square (PLS). Common method variance (CMV) bias is a crucial problem in research using questionnaire (Chin et al., 2003). The data collection from single source or self-response tends to result in a degree of covariance among the questionnaire items (Podsakoff et al., 2012). In order to test the presence or absence of CMB between variables, it is determined by most reliable approach, namely full collinearity evaluation using SmartPLS (Kock, 2015). If the VIF value of all indicators or variance is lower than 3.3 (see Table 4), it means there is no CMB problem in the model.

3.3.1 Knowledge-oriented leadership

Knowledge-oriented leadership is a leadership style that makes knowledge the main value in empowering and directing subordinates. The variables measured using four indicators include: leaders encourage knowledge creation, leaders encourage sharing of new knowledge, leaders encourage the use of new knowledge, and leaders encourage the empowerment of new knowledge. These indicators were adopted from (Mabey et al., 2012). All indicators were declared valid based on data processing with a loading factor of more than 0.5.

3.3.2 Knowledge-sharing climate

Knowledge-sharing climate is defined as the atmosphere of social interaction in the workplace felt by employees, which is dominated by the values of sharing knowledge among employees. Measurement of variables using five indicators, namely, fairness, innovativeness, affiliation (sense of closeness), superior support and achievement award. These indicators adopted from Jain et al. (2015) and Ahmad et al. (2018). All indicators were declared valid based on data processing with a loading factor of more than 0.5.

3.3.3 Knowledge-sharing behaviour

Knowledge-sharing behaviour is defined as employee behaviour in the work process through transferring and exchanging knowledge, documents, experiences, and information. Measurement of variables using four indicators namely, share new knowledge, share documents, share experiences and share new information. These indicators were adopted from Wang et al. (2017). All indicators were declared valid based on data processing with a loading factor of more than 0.5.

3.3.4 Innovation behaviour

Innovation behaviour is a series of employee efforts and behaviours in generating new ideas at work ranging from generating creative ideas, promoting new ideas, developing, implementing, and inspiring innovation in the workplace. This variable was measured using five indicators adopted from Sarwat and Abbas (2020), namely, generating creative ideas, promote new ideas, develop new ideas, implement new ideas and inspire innovation. Based on data processing, all indicators were declared valid with a loading factor of more than 0.5.

4 Results and discussion

4.1 Result

4.1.1 Descriptive analysis

All variables in the study were assessed using a seven point Likert scale, with 1 indicating strongly disagree and 7 indicating strongly agree. A mean score of less than 2 is considered low, a score of 2 to 4 is considered high in terms of comprehending each construct (knowledge-oriented leadership, knowledge-sharing climate, knowledge-sharing behaviour, and innovation behaviour) (Radzi et al., 2018). Table 2 displays the descriptive statistical results from this study.

Table 2 Descriptive analysis

Variables	*Mean*	*SD*	*KOL*	*KSC*	*KSB*	*IB*
KOL	5.886	1.174	1.000			
KSC	5.513	1.422	0.664	1.000		
KSB	5.506	1.197	0.569	0.637	1.000	
IB	5.496	1.251	0.679	0.668	0.756	1.000

Notes: KOL: knowledge-oriented leadership; KSC: knowledge-sharing climate; KSB: knowledge-sharing behaviour, IB: innovation behaviour.

4.1.2 Data analysis

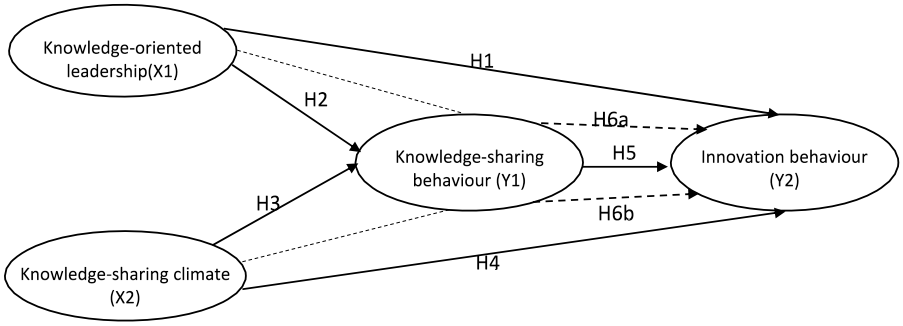
The data obtained in this study have been declared valid. The data is processed using PLS by testing the outer and inner models to see each variable's validity and reliability. The results of data processing can be seen as follows:

