

# The Impact of Motivation, Trust, and National Cultural Differences on Knowledge Sharing within the Context of Electronic Mail

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**Abstract**—The goal of this research is to examine the impact of trust, motivation, and national culture on knowledge sharing within the context of electronic mail. This study is quantitative and survey based. In order to conduct the research, 200 students from a leading university in New Zealand were chosen randomly to participate in a questionnaire survey. Motivation and trust were found to be significantly and positively related to knowledge sharing. The research findings illustrated that face saving, face gaining, and individualism positively moderates the relationship between motivation and knowledge sharing. In addition, collectivism culture negatively moderates the relationship between motivation and knowledge sharing. Moreover, the research findings reveal that face saving, individualism, and collectivism culture positively moderate the relationship between trust and knowledge sharing. In addition, face gaining culture negatively moderates the relationship between trust and knowledge sharing. This study sets out several implications for researchers and practitioners. The study produces an integrative model that shows how attributes of national culture impact knowledge sharing through the use of emails. A better understanding of the relationship between knowledge sharing and trust, motivation, and national culture differences will increase individuals' ability to make wise choices when sharing knowledge with those from different cultures.

**Keywords**—Knowledge sharing, motivation, national culture, trust.

## I. INTRODUCTION

KNOWLEDGE sharing has been widely identified as a key factor for sustained competitive advantage in a rapidly changing environment [1]-[3]. This research further expands our understanding of the impact of trust, motivation, and national cultural differences on sharing knowledge within the context of electronic mail communication.

Definitions of knowledge have been discussed broadly in the knowledge management literature. For example, knowledge can be defined as the intersection of information, experience, and theory [4]. This definition implies that knowledge can be broken down into explicit and tacit knowledge according to the way it is shared between individuals [5], [6].

Tacit knowledge is hard to capture and equally challenging to convert to useful information [6]-[8]. Tacit knowledge is mainly related to the formation of central beliefs, and automated, unconscious processes [9]. It is an outcome of social activities between individuals and groups [10]. To look

at it another way, tacit knowledge is constructed from an individual's know-how, along with contextual elements added through experience and interaction [11]. In other words, it involves individual experiences, beliefs, perspectives, and values.

Explicit knowledge refers to knowledge that can be expressed in words or documents [12], and shared in data forms such as scientific formulae, specifications, manuals, and the like [13], [14]. This kind of knowledge can be readily transmitted between individuals both formally and informally [15]. This research focuses mainly on explicit knowledge, and more specifically on explicit knowledge sharing through email.

National culture can play a mediating role that either facilitates or inhibits knowledge sharing between individuals [16]-[18]. As a result, research into how national culture impacts individuals in the context of knowledge sharing will be fruitful, as the findings will help to provide insights into the effects of national culture and enhance knowledge sharing strategies and policies. Understanding such effects can simplify interaction in a multicultural setting, and thus improve social interaction. Despite growing recognition of the importance of national cultural differences, and the use of electronic mail to share knowledge, there is a lack of empirical research into the relationship between these two areas. To address this gap, this empirical study attempts to answer the following research questions: "What is the impact of motivation and trust on sharing knowledge, and how does national culture moderate this relationship?"

The paper proceeds as follows. In the next section the theoretical model linking motivation, trust, knowledge sharing, and the moderating effect of national cultures is illustrated. Then, relevant literature on the impact on knowledge sharing of motivation, trust, and national culture differences is reviewed. Next, the research methodology and design of the study are presented, followed by the findings and discussion sections. The paper closes with a discussion of the results and conclusion.

## II. LITERATURE REVIEW

### A. Sharing Knowledge between Individuals

People commonly seek out friends and co-workers to get advice on dealing with their problems on the job. This tendency involves motivation, which plays a pivotal role in successful knowledge sharing between individuals [19].

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Motivational antecedents can be broken down into internal and external factors [20]-[22]. Internal factors include the perceived value and benefit of possessed knowledge. External antecedents include relationship rewards, for example, mutual trust with the recipient in exchange for sharing.

The theoretical model linking trust and motivation for knowledge sharing, as well as the moderating effect of national cultures, is illustrated in Fig. 1 and further illustrated in the following sub-sections.

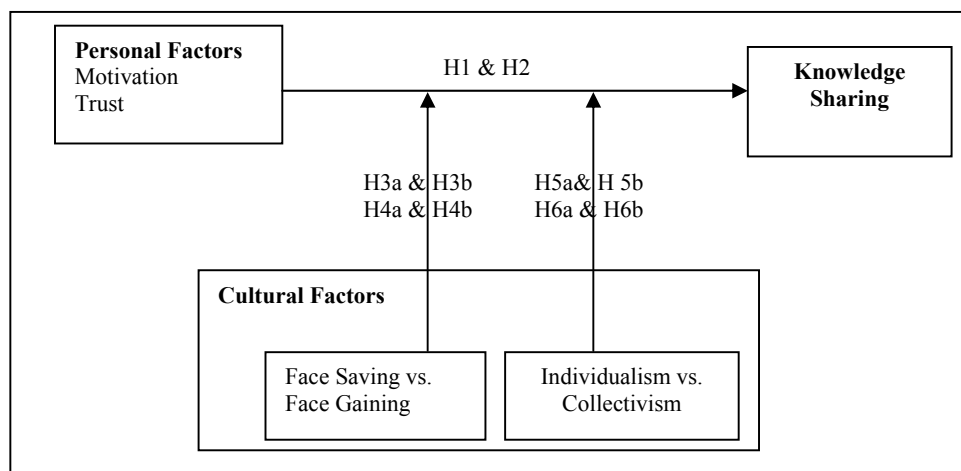


Fig. 1 Model of knowledge sharing between individuals

Previous research has insisted that intrinsic motivation has positive impacts on the sharing of knowledge [23]-[26]. In addition, previous research has offered a range of arguments regarding the effects of extrinsic motivation on the sharing of knowledge. Some studies affirm that extrinsic incentives motivate knowledge sharing [27], [28], while others argue that such incentives impact knowledge sharing negatively [20], [29].

If individuals perceive that they can obtain power from the knowledge they have, or that their knowledge can keep their position at work safe, this perception is likely to lead to knowledge hoarding [30]. An individual will not often be motivated to share his/her knowledge when the knowledge is regarded as essential and when there is the fear of losing possible advantages [20]. In addition, it is suggested that a lack of proper reward mechanisms is another reason why people are not motivated to share their knowledge with others [31]. Therefore, it is expected that where there is a higher level of motivation, there will be greater knowledge sharing. Although several studies argue that motivation factors are crucial determinants of knowledge sharing, there is no significant body of empirical research that assesses the impact of motivation on knowledge sharing via email. Hence, this study proposes the following hypothesis:

**H1.** Increased motivation to share knowledge exerts a positive impact on knowledge sharing through email.

Another factor that encourages individuals to share knowledge is trust. Trust can be defined as maintaining reciprocal faith in each other in terms of intentions and behaviors [32]. Trust can be defined as a belief that another individual will make an effort to achieve commitments, is honest, and will not take unfair advantage of opportunities [33], [34]. Trust has been found to enable knowledge sharing

in different settings, including within team interactions [35]-[37].

Many researchers illustrate that trust is central to knowledge sharing by individuals in an organization [38]-[41], and that in the absence of trust, even formal knowledge sharing practices are ineffective [42]. It is confirmed that high levels of worker trust can cause better knowledge sharing [43], [44]. It is believed that an individual's evaluation of the trustworthiness of another actor, together with that actor's appropriateness and credibility, form psychosocial filters that allow or inhibit an individual's knowledge sharing [42]. Therefore, when a critical degree of trust does not exist and when opportunities for social communication are limited, people may not be keen to share their knowledge via information technology systems. Therefore:

**H2.** Trust has a positive impact on knowledge sharing through the use of email.

### B. The Impact of National Culture on Sharing Knowledge

In order to investigate the impact of national culture differences on knowledge sharing, this study focused on some of the most salient attributes of national cultures. These attributes are: gaining face, saving face [45], and individualism-collectivism [46], [47]. These dimensions of national culture have been identified in studies such as [45]-[47], and are commonly seen as basic values that distinguish members of different cultural groups.

### C. Gaining Face and Losing Face

The literature indicates that one particular cultural attribute is very significant for sharing knowledge, namely, face [48], [45]. Face is the image that people strive to maintain before others in pursuit of recognition and inclusion [45]. The loss and gain of face cannot be examined without considering the

social interaction context. People need to develop certain skills to continue to enhance their face. Since knowledge sharing is a type of social activity, it should be affected by face to some extent.

It has been suggested that the desire to save face is a barrier to knowledge sharing [49]. People feel that they will lose face if they display their deficiencies in public. The realization of having lost face might make people feel embarrassed and disrespected by others. Since people attach significance to their own face, they will try their best to secure it. In order to avoid losing face, people will constrain their behavior as much as possible [50], even to the extent of avoiding contact with others [51]. Thus, during the knowledge sharing process, if individuals are afraid of sharing knowledge that they believe might be 'wrong'-thereby displaying their ignorance in such a way that would make them feel a loss of face-they are likely to be less motivated to participate in knowledge sharing activities. The researcher has noticed that although the concern for face is encountered in many cultures across the globe, it is a particularly important concern in a collectivistic culture, such as the Chinese culture, and that this concern can limit collectivists' motivation to share some kinds of knowledge [48]. It is clear from the previous discussion that the desire to save face does not encourage individuals to share knowledge. Therefore, the following hypotheses are proposed:

**H3a.** *Face saving moderates the relationship between motivation and knowledge sharing such that it will have a negative impact on the relationship.*

**H3b.** *Face saving moderates the relationship between trust and knowledge sharing such that it will have a negative impact on the relationship.*

Face gaining has been explained by numerous researchers. For example, it is believed that face gaining motivates individuals to provide help to others [52]. It is argued that one significant method by which one can gain face in order to accord with the expectations of others is self-expression [51]. It is confirmed that individuals concerned with gaining face will be more motivated to share knowledge [45]. Furthermore, it is found that people who focus on gaining face are more likely to demonstrate their ability and share knowledge [51]. Therefore, the following hypothesis is suggested for testing:

**H4a.** *Face gaining moderates the relationship between motivation and knowledge sharing such that it will have a positive impact on the relationship.*

People generally go to friends to get advice on dealing with problems on the job. This tendency involves trust, which is an important factor for knowledge sharing among individuals [42], [43]. It is believed that culture facilitates active knowledge sharing among individuals and that trustworthy behavior enhances communication speed by empowering individuals to freely share personal knowledge and concerns [53]. Building trust helps deal with the fear of losing face [54] and encourages individuals to share knowledge [55]. This relationship between trust and knowledge sharing is further enhanced by the desire of the individual to 'show their knowledge' in order to gain face. Hence, this study proposes the following hypothesis:

**H4b.** *Face gaining moderates the relationship between trust and knowledge sharing such that it will have a positive impact on the relationship.*

#### *D. Individualism/Collectivism*

The individualism-collectivism cultural dimension has become one of the most significant constructs identifying cross-cultural variation in values, attitudes, and behaviors [56]. Individualism is characterized by the tendency of people to place personal goals ahead of the goals of a larger social group, such as the organization [57]. They tend to engage in knowledge sharing behaviors with the express purpose of self-gain. For this reason, individualists are motivated to share knowledge with the expectation that they will gain from it similar, reciprocal behavior on the part of others. Hence, this study proposes the following hypothesis:

**H5a.** *Individualism moderates the relationship between motivation and knowledge sharing such that it will have a positive impact on the relationship.*

Few scholars formally link individualism with trust; in fact, many believe that trust is low in individualist societies. A general theme is that because individualists have a less interdependent world view, they place less significance on relationships and nurture them with less attention than collectivists tend to [57]. This discussion leads to proposing the following hypothesis:

**H5b.** *Individualism moderates the relationship between trust and knowledge sharing such that it will have a negative impact on the relationship.*

In contrast, collectivism is the degree to which people prefer to behave as members of a group rather than as individuals. In a collectivist culture, members prefer to maintain harmony and relationships. Therefore, with reference to sharing knowledge, collectivism has been viewed as the subordination of personal objectives to those of the group [58]. Members of collectivistic cultures tend to concentrate on the requirements of the various collectives they belong to, which is why they might be more motivated to share what they know with other members of the same collectives. Cross-cultural literature suggests that members of collectivist cultures tend to be open and keen to share their knowledge with members of their in-group [48]. Hence, their motivation to share knowledge more widely is inhibited, and it is suggested that collectivistic cultures will negatively moderate the relationship between motivation and knowledge sharing. Therefore, the following hypothesis is posed:

**H6a.** *Collectivism moderates the relationship between motivation and knowledge sharing such that it will have a negative impact on the relationship.*

