

# EFFECTS OF TRANSFORMATIONAL LEADERSHIP ON TACIT KNOWLEDGE SHARING: MEDIATING ROLES OF TRANSACTIVE MEMORY SYSTEM AND TURNOVER INTENTION

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## ABSTRACT

*With the recovery of the economy, employee turnover intention will increase correspondingly, and employee turnover will impact the loss of tacit knowledge which could be critical for organizations. Thus, it is important to study how to maintain tacit knowledge in the organization. To contribute literature in this area, this paper studies the impact of employee turnover intention on tacit knowledge, which, in turn, helps scholars to gain knowledge sharing based on social exchange theory from different perspectives. To do so, we use transformational leadership factor in leadership theory and transactive memory system factor based on social exchange theory to expand the research of tacit knowledge sharing. We find that turnover intention and transactive memory systems play mediating roles between transformational leadership and tacit knowledge sharing. Our study expands the work by existing literature on tacit knowledge sharing with certain theoretical significance and enriches the theoretical research literature in the field of tacit knowledge research. Our findings have practical significant contributions for organizations to obtain valuable knowledge management which, in turn, enhance the continuation of tacit knowledge.*

**Keywords:** Tacit Knowledge Sharing, Turnover Intention, Transformational Leadership, Transactive Memory System, Structural Equation Modeling

## INTRODUCTION

Since the slowdown of the global economy in 2020, China has become the first major economy to see economic recovery (Wang & Zhang, 2021). The economic recovery has encouraged higher turnover intention of employees (Ilmakunnas & Maliranta, 2003). According to the newest statistics, the USA has an average turnover rate of 13%-24% appropriately in the high-tech software industry, for example, 13.3% in the IT & computer software sector and 23.7% in terms of embedded software engineers (Booz, 2018). The turnover rate in the high-tech industry of China was 20.6% in 2019. LinkedIn made an analysis on 500 million worldwide professionals and found that the highest turnover rate occurred among technology (software) professionals (Booz, 2018).

Employee turnover can produce serious impacts as they will take away all their working knowledge and experience while leaving their workplace (Urbancová & Linhartová, 2011; Wan & Mohammad, 2016). When an employee leaves an enterprise, the enterprise loses not only human capital but also the knowledge accumulated by the employee, both explicit and tacit (Labarre, 1998). Employee turnover will result in a serious loss of tacit knowledge (Wan & Mohammad, 2016). Knowledge can be classified into explicit knowledge and tacit knowledge

by its representation forms (Polanyi, 1962). Contrary to explicit knowledge, scholars considered tacit knowledge as the knowledge that is hard to transfer to others in written or verbal form (Ryan & Connor, 2013). Companies need to retain all types of knowledge of employees to preserve the wealth of the company (Branch, 1998). Transformational leaders can promote teams to accept professional knowledge through a transactive memory system (Peltokorpi & Hasu, 2011).

Employee turnover will seriously affect the tacit knowledge and competitiveness of enterprises (Wan & Mohammad, 2016). Knowledge loss can be a potential threat to the survival of an organization (Urbancová & Linhartová, 2011). Therefore, the continuation of tacit knowledge is taken in this study as a potential method for eliminating the threat in order to keep the competitiveness of an organization. This study provides different perspectives in the field of tacit knowledge sharing. Academically, tacit knowledge sharing helps scholars review knowledge sharing based on social exchange theory from different perspectives. With the discussion of tacit knowledge sharing, this study discusses more other related factors, such as transformational leadership, turnover intention, and transactive memory system. This study introduces transformational leadership factors in transformational leadership theory and transactive memory system factors based on social exchange theory to expand the research of tacit knowledge sharing. In short, under the background of economic recovery and the rising turnover intention of employees, the influence of transformational leadership and transactive memory system on tacit knowledge sharing is studied as one of the means to retain the tacit knowledge in the organization.

## LITERATURE REVIEW, BACKGROUND THEORY AND HYPOTHESES

### Tacit Knowledge Sharing

Tacit knowledge sharing is critical to individuals and organizations (Panahi et al., 2012). Tacit knowledge sharing and transfer play a vital role in local and global economic development. In the 21st century, knowledge has become an important asset for organizations. Therefore, it is necessary to be aware of the importance of tacit knowledge sharing in organizations (Mohajan, 2016). Tacit knowledge sharing may bring risks to individuals, such as losing the competitive advantage with peers (Leonard & Sensiper, 1998). Interpersonal trust among colleagues and the reputation of colleagues may limit tacit knowledge transfer (Lucas, 2005). Organizational management should respect the fact that tacit knowledge is the intellectual property of employees. Managers should encourage employees to share knowledge with colleagues. Therefore, it is essential to establish a proper organizational atmosphere and a friendly atmosphere, which will promote the sharing of tacit knowledge (Urbancová & Urbanec, 2011). Both emotion-based trust and cognition-based trust are positively correlated with employees' willingness to share tacit knowledge (Holste & Fields, 2010). The psychological connection between transformational leaders and employees can make employees trust leaders (Seto & Sarros, 2016).

### Transformational Leadership

The concept of transformational leadership was introduced by Burns in 1978. As defined by scholars, transformational leaders are able to change the consciousness of their followers, enhance their spirit, and inspire them to do their best to achieve the goals of the organization (Luthans, 2005). Transformational leadership theory has developed and changed its initial focus, from measuring the high ethical behavior of leaders to achieving organizational goals (Hunt, 2017). It was mentioned that transformational leaders with personalized influence characteristics exhibit high ethical behavior, which leads followers to respect and have confidence in their leaders (Yıldız & Şimşek, 2016). The central focus of transformational leaders is to inspire and

motivate their followers to achieve organizational goals (Gregory et al., 2004). Transformational leaders can facilitate teams to receive specialized knowledge through the transactive memory system (Peltokorpi & Hasu, 2011).

### **Transactive Memory System**

As team members interact with each other, team members begin to know what kind of knowledge one has about the team, which is also known as the transactive memory system (TMS) (Wegner, 1987). The transactive memory system is a shared system for encoding, storing, and retrieving the knowledge one has about the team (Kush, 2016). The idea of the transactive memory system is originally explained how to distribute cognitive labor among individuals in intimate relationships so that individuals can take on the responsibility of remembering the collective knowledge they need. (Liang et al., 1995; Gino et al., 2010). Transactive memory does not belong to an individual, it is the property of a group. Cross-memory is complementary. If you ask a person a question, that person can usually answer the question better after consulting with other members of the team. This answer is far beyond the person's own internal information. (Wegner, 1987).

### **Turnover Intention**

The turnover intention was defined as the intention to willfully and cautiously leave an organization (Tett & Meyer, 1993). Turnover intention is a psychological decision between an individual's attitude towards the job and his decision to quit, and it is the direct cause of staying or leaving (Fox & Fallon, 2003). Previous studies have successfully proved that turnover intention and turnover rate have a consistent correlation (Fox & Fallon, 2003). Quite a few people support the view that turnover intention may be the most critical and direct reason for turnover decisions (Chiu & Francesco, 2003). Although the turnover intention is a perception, scholars have proposed that turnover intention is an important indicator of actual turnover, and it is the final stage before employees actually leave (Tett & Meyer, 1993). Blomme et al. (2010) pointed out that reducing the willingness to leave is an effective way to reduce the actual turnover rate of employees.

### **Transformational Leadership and Turnover Intension**

Alatawi (2017) investigated the influencing factors of the turnover intention and transformational leadership style on the employee turnover rate in organizations. Researchers confirmed that transformational leadership style was negatively impacted on turnover intention and suggested that managers with transformational leadership style can be expected to lower turnover rate and remain competitive in an unstable economic environment, further improving productivity and performance (Alatawi, 2017). Kharabsheh et al. (2017) studied the influencing factors of the relationship between turnover intention and transformational leadership on nurses in Jordanian public hospitals, and the mediating effects of organizational culture on turnover intention. Researchers found that transformational leadership is negatively impacted turnover intention (Kharabsheh et al., 2017). Therefore, the following hypothesis is generated from the above findings:

*Hypothesis 1: Transformational leadership has a negative impact on turnover intention.*

### **Turnover Intention and Tacit Knowledge Sharing**

The relationship between turnover intention and knowledge sharing has not been empirically studied. As an experienced structure, Knowledge sharing has not been fully

developed is the main reason (Hislop, 2003). However, the interaction model between knowledge sharing and organizational culture can predict turnover intention (Jacobs & Roodt, 2007). Moreover, researchers confirmed that knowledge sharing and turnover intention have a significant negative relationship. Researchers confirmed that nurses who share knowledge had low turnover intention (Jacobs & Roodt, 2011). The hypothesis that the turnover intention and the tacit knowledge are significantly negatively related was proposed by some researchers but no empirical studies have been conducted. The author indicated that there was a paucity of research literature in this area and called for future researchers to conduct empirical studies (Wan & Mohammad, 2016). The research showed that knowledge sharing could reduce teachers' turnover intention (Srivastava & Pradhan, 2019). Therefore, the following hypothesis is given from the above findings:

*Hypothesis 2: Turnover intention has a negative impact on tacit knowledge sharing.*

### **Transformational Leadership and Transactive Memory System**

Transformational leadership has been proved to be a moderating role between team innovation and transactive memory system because transformational leadership motivates team members to form a professional knowledge system, in which complementary task information items are combined in a novel way. A transactive memory system helps the team to gather task expertise and enhance creativity (Gino et al, 2010). Transformational leaders can enhance team innovation through the transactive memory system, make team members acquire specialized knowledge, and use the specialized knowledge to accomplish innovative tasks (Peltokorpi & Hasu, 2011). Therefore, the following hypothesis is produced from the above findings:

*Hypothesis 3: Transformational leadership has a positive impact on the transactive memory system.*

### **Transactive Memory System and Tacit Knowledge Sharing**

A transactive memory system is a shared mental model in which there is a collaborative division of work for studying, memory, and communication-related team knowledge. The study concluded that since the expert knowledge is mostly tacit, a transactive memory system will be essential for tacit knowledge sharing and acquisition. Researchers conducted questionnaires in Ireland and the UK and found a positive correlation between transactive memory and tacit knowledge (Ryan & Connor, 2013). Moreover, social interaction is not only considered as a necessary condition for expanding transactive memory system (Lewis, 2003), but also closely related to tacit knowledge (Koskinen et al., 2003). Furthermore, researchers studied tacit knowledge integration based on social networks from the perspective of the transactive memory system and found that the transactive memory system has a significant positive impact on tacit knowledge integration (Zhang et al., 2012). Therefore, the following hypothesis is generated from the above findings:

*Hypothesis 4: Transactive memory system has a positive impact on tacit knowledge sharing.*

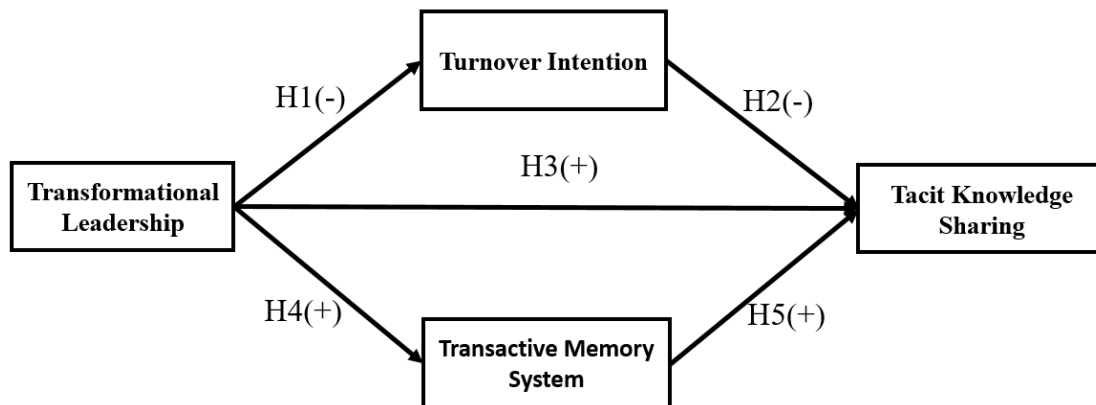
### **Transformational Leadership and Tacit Knowledge Sharing**

Transformational leadership has positive impacts on knowledge sharing (Al-Husseini & Elbeltagi, 2018). Researchers studied the relationship between transformational leadership and organizational climate, employee knowledge sharing behavior, and organizational learning. Researchers found that transformational leadership has direct impacts on knowledge sharing (Kim, 2020). