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DETERMINANTS OF KNOWLEDGE SHARING BEHAVIOUR AMONG STUDENTS OF PRIVATE HIGHER EDUCATION INSTITUTIONS IN KLANG VALLEY, MALAYSIA

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Abstract

Activities relating to knowledge sharing in education institutions is getting popular these days. University and college can practice knowledge sharing through initiatives like giving rewards to motivate students to share knowledge. Students who develop the knowledge sharing habit tend to carry the habit to their future workplace. Organisations need employees who are willing to share knowledge to gain competitive advantage and reduce training costs.

Thus, the objective of this study is to identify factors affecting the knowledge sharing behaviour of students in higher education institutions. Quantitative research is employed by testing theoretical and hypotheses using a sample size of 100 respondents. PLS software is used for statistical analysis after collecting data. The findings show that extrinsic motivation, intrinsic motivation and organisational culture have significant impact on knowledge sharing behaviour, while interpersonal trust has no impact on the latter. Hence, authorities of university and college are recommended to use different motivators to encourage students to participate in knowledge sharing. For example, university and college can provide scholarships for extrinsically motivated students to share knowledge.

Keywords

Knowledge Sharing Behaviour, Extrinsic Motivation, Intrinsic Motivation, Organisational Culture, Interpersonal Trust

Introduction

One of the key aspect of knowledge management is knowledge sharing (Igbinovia and Osuchukwu, 2018). Knowledge sharing is about sharing task-relevant information, ideas and suggestions in a team (Li, 2016; Appel-Meulenbroek et al., 2018). In this knowledge driven economy, sharing of knowledge plays a crucial role as it is among the most important intangible asset for an organization (Dey and Mukhopadhyay, 2018).

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Some of the benefits of knowledge sharing are as follows. It improves the organisations' effectiveness and work environment (Nadason et al., 2017). It also helps in collaborating with team members, developing new ideas and helping each other (Coun et al., 2019). Castaneda and Cuellar (2020) supported this by indicating that collaborative activities have paved way for effective and efficient innovation, which is considered as an important factor to maintain the competitive advantage for knowledge intensive organisations (Dey and Mukhopadhyay, 2018; Zheng, 2017; Mohajan et al., 2017). According to Robinson (2018), large organisations in the USA will be able to save a huge sum of money, amounting to approximately $200 million, in employees' productivity through knowledge sharing, while smaller firms can save up to $2 million. Moreover, successful innovation can be created through knowledge flows in organisations (Wulf and Butel, 2017; Appel-Meulenbroek et al., 2018). Hence, it is essential to encourage knowledge sharing in an organization as it will offer fast solutions, improvement in response time, create awareness, increase coordination and enhance employees' performance (Nadason et al., 2017; Dey and Mukhopadhyay, 2018). Following this, many companies have invested a lot of money and time towards enhancing knowledge sharing practices (Zheng, 2017).

While knowledge management approach among local organizations is seen to be in the initial stage of implementation, it cannot be denied that Malaysia is on its way towards becoming a knowledge economy through initiatives such as enhancing technological capability and improving firm innovativeness so as to increase the competitiveness of local firms, leading to higher growth (Mohamad et al., 2017). Some of the initiatives that the local government has taken to this date comprise the introduction of the Multimedia Super Corridor (MSC), National Information Technology Agenda (NITA) and Knowledge-Based Economy Master Plan (Drus et al., 2015).

It cannot be denied that institutions of higher education, such as colleges and universities, contribute largely towards developing Malaysia's workforce and economy since they create most of the knowledge processes (Mallasi and Sulaiman, 2015). University and college students who have a positive attitude towards sharing of knowledge will continue learning through knowledge sharing when they step into the working environment. They are also the driving force for the future development and growth (Chong et al., 2013). Thus, education institutions will play the role of cultivating knowledge sharing among the students in order to get them ready for the work environment.

The type of knowledge that is shared among individuals include explicit and tacit knowledge. Explicit knowledge is often in writing and formal form such as reports, documents, patents, etc. Meanwhile, tacit knowledge is rooted in values and experiences such as developed skills, abilities, feelings, etc. (Holste and Fields, 2010; Ismail and Yusof, 2010; Asrar-ul-Haq and Anwar, 2016). The lack of knowledge sharing among colleagues will lead to frustrated employees, missed opportunities and delayed projects (PR Newswire, 2018). Companies too experience a decline in competitive advantage due to the lack of innovation (Khosravi and Ahmad, 2014).

Thus, taking the above into consideration the objective of this study is to analyse the determinants of knowledge sharing among students through the perspective of Social Exchange Theory, Altruism Theory on Ethical behaviour, and Intellectual Capital Theory that

can be linked to organizational culture. Following this, the four determinants of knowledge sharing are identified as Extrinsic Motivation, Interpersonal Trust, Intrinsic Motivation, and Organisational Culture.

Literature Review

Related theories

The social exchange theory explores human behaviour and it is often applied towards understanding organizational behaviour (Oparaocha, 2016). According to Oparaocha, Social exchange is a form of social interactions that is based on reciprocity, mutual obligations and psychological contracts. It involves economic resources such as money and social emotional status (Olatokun and Nwafor, 2012). A good social exchange relationship can be achieved by trust, loyalty and behaviours that are willing to go beyond employment contract (Hu et al., 2012). As such, interpersonal trust also plays an important role in social exchange behaviour so as to avoid unclear equality of exchange and vague responsibilities (Tanskanen, 2015). Thus, the act of sharing knowledge is one of the social exchange behaviour (Wu and Lee, 2016; Wang et al., 2015). As such, the Social exchange theory focuses on the concept of monetary benefit, non-monetary benefit and also reciprocity (Paraskevaidis and Andriotis, 2017), which are all component of extrinsic motivation. Hence, this theory will be applied to the following two determinants of knowledge sharing, which are extrinsic motivation and interpersonal trust. On the other hand, the altruism theory of ethical behaviour indicates doing good to others as the moral action. In other words, it reflects the unselfish and desirable behaviour of helping people out of concern over their well-being, and not because of obligation resulting from duty, loyalty, or religious reasons (Ricard, 2016). This theory is applied to Intrinsic Motivation, which is one of the determinants of knowledge sharing.

With reference to the intellectual capital theory, the organizational culture developed by a group of people in an organization helps to cope with the problems of external adaptation and internal integration (Schein et al., 2016). This culture is then passed on to new members by sharing with them the correct way to perceive, think and feel. As such, organisations tend to focus on initiatives relating to knowledge management in order to derive values from the knowledge of their employees and foster organizational learning (Mueler, 2014). Moreover, processes are organized around projects, resulting in knowledge sharing between project teams, thus fostering organization-wide learning.

Knowledge sharing behavior

Knowledge sharing is among the core concepts in knowledge management studies (Mosha, 2019; Boateng et al., 2015). It is known as the way people communicate and receive knowledge (Sergeeva and Andreeva, 2015). Knowledge can be shared when a group of people are working together to solve problems and generate new ideas (Amayah, 2013). In a workplace, the employees often share information, values, experiences, knowledge and work-related expertise with others either through explicit or tacit way (Ononye and Igwe, 2017). There are several ways for individuals to share explicit knowledge, for instance, written notes and discussion on data analysis (Nemati et al., 2002). Conversations during informal discussions and meetings also help in developing new tacit knowledge among them (Amayah, 2013; Ooi et al., 2010). Individuals can

contribute to creativity, innovation, knowledge application and even competitive advantage of the organisations by sharing knowledge (Wang and Noe, 2010).

Knowledge sharing is also common among students as they tend to share information with each other every day. Academic institutions are encouraged to modify their assessment procedures and policies to encourage students to share knowledge (Ononye and Igwe, 2017; Ong et al., 2011). University's webpage like E-Learning also provide a platform for students to share knowledge (Yu et al., 2013). Sharing knowledge among students will help enhance the learning process and generate knowledge workers (Sari et al., 2017). Fresh graduates will gain problem solving and analytical skills through sharing knowledge and they tend to bring these skills over to the workplace through innovative activities (Olokundun and Olaleke, 2017).

Besides, gender differences can affect knowledge sharing culture (Kathiravelu et al., 2014). Different genders will have different social expectations which influences men to be more social hierarchies while women to be more network oriented. Prior studies also show that women tend to focus on intimacy, cooperation and harmony while men focus on competitiveness and dominance. So the open cooperativeness nature of women engage more in trust, reciprocity and social ties (Chai et al., 2011) which are key factors that lead to knowledge sharing (Jiang and Hu, 2015).

Extrinsic motivation

Extrinsic motivation is the behaviour of individuals that participate with a purpose (Lee et al., 2005) and it is the key for knowledge sharing (Rutten et al., 2016). Peer recognition, monetary and non-monetary benefits and reciprocity are the factors of extrinsic motivation (Rode 2016). The most common extrinsic factor is reward (Jeon et al., 2011). Some research found that the larger the reward an individual gets, the more knowledge that will be shared with others (Kalhoro et al., 2017). A classroom experiment was conducted and it was proven that rewards like bonus marks and monetary rewards will prompt students to share knowledge more willingly (Shoemaker, 2014). Moreover, non-monetary rewards, such as enhancing personal image, increasing reputation and gaining recognition also motivate individuals to share knowledge with others (Zhang et al., 2017).

Past studies have found mixed results for the impact of extrinsic motivation on knowledge sharing behaviour (Lin and Lo, 2015). Lin (2007) claimed that extrinsic motivation has no impact on knowledge sharing behaviour. Meanwhile, Bock and Kim (2002) discovered that there is a negative relationship between extrinsic motivation and knowledge sharing behaviour. Nevertheless, the majority of researchers have found a positive relationship between knowledge sharing behaviour and extrinsic motivation (Cabrera et al., 2006; Rutten et al., 2016; Olatokun and Nwafor, 2012). Following this, the first hypothesis is suggested as follows:
H1: Extrinsic motivation is positively related to knowledge sharing.

Intrinsic motivation

Past researchers have found intrinsic motivation to be a key element of knowledge sharing behaviour (Geri et al., 2017; Tangaraja et al., 2015; Pee and Lee, 2015; Llopis and Foss, 2016), which comprises the unselfish concern for other people and the genuine enjoyment in helping others (Paraskevaidis and Andriotis, 2017), without expecting rewards (Tang et al., 2016; Chang

et al., 2015). Individuals who are intrinsically motivated prefer immaterial benefits such as feelings of pride and satisfaction when sharing knowledge in order to help others build new capabilities.

When individuals are intrinsically motivated, they tend to build capabilities by asking questions, discussing with people, acquiring knowledge, having a learning orientation and finding solutions (Nesheim et al., 2011), even if it means losing their competitive edge against their peers (Paraskevaidis and Andriotis, 2017). According to Chang and Teng (2017) and Moghavvemi et al. (2017) individuals who are intrinsically motivated produce greater innovative ideas and higher quality work during knowledge sharing discussions. Liu and Fang (2010) indicated that intrinsic motivation has more influence on knowledge sharing behaviour as compared to extrinsic motivation. Following the discussion above, it is postulated that:
H2: Intrinsic motivation is positively related to knowledge sharing.

Interpersonal trust

The initial point to explore knowledge sharing is by starting from individuals because knowledge is resided in them, and interpersonal trust is a prerequisite for people to share knowledge (Huang et al., 2013; Wickramasinghe and Widyaratne, 2012; Tamjidyamcholo et al., 2013; Chiregi and Navimipour, 2016). When there is trust, the frequency of people working together in groups and the quality of knowledge sharing increases, leading to higher productivity, and also greater ability and effectiveness in solving problems (Rahman et al., 2015; Wickramasinghe and Widyaratne, 2012).

Yusof and Ismail (2010) and Rutten et al. (2016) discovered that a positive relationship exists between knowledge sharing and interpersonal trust, while other researchers found that interpersonal trust does not impact the amount of knowledge shared (Li, 2005; Kim and Lee, 2006; Chow and Chan, 2008; Chiu et al., 2006). Nevertheless, most researchers claimed that trust has a positive impact on knowledge sharing behavior (Al-Busaidi and Olfman, 2017; Razmerita et al., 2016; Golden and Raghuram, 2010). As a result of this, it can be hypothesized that:
H3: Interpersonal trust is positively related to knowledge sharing.

Organisational Culture

Organisational culture is defined as the unwritten and tacit rules of how employees should behave in an organisation (Shao et al., 2012; Lee et al., 2016). It is the key factor that encourages collaboration among employees, especially when it comes to sharing knowledge (Shao et al., 2012). It can affect the organisational functioning, decision making and employee collaboration in an organisationalsettings (Alattas and Kang, 2015). Communication between individuals, interpersonal trust, rewards and information systems can also affect the knowledge sharing culture within an organization (Nadason et al., 2017). As such, individuals will practice knowledge sharing when the culture is innovative, open to change and have shared visions among peers (Kathiravelu et al., 2014).

The success of knowledge sharing relies on the ability and willingness to share knowledge among peers (Osman et al., 2015). An open organizational culture allows knowledge to flow freely as individuals are encouraged to share knowledge within a sharing norm (Pi et al., 2013). When the culture is focused on building close relationships with each other, individuals within an

organization will devote more time and resources on knowledge sharing through social interaction (Igbinovia and Osuchukwu, 2018). Following the above discussion, it is postulated that: *H4: Organisational culture is positively related to knowledge sharing.*

Overall, the majority of past research on knowledge sharing behaviour studies are in organisational context (Israilidis et al., 2015; Majid and Panchapakesan, 2015). There is limited studies in the education field and from Malaysian perspective.

The conceptual framework in Figure 1 was arrived at based on the studies carried out by Hung et al. (2011), Kuvaas et al. (2012), Alsharo et al. (2017), Kathiravelu et al. (2014) and Chai et al. (2011), which depicts the relationship between the independent variables and dependent variable (knowledge sharing behaviour)

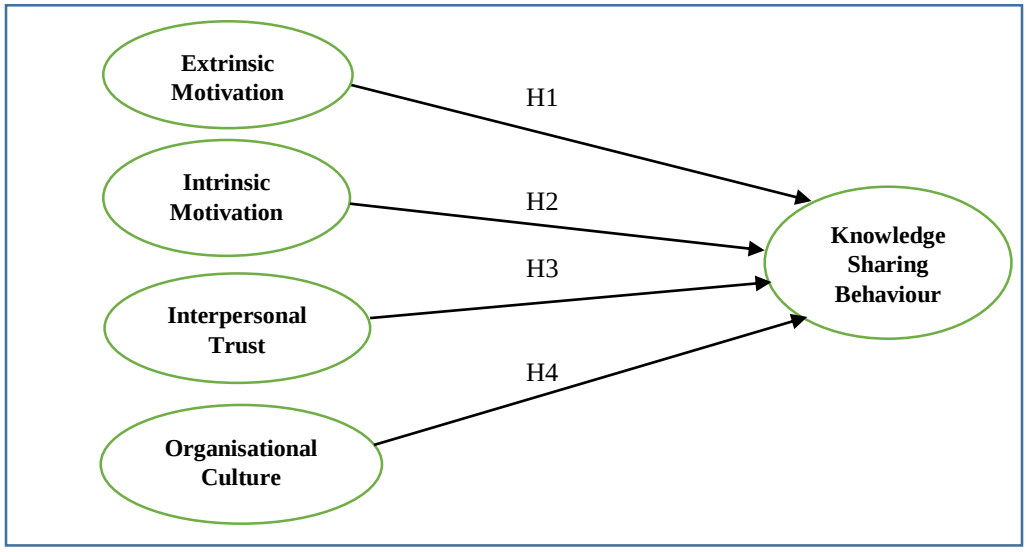

Figure 1: Conceptual Framework

Methodology

A quantitative strategy was employed in this explanatory research, which involves primary data collection. Thus, a questionnaire survey in the online mode was designed and distributed in order to investigate the knowledge sharing behaviour among students of higher learning private educational institutions in Klang Valley, Malaysia. The non-probability purposive sampling technique was applied in determining the 100 respondents. This sample size meets the minimum requirement (n=100) for a meaningful result in a particular study (Bullen, 2014).

The independent variables in this study comprise extrinsic motivation, intrinsic motivation, interpersonal trust and organisational culture, while the dependent variable is knowledge sharing behaviour. The tools used to measure these variables were adopted from various authors and they are presented in Appendix 1. The five-point Likert scale, ranging from (1) “strongly disagree” to (5) “strongly agree” was used to record the responses, while the demographic factors were quantified using the nominal scale.

The Partial Least Square Structural Equation Modelling (PLS-SEM) analytical technique was applied with the aid of the SmartPLS software in order to assess evidence of reliability & validity of the measurement. The two-step approach was adopted, comprising *Measurement Model Analysis* (Outer Model) and *Structural Model Analysis* (Inner Model) (Anderson and Gerbing, 1988). The reliability test was performed using Cronbach-Alpha and Composite Reliability, while the validity test was performed using the Average Variance Extracted (AVE) and Discriminant Validity.

Results and Discussion

The results of the tests for internal validity and reliability of the indicators are presented in Table 1. Both Cronbach's alpha and Composite Reliability (CR), which are both criterion for reliability, recorded satisfactory values that were approximately 0.70 or greater, rendering them to acceptable for confirmatory purpose. As for measuring the convergence validity of the measurement model, the loading and Average Variance Extracted (AVE) values were used. Composite reliability (CR) measures reliability better than Cronbach's Alpha, while AVE measures validity better. Although a few indicators have recorded loadings below 0.7, they were maintained as the AVE is within the acceptable range of 0.5 and above (Sarstedt et al., 2011). However, some of the indicators were removed from Table 1 due to low loadings (ie. lower than 0.6). These indicators are EM1, EM2, EM4, OC4 and OC6. Thus, the measurement model assessments in Table 1 show values that were recorded after the items were deleted.

Table 1: Internal Consistency Tests for Reliability and Validity

Constructs (Variables)	Loading	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)	VIF values
Knowledge Sharing		0.705	0.819	0.531	-
KS1	0.703				
KS2	0.785				
KS3	0.748				
KS4	0.674*				
Extrinsic Motivation		0.688	0.796	0.503	1.404
EM3	0.517*				
EM5	0.591*				
EM6	0.857				
EM7	0.800				
Intrinsic Motivation		0.858	0.898	0.642	1.887
IM1	0.811				
IM2	0.779				
IM3	0.888				
IM4	0.878				
IM5	0.621*				
Interpersonal Trust		0.856	0.898	0.639	1.461
IT1	0.772				
IT2	0.751				
IT3	0.888				

IT4 IT5	0.883 0.682*				
Organisational Culture OC1 OC2 OC3 OC5	 0.665* 0.672* 0.731 0.665*	0.667	0.800	0.503	2.057

Note: * Maintain indicators although loading values are below 0.70;

Subsequently, in order to detect multicollinearity, the Variance Inflation Factor (VIF) was applied to ensure that correlation between the independent variables in the model doesn't exist (Hair et al., 2017). The VIF value has to be below 5 to ensure there is no substantial multicollinearity within the independent variables affecting the dependent variable or mediating variable. Table 1 also shows that the inner VIF values of the variables are not correlated with one another.

In addition, the discriminant validity test, which was measured using the Heterotrait-monotrait (HTMT) ratio of correlation, was conducted to understand the extent to which each construct is truly distinct from the other. The HTMT value that is more than 0.85 shows that the two constructs are highly overlapping. This means they are measuring the same thing, indicating the lack of discriminant validity (Hair et al., 2017). From Table 2, it is clear that the HTMT ratios of all constructs are below the 0.90 threshold. This helps avoid the issue of multicollinearity (Gold et al., 2001).

Table 2: Discriminant validity: HTMT values of the construct

	Extrinsic Motivation	Interpersonal Trust	Intrinsic Motivation	Knowledge Sharing
Interpersonal Trust	0.563	-	-	-
Intrinsic Motivation	0.415	0.526	-	-
Knowledge Sharing	0.765	0.629	0.818	-
Organisational Culture	0.702	0.863	0.658	0.862

The statistical testing of the structural model is carried out on the relationships of the variables under study. Nonparametric bootstrapping is utilised since the PLS-SEM does not assume the normal distribution of data. Bootstrapping yields the path coefficient value which shows the hypothesised relationships of variables (Akintunde, 2012). Thus, the larger the path coefficient value, the greater the effect of the independent variable on the dependent variable. To examine the standard error of coefficient estimates, the path coefficients are tested for statistically significant by observing the p-value and t-value. The hypothesis is statistically significant if the theoretical t-values are 1.645 and above for a 10% probability error, 1.960 and above for a 5% probability error, and 2.576 and above for a 1% probability error.

Table 3: Path coefficient

Hypothesis	Relationship	β (Path Coefficient)	t-value	p-value

H1	Extrinsic motivation is positively related to knowledge sharing	0.351	4.265	0.000*
H2	Intrinsic motivation is positively related to knowledge sharing	0.417	3.852	0.000*
H3	Interpersonal trust is positively related to knowledge sharing	-0.003	0.024	0.981
H4	Organisational culture is positively related to knowledge sharing	0.205	1.837	0.066**

Note: Path significance: * P < 0.01: significant at 1% (probability error of 1%)
** P < 0.10: Significant at 10% (probability error of 10%)

Results from Table 3 show that the hypothesised relationships are found to be significant and with appropriate signs, with the exception of the relationship between interpersonal trust and knowledge sharing. This finding is similar to those of Li (2005), Kim and Lee (2006), Chow and Chan (2008) and Chiu et al. (2006) as they all seem to also discover that the relationship between interpersonal trust and knowledge sharing behaviour is insignificant. Li (2005) explained that it is because people are too concerned about the misuse of knowledge disclosure. Another possible explanation by Chiu et al. (2006) is that individuals only share knowledge when there is fairness in knowledge exchange and also frequent interaction resulting from close relationships (Chiu et al.). also claimed that trust is only crucial in highly risky knowledge sharing relationships.

This suggests that instead of trying to incorporate interpersonal trust as an independent variable in this framework, it could be established as a mediator instead, connecting organizational culture, intrinsic motivation and extrinsic motivation respectively with knowledge sharing behaviour. In other words, interpersonal trust can be assumed to complement the effects of these independent variables on knowledge sharing behaviour, rather than directly impacting the latter. This is because, as indicated in the earlier section, social relationships and activities are obtained through trust (Hu et al., 2012), which means that students are willing to share knowledge with peers if they are seen to be trustworthy and dependable, expecting the favour will be returned sometime in the future (Park and Lee, 2014; Wang and Hou, 2015). Moreover, the trust factor needs to be established in an organizational setting before knowledge sharing can be intensified.

While both intrinsic and extrinsic motivation are found to have strong effects on knowledge sharing behaviour with 1% significance level, organizational culture has a 10% significance level with a p-value of 0.066. It is acknowledged that the relatively small sample size in this study could have been the reason for the increase in the margin of error in this case, thus reducing the statistical power (Deziel, 2018). These results are also supported by past literature that found that extrinsic motivation (Cabrera et al., 2006; Rutten et al., 2016; Olatokun and Nwafor, 2012), intrinsic motivation (Welschen et al., 2012; Geri et al., 2017; Tangaraja et al., 2015) and organisational culture (Poul et al., 2016) have significant impact on knowledge sharing behaviour.

Subsequently, the *R* square value is established in this research as it shows the variance of outcome when identifying the relationship between the independent and dependent variables (Cohen 1988) as described by the research framework. The *R* squared value of 0.601 in this study which is considered moderate according to Hair et al. (2017), indicates that organizational culture, intrinsic motivation, extrinsic motivation and interpersonal trust explain 60% of the variance of knowledge sharing. This is shown in Table 4.

Table 4: *R* square value of knowledge sharing

Construct Relations	***R* Square**	***R* Square Adjusted**
Knowledge Sharing	0.601	0.600

The subsequent section covers the PLS-MGA which applies a bootstrap-based multigroup analysis technique that tests differences in groups (Hair et al., 2017). This analysis accounts for heterogeneity and considers gender (ie. male and female) as a categorical moderator variable. The number of male and female respondents from the questionnaire survey comprised 41% and 59% respectively. Thus, the outcome of this analysis will determine whether gender differences moderate the relationship between the independent and dependent variables in this research.

The results are presented in Table 5 and there is evidence to show that there is significant differences between groups, whereby intrinsic motivation is a stronger predictor of knowledge sharing for female compared to male. In this case, intrinsic motivation has a p-value of 0.981 which is greater than 0.95. A significant difference between two groups exists if the p-value is more than 0.95 or below 0.05 (Almalki, 2016). This result is supported by many researchers who agree that gender differences can influence knowledge sharing behaviour (Jiang and Hu, 2015; Kathiravelu et al., 2014; Chai et al., 2011). It seems that female have a greater tendency to cultivate the feeling of pride and satisfaction when sharing knowledge with others in order to help them improve their capabilities.

As for Extrinsic motivation, it is a stronger predictor for female as well, with a 10% significant level. However, organizational culture is a stronger predictor for male as opposed to female. Looks like men are more receptive to knowledge sharing in an innovative and visionary culture. This finding is in line with that of other authors who indicated that gender differences can affect the knowledge sharing culture as each gender behaves differently based on their social expectations (Kathiravelu et al., 2014). Thus, men tend to be more social hierarchies while women more network oriented (Jiang and Hu, 2015).

Table 5: PLS-MGA of male and female

Structural Relation	**Gender**	**Path coefficient**	**t-value**	**p-value**	**p-value**
Extrinsic motivation → Knowledge sharing behaviour	Male	0.495	5.155	0.000	0.063***
	Female	0.245	1.854	0.064***	
Intrinsic motivation → Knowledge sharing behaviour	Male	0.163	1.003	0.316	0.981*
	Female	0.597	4.846	0.000*	
Interpersonal trust → Knowledge sharing behaviour	Male	-0.007	0.031	0.975	0.530
	Female	0.004	0.034	0.973	

Organisational culture → Knowledge sharing behaviour	Male	0.364	2.246	0.025**	0.085***
	Female	0.075	0.539	0.590	

Note: Path significance: * P < 0.01: significant at 1% (probability error of 1%)
** P < 0.05: Significant at 5% (probability error of 5%)
*** P < 0.10: Significant at 10% (probability error of 10%)

Conclusion

In general, this findings acknowledges the fact that a positive relationship exists between the independent variables, such as intrinsic motivation, extrinsic motivation and organizational culture, and the dependent variable, which is knowledge sharing behaviour. Thus, knowledge sharing can be looked upon as an important tool that increases productivity through group discussions and teamwork.

The significant contributions of this study to the authorities of educational institutions are as follows. Since intrinsic motivation is found to have the greatest impact on knowledge sharing behaviour among students, authorities are encouraged to empower students to share knowledge in a creative environment by thinking out-of-the-box during classroom activities. Moreover, authorities should create the culture of knowledge sharing within the institution since organisational culture is also found to significantly impact knowledge sharing behaviour. One such method is by creating online learning space, which allows students to connect and interact by sharing information. Moreover, since extrinsic motivation also largely impacts knowledge sharing, authorities are encouraged to provide rewards in class, such as bonus marks in order to prompt students to participate in knowledge sharing.

Overall, it is crucial for authorities to identify the underlying factors that affect students' knowledge sharing behaviour since this attribute adds value to all stakeholders, namely students, educational institutions and firms.

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Appendix 1: Measure of constructs

Constructs	Questions based on the questionnaire survey	Reference (Adopted from)
Knowledge Sharing Behaviour	KS1. My friends and I share knowledge and viewpoints with each other.	Chennamaneni (2006); Shih (2011)
	KS2. I believe that knowledge sharing among friends has a positive impact.	
	KS3. I am aware of the importance of sharing knowledge with my friends.	
	KS4. I often provide my opinions during discussions with my friends.	
Extrinsic Motivation	EM1. I will share knowledge if I could gain some monetary rewards by doing so.	Chennamaneni (2006)
	EM2. When I share knowledge with my friends, I expect them to do the same for me.	

	EM3. When I share knowledge with my friends, I believe that my queries for knowledge will be answered in the future.	
	EM4. I know that my friends help me in my daily activities. As such, it is only fair to help them out when they are in need of knowledge.	
	EM5. My friends respect me when I share knowledge with them.	
	EM6. Knowledge sharing among friends will strengthen the ties between my group members and myself.	
	EM7. My knowledge sharing would get me well-acquainted with new friends.	
Intrinsic Motivation	IM1. I always do my best to assist my friends.	
	IM2. I enjoy seeing my friends benefit from knowledge sharing.	
	IM3. I enjoy assisting my friends in learning.	
	IM4. I enjoy sharing knowledge with my friends.	
	IM5. It feels good to help my co-workers solve their work related problems.	
Interpersonal Trust	IT1. I feel the information received from my friends is trustworthy.	Shih (2011)
	IT2. If I face difficulties in my studies, I know that my friends will help me out.	
	IT3. I believe that my friends will not take advantage of me.	
	IT4. I think my friends are sincere about sharing knowledge.	
	IT5. Sharing knowledge with friends will not cause me to lose my competitiveness.	
Organisational Culture	1. The structure of university or college enables interaction and the sharing of knowledge.	Mueller (2014); Molose and Ezeuduji (2015)
	2. My friends support knowledge and technical information sharing.	
	3. During our spare time, my friends socialize and participate in social activities.	
	4. I coordinate studies by directly communicating with knowledgeable friends.	
	5. My friends have a strong sense of participation in knowledge sharing.	
	6. In university or college, there is always someone to address academic problems.	