Discussing the impact of group membership on knowledge sharing, it is described how in China, one's membership of in-groups impacts all daily activities [59]. It is suggested that the in-group is the source of identity and protection, and the center of loyalty, and in exchange for such loyalty, information can be expected to be shared within the group but be restricted to those considered outside the group [60]. It is also found that collectivism has a dual impact on knowledge sharing [61]. On

the one hand, collectivism facilitates knowledge sharing in tightly knit in-groups [62]. On the other hand, however, collectivism reduces the sharing of knowledge with out-group members. Hence, collectivistic cultures will positively moderate the relationship between trust and knowledge sharing. Consequently, the following hypothesis is proposed for testing:

**H6b.** *Collectivism moderates the relationship between trust and knowledge sharing such that it will have a positive impact on the relationship.*

### III. RESEARCH METHODOLOGY AND DESIGN

A survey can be an efficient and effective tool for gathering data on human attitudes, behavior and characteristics [63], and so, a questionnaire survey was used to collect data to test the suggested hypotheses. Prior to administering the survey, ethics

approval was obtained. Emails were next sent to students inviting their participation. The email and paper surveys attracted 212 responses, some of which were invalid on the grounds of being incomplete. After removing these invalid submissions, 200 valid responses remained for further analysis. The study focused on Chinese and European students who were studying in the Management School of a New Zealand University.

#### A. Survey Development and Design

The items used in this survey were adopted from previous studies (see Table I). The responses were recorded along a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). In addition to the variables under study, four control variables were included: gender, age, ethnic group, and educational level.

TABLE I  
 STRUCTURE OF THE SURVEY INSTRUMENT

Factors	Items	References
Trust	I can trust the students I work with to lend me a hand if I need it.	[64]
	I believe that other students are honest and reliable.	
	I believe that other students are knowledgeable and competent in their areas.	
Personal motivation	I enjoy sharing my knowledge with other students.	[65]
	I enjoy helping students by sharing my knowledge.	
	Sharing my knowledge with classmates is pleasurable.	
Gaining face	I like to share my knowledge in public, because it will help me gain face.	[66], [67]
	I feel comfortable about asking questions.	
Saving face	Sharing knowledge with other students will help me gain face.	[66], [67]
	I pay a lot of attention to how others see me.	
	I feel a loss of face when others turn down my ideas.	
Individualism	I prefer to solve minor problems by myself, without seeking help from others.	[67]-[69]
	I don't like to rely on other people.	
	It is important that I do my task better than others.	
Collectivism	My personal identity, independent of others, is very important to me.	[70]
	When another person does better than I do, I get tense and aroused.	
	I am willing to share knowledge that I control with other members of my study group.	
Knowledge sharing	Information held by study groups should be shared with other study groups.	[67], [71]
	I give priority to the goals of the larger group I belong to.	
	I like to be kept fully informed of what my colleagues know.	
	When I need certain knowledge, I ask my colleagues about it.	
	I regularly inform my colleagues of what I am working on.	
	I share knowledge that I have acquired with my colleagues.	
When a colleague is good at something, I ask him/her to teach me.	[72]	
When I have learned something new, I make sure my colleagues learn about it too.		

#### B. Measures

The Predictive Analysis Software (PASW) was used to analyze the survey data. The first stage was to prepare the data for analysis. The data for the dependent, independent, and control variables were first input into an Excel spread sheet and then exported into PASW. The independent variables are trust, motivation, face gaining, face saving, individualism, and collectivism. The dependent variable is knowledge sharing. In addition, this research contains four control variables: gender, age, ethnic group, and educational level.

#### C. Reliability of the Instruments

Internal reliability measures of the scales were obtained through the use of Cronbach's alpha. Table II shows the internal reliability for all scales used in the study. Reliabilities were above the cut off level of 70 %.

TABLE II INTERNAL RELIABILITIES FOR ALL SCALES	
Scale	Cronbach's Alpha ( $\alpha$ )
Trust	.883
Motivation	.869
Gaining Face	.874
Saving Face	.874
Individualism	.874
Collectivism	.897
Knowledge Sharing	.877

#### D. Correlations

The researcher broadly undertook correlation analysis between all variables in the model. A summary of correlations between all variables in the conceptual framework is presented in Table III.

The research findings illustrate that the correlation between knowledge sharing and personal motivation is the highest at p

<0.01,  $r = 0.797$ . The high positive correlation between knowledge sharing and motivation indicates that students who

have higher motivation to share knowledge are more likely to engage in this activity. This correlation supports hypothesis 1.

TABLE III  
CORRELATION MATRIX

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11
1. Trust	3.76	1.694	1										
2. Motivation	3.69	3.012	.132	1									
3. Gaining fac.	3.27	2.232	-.029	.539**	1								
4. Saving face	3.11	2.007	.001	.547**	.705**	1							
5. Individualism	3.25	2.336	-.098	.556**	.693**	.688**	1						
6. Collectivism	3.94	1.996	.153*	-.274**	-.474**	-.501**	-.515**	1					
7. Kno. sharing	3.58	.885	0.270**	0.797**	0.748**	0.734**	0.741**	-0.218**	1				
8. Gender	1.51	.501	.152*	.000	-.090	.044	-.079	.034	.057	1			
9. Age	1.69	.888	.104	.160*	.178*	.102	.141*	.015	.137	-.064	1		
10. Ethnicity	1.45	.499	.083	-.526**	-.651**	-.667**	-.699**	.573**	-.290**	.031	-.035	1	
11. Education	1.29	.453	.115	.140*	.137	.083	.152*	-.002	.237**	.049	.684**	.008	1

The correlation between trust and knowledge sharing was also significant at  $p < 0.01$ ,  $r = 0.27$ , and this finding supports research hypothesis 2. In summary, significant correlations between the dependent and independent variables justified taking the next step and performing a regression analysis.

#### E. Multiple Regression Analyses

Multiple regressions were used in order to test hypotheses 3a, 3b, 4a, 4b, 5a, 5b, 6a, 6b. The results of the regression analyses are presented in Table IV. In the first step, the researcher included all the control variables: age, level of education, ethnicity, and gender. In the second step, all the interaction variables were included in the equation. The results show that when the main variables were added, the model (Step 2) accounted for an additional 57.3 % of the variance in knowledge sharing ( $\Delta R^2 = 0.573$ ,  $p < 0.001$ ) (see Table IV). Furthermore, gender, age, and educational level did not produce any significant effect in the analysis in Step 2, whereas ethnic group did have a significant effect.

The results of multiple regression analyses for the relationship between motivation and knowledge sharing and the moderating effect of national culture are illustrated in Table IV. Consistent with the theorization, research finding revealed a significant and positive relationship between motivation and knowledge sharing ( $\beta = 0.370$ ,  $p < 0.001$ ) once again establishing hypothesis H1. Four hypotheses suggesting moderating effects relating to national culture were tested. The first predicted that face saving negatively moderates the relationship between motivation and knowledge sharing (H3a). Contrary to expectation, face saving positively (not negatively) moderates the relationship between motivation and knowledge sharing ( $\beta = 0.547$ ,  $p < 0.001$ ). The second predicted that face gaining positively moderates the relationship between motivation and knowledge sharing (H4a). This hypothesis was supported ( $\beta = 0.539$ ,  $p < 0.001$ ). The third predicted that individualism positively moderates the relationship between motivation and knowledge sharing (H5a). This hypothesis was supported ( $\beta = 0.556$ ,  $p < 0.001$ ). The fourth predicted that collectivism negatively moderates the relationship between motivation and knowledge sharing

(H6a). As expected, this hypothesis was supported ( $\beta = -0.274$ ,  $p < 0.001$ ).

TABLE IV  
RESULTS OF REGRESSION ANALYSIS WITH ALL STANDARDIZED PREDICTOR AND MODERATOR VARIABLES

Variables	Knowledge sharing	
	Step 1	Step 2
Gender	.011	.003
Age	.089	-.003
Ethnic Group	-.600***	-.135***
Educational Level	.164*	.038
Face Gaining		.344***
Face Saving		.272***
Individualism		.337***
Collectivism		.252***
Trust		.266***
Motivation		.370***
Trust × Face Gaining		-.029
Trust × Face Saving		.001
Trust × Individualism		-.098
Trust × Collectivism		.153*
Motivation × Face Gaining		.539***
Motivation × Face Saving		.547***
Motivation × Individualism		.556***
Motivation × Collectivism		-.274***
F	34.766 ***	1235.135***
R <sup>2</sup>	.416	.989
Adjusted R <sup>2</sup>	.404	.989
$\Delta R^2$	.416	.140

\*\*\* $p < 0.001$ , \* $p < 0.05$ . Note:  $\beta$  estimates are standardized regression coefficients.

The results of the multiple regression analyses for the relationship between trust and knowledge sharing and the moderating effect of national culture are shown in Table IV. Consistent with the theorization, trust was found to be significantly positively related to knowledge sharing ( $\beta = 0.266$ ,  $p < 0.001$ ), once again providing evidence for hypothesis H2. Four hypotheses were suggested for the moderating effect of national culture. The first predicted that the relationship between trust and knowledge sharing would be negatively

moderated by face saving (H3b). This proposition was not supported ( $\beta = 0.001$ ,  $p = 0.493$ ). The second predicted that face gaining would positively moderate the relationship between trust and knowledge sharing (H4b). This hypothesis was not supported ( $\beta = -0.029$ ,  $p = 0.340$ ). The third predicted that individualism would negatively moderate the relationship between trust and knowledge sharing (H5b). This hypothesis was not supported ( $\beta = -0.098$ ,  $p = 0.083$ ). The fourth predicted that the relationship between trust and knowledge sharing would be positively moderated by collectivism (H6b). This hypothesis was weakly supported ( $\beta = 0.153$ ,  $p < 0.05$ ). A summary of the analysis results is shown in Table v.

TABLE V  
SUMMARY OF RESULTS OF HYPOTHESES TESTING

Hypotheses	Decision
H1: Increased motivation to share knowledge among students exerts a positive impact on knowledge sharing.	Accepted
H2: Increased trust among students has a positive impact on sharing knowledge.	Accepted
H3a: Face saving moderates the relationship between motivation and knowledge sharing such that it will have a negative impact on the relationship.	Rejected (opposite direction)
H3b: Face saving moderates the relationship between trust and knowledge sharing such that it will have a negative impact on the relationship.	Rejected
H4a: Face gaining moderates the relationship between motivation and knowledge sharing such that it will have a positive impact on the relationship.	Accepted
H4b: Face gaining moderates the relationship between trust and knowledge sharing such that it will have a positive impact on the relationship.	Rejected
H5a: Individualism moderates the relationship between motivation and knowledge sharing such that it will have a positive impact on the relationship.	Accepted
H5b: Individualism moderates the relationship between trust and knowledge sharing such that it will have a negative impact on the relationship.	Rejected
H6a: Collectivism moderates the relationship between motivation and knowledge sharing such that it will have a negative impact on the relationship.	Accepted
H6b: Collectivism moderates the relationship between trust and knowledge sharing such that it will have a positive impact on the relationship.	Weakly Supported

#### IV. DISCUSSION OF THE RESULTS AND CONCLUSION

As expected, motivation and trust were found to be positively and significantly related to knowledge sharing using electronic mail. This finding supports the existing knowledge management literature on motivation [23], [25], [19], [26], and on trust [38]-[40], [73].

The study presented the researcher with some surprising results. Contrary to expectation, face saving moderated the relationship between motivation and knowledge sharing positively and not negatively. This unexpected result may be because the participants in the study were university students engaged in a learning environment. Perhaps, for students, there is a greater danger in losing face when they fail an assignment, and this fear of failure may drive their motivation to share knowledge and to expect reciprocity.

A number of the hypotheses were not supported in the study. The study shows that face saving, face gaining, and individualism have non-significant moderating effects on the

relationship between trust and knowledge sharing, suggesting perhaps that increasing levels of trust build affective bonds between individuals and that this relationship building may mitigate the fear of losing face, reduce the need for face gaining, and remove any tendency to behave individualistically.

This study makes several contributions. It contributes to the theory of knowledge management by developing and testing an integrative model of knowledge sharing that incorporates salient characteristics of national culture in the knowledge sharing context. Specifically, this study provides a better understanding of the nature of knowledge sharing, and the influence of motivation, trust, and national cultural factors.

In addition to the theoretical contribution, this study also has practical implications. First, the results may provide practitioners with new ideas on how to improve current practices, or even serve as a warning against particular practices in certain contexts. Secondly, practitioners must take into consideration the fact that knowledge sharing can happen only when individuals are motivated to share their existing knowledge. Therefore, practitioners must facilitate positive perceptions of knowledge sharing among individuals by indicating to them that their knowledge sharing makes a significant contribution to their own performance and to that of their organizations. Thirdly, the research can more fully inform practitioners of the critical success factors that enable individuals of different cultures to share knowledge with one another effectively.

This study has several limitations. First, the study considers only students whose collaborative, educational, and learning context is quite different from other contexts, such as organizational settings. Future studies could be undertaken to incorporate multiple contexts when testing the proposed model. Second, the study considers only one form of knowledge, i.e. explicit knowledge. Future studies may want to consider both explicit and tacit knowledge sharing.

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