The research model was analysed using PLSs in the study. SmartPLS provided the software used to conduct the analysis (Hair et al., 2019). A variance-based PLS technique is preferred to covariance-based approaches because PLS places less constrains on sample size and distribution (Chin et al., 2003). PLS is a SEM approach that evaluated both a measurement model and a theoretical structural model at the same time. Furthermore, because PLS changes predictor variables to an orthogonal component known as PLS, it is an equivalent strategy for resolving multicollinearity problems that typically emerge in multivariate regression research (Chin et al., 2003). Although the measurement prediction and structural parameters occur concurrently, the PLS model application is usually done in two steps. The first phase is to evaluate the measurement model using confirmatory factor analysis, as well as to evaluate the theoretical construct reliability and validity. The second phase involves estimating the structural model test of the (path) linkages between the hypotheses in this research model.

4.1.2.1 Measurement model

The first step before testing measurement models is to estimate the model (Figure 1). Internal consistency (Cronbach alpha and composite reliability); convergent validity (indicator reliability and AVE); and discriminant validity are all tested via measurement model evaluation (Fornell-Larcker criterion, cross loading, and HTMT). The measurement model's test results are shown in Figure 2 and Table 3.

Figure 1 Conceptual framework



The measurement model evaluation findings are regarded fulfilled if the indicator reliability of each outer loading's items is between 0.5 to 0.7. The average value of all variable is greater than 0.5 (Figure 3, Table 3).

Cronbach alpha values greater than 0.60 to 0.80 and more than 0.80 to 1.00 have a dependability rating of fairly reliable, dependable, and very reliable (Kock, 2015). If measurement model result indicates an AVE less than 0.5 and a composite reliability more than 0.6, the construction is sufficiently convergent (Hair et al., 2010). Fornell-Larcker, on the other hand, employed a matrix and heterotrait-monotrait (HTMT ratio of correlations) as described by Fornell and Larcker (1981) to assess discriminant validity. The value of the square root of AVE (diagonal) in the Fornell-Larcjker matrix (Table 4) is bigger than all other values, whereas the value of HTMT (Table 3) is lower than one. As a result, the discriminant validity of the measurement models was established.

Table 3 Measurement model evaluation

Variables	*Indicators*	*Convergent validity*		*Internal consistency reliability*		*Discriminant validity HTMT< 1*
		Outer loadings	*AVE*	*Composite reliability*	*Cronbach alpha*	
		> 0.70	> 0.70	> 0.7	> 0.7	
KOL	KOL.1	0.949	0.918	0.978	0.970	Yes
	KOL.2	0.971				
	KOL.3	0.962				
	KOL.4	0.950				
KSC	KSC.1	0.507	0.648	0.899	0.855	Yes
	KSC.2	0.853				
	KSC.3	0.870				
	KSC.4	0.925				
	KSC.5	0.803				
KSB	KSB.1	0.927	0.774	0.931	0.900	Yes
	KSB.2	0.704				
	KSB.3	0.943				
	KSB.4	0.923				
IB	IB.1	0.854	0.779	0.946	0.929	Yes
	IB.2	0.891				
	IB.3	0.935				
	IB.4	0.898				
	IB.5	0.833				

Notes: KOL: Knowledge-oriented leadership; KSC: Knowledge-sharing climate; KSB: Knowledge -sharing behaviour, IB: Innovation Behaviour

Table 4 Fornell-Larcker criterion and VIF

Fornell-Larcker criterion				
Variables	*IB*	*KOL*	*KSB*	*KSC*
IB	0.883			
KOL	0.679	0.958		
KSB	0.756	0.569	0.880	
KSC	0.668	0.664	0.637	0.805
VIF				
Variables	*IB*	*KOL*	*KSB*	*KSC*
IB				
KOL	1.913		1.790	
KSB	1.799			
KSC	2.177		1.790	

Notes: KOL: knowledge-oriented leadership; KSC: knowledge-sharing climate; KSB: knowledge-sharing behaviour, IB: innovation behaviour.

Figure 2 Estimation model (see online version for colours)

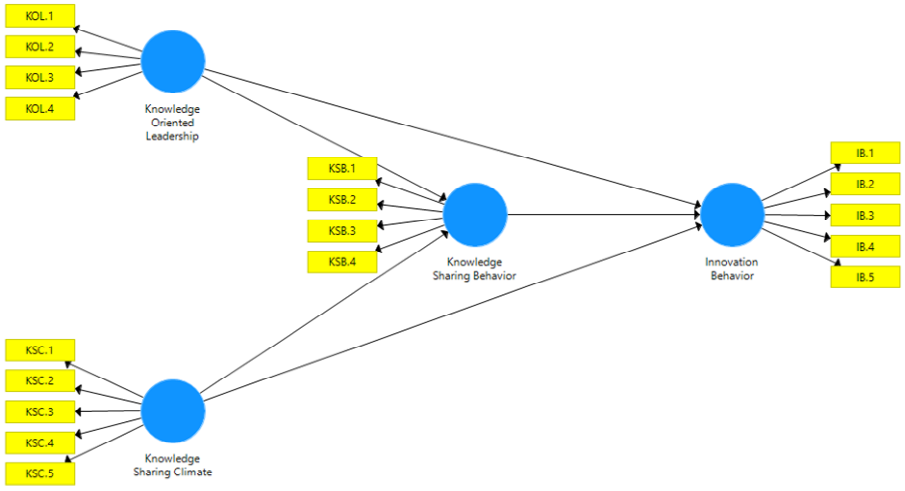
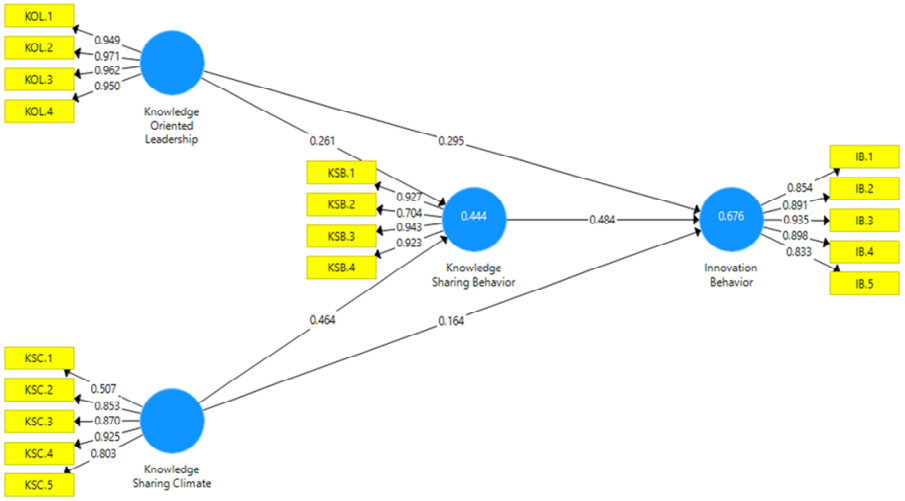


Figure 3 Measurement model evaluation (see online version for colours)



4.1.2.2 Structural model

Coefficient determination

R^2 (coefficient determination) (Table 5) is used to assess exogenous structures capacity to explain endogenous variables. The predicted R^2 value ranges between 0 and 1. The R^2 value of all endogenous variables demonstrated the model's capacity to predict. R^2 values of 0.75, 0.50, and 0.25 (Hair et al., 2017) indicate that endogenous variables are capable of predicting models (strong, moderate, and weak).

Table 5 Coefficient determination

Variables	R^2	R^2 *adjusted*
Innovation behaviour	0.676	0.664
Knowledge sharing behaviour	0.444	0.431

It may be inferred that endogenous variables KSB and IB have poor and moderate predictive power (0.431 and 0.664, respectively). Exogenous factors KOL and KSC can be stated to predict (43.1%) endogenous variables KSB, whereas the rest is impacted by variables outside of this study. Exogenous KSB factors can likewise predict endogenous IB variables (66.4%), with the remaining impacted by variables outside of this study.

Figure 4 illustrates the structural model analysis findings, displaying the path coefficient together with their significance level.

Figure 4 Structural model evaluation (see online version for colours)

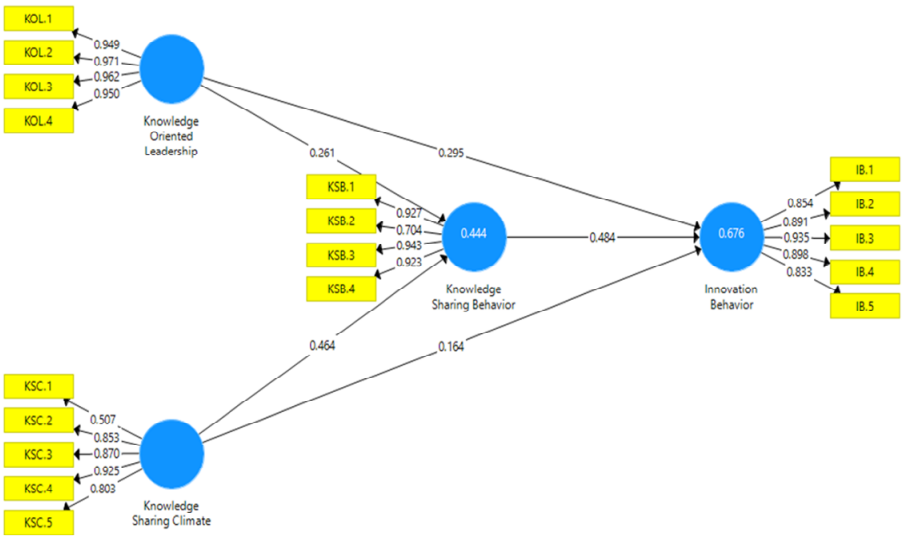


Table 6 displays the path coefficient, t-value, and ρ-value for each hypothesis. The strength of the association between constructs is described by path coefficients (latent variables). This assessment is comparable to that of the regression coefficients. The use of bootstrapping procedures, similar to indicator weight analysis, enables access to the importance of each coefficient (Tenenhaus et al., 2005).

Despite the fact that the coefficient determination values were weak and moderate, the hypothesis test findings revealed that all hypothesis (except H4) were supported (Table 6). The path coefficient demonstrates a substantial association between knowledge-oriented leadership and knowledge sharing behaviour, as well as knowledge sharing climate and innovation behaviour. As a result, H1, H2, H3, and H5 were all supported. MacKenzie et al. (2005) classified route coefficients less than 0.30 as causing moderate (effects), path coefficients between 0.30 and 0.60 as strong, and path coefficients more than 0.60 as extremely strong.

Table 6 Hypothesis results

Hypothesis/path	*Path coefficient*			*t-value*	*p-value*	*VAF*	*Confidence interval (95%) bias corrected*		*Results*	*Effect*
Direct	*DE*	*IE*	*TE*			*IE/TE*	*CI LL*	*CI UL*		
H1: KOL → IB	0.295			2.317	0.021		0.066	0.558	Supported	
H2: KOL → KSB	0.261			2.094	0.036		0.025	0.514	Supported	
H3: KSC → KSB	0.464			4.016	0.000		0.207	0.660	Supported	
H4: KSC → IB	0.164			1.489	0.137		–0.066	0.364	Not supported	
H5: KSB → IB	0.484			4.633	0.000		0.262	0.674	Supported	
Mediation analysis:										
Indirect effect										
H6a: KOL → KSB → IB		0.126		1.766	0.077	0.299	0.016	0.303	Supported	Partial mediation
H6b: KSC → KSB → IB		0.224		3.095	0.002	0.577	0.100	0.380	Supported	Partial mediation
Total effect										
KOL → IB			0.421	3.776	0.000		0.197	0.635		
KSC → IB			0.388	4.016	0.000		0.152	0.586		

Notes: KOL: knowledge-oriented leadership; KSC: knowledge-sharing climate; KSB: knowledge-sharing behaviour, IB: innovation behaviour.
VAF: < 0.2 = no mediation; > 0.2 = partial mediation; > 0.8 = full mediation (Hair et al., 2019).

Source: SmartPLS output

Consequently, KOL establishes a moderate, positive, significant effect on IB (path coefficient = 0.295; t-value > 1.96; ρ-value < 0.05). The other result also arises KOL, has a moderate, positive, significant effect on KSB (path coefficient = 0.261; t-value > 1.96; ρ-value < 0.05). If the university leader have a high level of knowledge oriented, it will give the higher level of knowledge sharing behaviour and innovation behaviour. Meanwhile, KSC has a strong, positive and significant effect on KSB (path coefficient = 0.464; t-value > 1.96; ρ-value < 0.05). KSB also has a strong, positive and significant effect on IB (path coefficient = 0.484; t-value > 1.96; ρ-value < 0.05). This indicates that there is a strong KSC at the university, able to increase the KSB.

Likewise, the high level of KSB will give an increase to the IB. Unlike H1.H2, and H3, H4 was not supported. KSC has moderate, positive, and not significant on IB (path coefficient = 0.164; t-value <1.96; ρ-value > 0.05). This shows that KSC at the university has not been able to provide an increase in IB. Furthermore, the mediation analysis showed that KSB was able to mediate the relationship between KOL on IB and KSC on IB, H6a and H6b were supported (Table 6).

4.2 Discussion

Given the rising interest in knowledge-oriented leadership, there is a lack of research on the linkage between leadership, work climate, knowledge sharing behaviour and innovation behaviour in the context of knowledge that seem to be a significant gap to study. The final result of this study:

4.2.1 Knowledge-oriented leadership on innovation behaviour and knowledge-sharing behaviour

This study indicated that knowledge-oriented leadership had a moderate influence on innovation behaviour, and knowledge-sharing behaviour. The highest indicator of the knowledge-oriented leadership variable was the leader encourages the empowerment of new knowledge. This means that a leadership style that makes knowledge the main value by empowering new knowledge to employees, so that the knowledge already possessed by employees is not easily forgotten but will experience increased knowledge. The knowledge that has been transferred to others will have a positive effect on organisations and individuals. This must also get support from superiors so that in an effort to empower will get support, both material and non-material. This finding is in line with the statement of Singh (2008) and Jasimuddin and Naqshbandi (2019), which stated that knowledge-oriented leadership will clarify the role expectations of HR so that it can produce innovative strategies. An innovative strategy in an organisation is a sure step to maintain a competitive advantage. Because organisations that are able to innovate continuously will ensure its sustainability in the future. In addition, research by Rosing et al. (2011) and Naqshbandi and Jasimuddin (2018) also stated that a knowledge-oriented leadership style that has the right goals and roles will increase the company's innovative performance. Thus, a leader in leading an organisation must have a clear purpose, vision, and mission to direct employees in achieving common goals.

4.2.2 Knowledge-sharing climate on knowledge-sharing behaviour

In addition, the finding in this study is knowledge-sharing climate had a strong influence on knowledge-sharing behaviour. However, its relationship with the innovation behaviour variable has a weak influence. The highest indicator in the knowledge-sharing climate variable is an affiliation or a sense of closeness between employees and support from superiors. This shows that the atmosphere created by employees through establishing a sense of belonging to work and creating co-workers as someone who will help employees work when they find difficulties in carrying out work assignments. At the same time, the indicators of superior support will affect the realisation of the organisation's expectations, namely the goal to achieve success in bringing the organisation. So that by getting support from superiors, it will make easier for employees to transfer their knowledge to co-workers through the facilities provided by superiors. Thus, the spirit towards integrity in work will clarify organisational goals to eventually become an innovative strategy. This finding is in line with the statement of Radaelli et al. (2014) and Ahmad et al. (2018) revealed that a strong organisational knowledge-sharing climate would promote knowledge sharing at the individual level. This means that if the knowledge-sharing climate is strong, it will indirectly strengthen employee relations in promoting the knowledge that individuals already have. Knowledge that is always promoted will increase the values of the effectiveness of togetherness in increasing insights that are not yet known by individuals. Thus, increasing insight or knowledge will trigger the emergence of innovative ideas generated by employees through knowledge-sharing behaviour.

4.2.3 Knowledge-sharing climate on innovation behaviour

The knowledge-sharing climate that has been available in the work environment has not been maximised in shaping the behaviour of employees to innovate. This indicates that the efforts made by the university have existed but are still limited, for example, the provision of infrastructure, a conducive environment, etc. so employees have not been able to raise awareness of employees to innovate (for example, climate bureaucratic procedures), tend to be afraid to accept changes, and take the risk of work errors. Knowledge-sharing climate needs to be applied to improve innovation behaviour. However, from the results of this study, the direct path knowledge-sharing climate is not able to improve employee innovation behaviour. Several aspects that can be explained are, first, the character of the object of research; the university is still strict in carrying out operational procedures, which makes employees at the university afraid of accepting the risk of work errors. Second, the trust factor (Chawla, 2019) that is thought to be the reason does not support the influence of knowledge-sharing climate on innovation behaviour (Naqshbandi et al., 2019).

4.2.4 Knowledge-sharing behaviour on innovation behaviour

Meanwhile, another variable that directly influenced innovation behaviour was knowledge-sharing behaviour. The indicator of knowledge-sharing behaviour with the highest value is sharing experience, meaning that an experience in dealing with a problem makes an organisation stronger. This shows that sharing experiences with co-workers will increase employees' innovative behaviour in dealing with a problem that is unknown when it will come. So that by strengthening individual experiences and sharing their

experiences with colleagues, it will ease the work and spur creativity on innovations created by other individuals. This finding agrees with the study of Kim and Lee (2013), Jasimuddin and Naqshbandi (2019) and Islam et al. (2018) which stated that knowledge sharing has a positive and significant effect on service innovation. So, based on these findings, it can be concluded that in providing innovative services, adequate knowledge is needed through knowledge transferred and knowledge obtained from other individuals to create new innovation opportunities so that an organisation will continue to exist in the future.

4.2.5 Mediation Role of Knowledge-sharing behaviour

Furthermore, the results of this research demonstrate that all university members' knowledge sharing behaviours can partially mediate the association between knowledge sharing behaviours and the knowledge sharing climate on innovation behaviour. This means that, in addition to having a direct impact on the formation of innovation behaviour, the behaviour of all university members may also support and enhance leaders' knowledge orientation and establish a climate for knowledge sharing among university members to foster innovative behaviour. The leadership style and climate formed in a university environment increase the spirit of being willing to carry out activities to share documents, information, experience, and knowledge so as to encourage the creation of innovative behaviour.

These empirical results clearly demonstrated that the spirit or awareness of the desire to exchange data, documents, information, and experiences as a type of action to share knowledge was capable of partially mediating the relationship between knowledge-oriented leadership and innovative behaviour. These empirical results back up existing studies, such as Wang et al. (2017), Naqshbandi et al. (2019), Naqshbandi and Jasimuddin (2018) and Dehaghi (2022), on the value of knowledge sharing enablers and outcomes in terms of leadership and climate in a university environment to foster the bahavior of all its members for inventive development ideas, novel idea formation, and innovation inspiration.

In the terms of effect size, knowledge sharing behaviour is still only to a partial degree. This shows that there are other elements (Naqshbandi and Tabche, 2018; Nurhidayati and Fachrunnisa, 2020; Sudarti and Fachrunnisa, 2021; Nurhidayati and Adriyanto, 2022) that can optimise the role of knowledge sharing as a mediator. For example, combining knowledge sharing with the use of new technology (Jasimuddin and Naqshbandi, 2019; Naqshbandi et al., 2019; Prameswari and Fachrunnisa, 2020; Damayanti et al., 2020). As a logical consequence, the current research indicates that university members (leaders, managers, and staff) mush have the spirit or willingness to share knowledge in order to realise innovation behaviour. When all university members have formed the awareness to share knowledge, leadership will encourage knowledge sharing, climate, and new knowledge usage so that all university members will be encouraged to innovate. Similarly, in the university environment, fair treatment, innovative competencies, a sense of togetherness, superior support, and awards create atmosphere that foster the realisation of a mindset and willingness to innovate.

5 Conclusion

5.1 Theoretical contribution

This article explores knowledge-oriented leadership and knowledge-sharing climate, and knowledge-sharing behaviour toward innovation behaviour. This research theoretically contributes to three aspects. First, this study expands on innovative behaviour from the perspective of leadership and work environment culture. Second, this study uses the mediator variable of knowledge-sharing behaviour in mechanism relationship between knowledge-oriented leadership and knowledge-sharing climate with innovation behaviour. Investigating the mediating role of knowledge-sharing behaviour in both relationships is important and crucial contribution of this study. Examining of the mediating of knowledge-sharing behaviour on the relationship knowledge-oriented leadership and innovation behaviour shows relevant findings in the context of university institution, which the main function of the university, but relatively slow response in change and working in daily routine for administration tasks. This study implies that knowledge-sharing behaviour is urgent tradition should be developed for all members of the university, including the staff administration.

5.2 Managerial implication

This study has also extended the current research on knowledge-oriented leadership, knowledge-sharing climate, knowledge-sharing behaviour and innovation behaviour in university context. The universities are crucial as those are the pillar in generating, and sustaining socio-economic of the nation. The universities need to adapt with environmental change by encouraging innovative behaviour of the members. Practically, these findings highlight the potential for enhancing the quality of leader of the universities through developing knowledge-oriented leadership. The top and middle management of the universities needs to generate such leadership, as they are main actors and role model of employees related of knowledge in term of, searching, creating, sharing and documenting of knowledge. Such leader needs more efforts to encourage organisation activities that impact on increasing knowledge of their employees. The tradition of sharing knowledge in the universities need to develop to obtain best management practices. As, those components will lead to new initiative and innovative behaviour. Based on this evidence, this study recommends that leaders of the universities should pay more attention to improve innovation behaviour by enhancing role model of leadership-oriented knowledge, interaction in knowledge-sharing behaviour and knowledge-sharing climate. The limitation of this research is that the number of respondents is only one organisation, so it is necessary to expand the scope of distributing questionnaires in other similar organisations to obtain more accurate data.

The results of this study provide insight into HR practices that can be used as a reference to improve innovation behaviour. The important finding in this study is that knowledge-sharing behaviour has the strongest influence compared to other variables, namely knowledge-oriented leadership and knowledge-sharing climate. Thus, the organisation needs to evaluate and empower the knowledge-sharing behaviour of employees. Further, the empowerment of knowledge will ensure the continuity of the organisation appropriately. Another finding in this study also states that the most influential variable on knowledge-sharing behaviour is knowledge-sharing climate. This

shows that the knowledge-sharing climate that the employees have created provides synergies in working to influence each other with the duties of each employee so that it becomes a connecting bridge to increase awareness of employees' knowledge. Based on these findings, it is important to provide access to information, provide solutions and opinions to co-workers, instil a sense of empathy for work, have a sense of responsibility for joint work, create a very pleasant atmosphere of knowledge sharing so that employees are interested in doing it again, provide support for employees, and give awards for employee achievements. Thus, as employees return to the work environment, it will have a positive effect through their creative ideas in improving behaviour that can innovate co-workers. If an organisation is able to implement these findings, it will clarify the expectations of individuals and organisations.

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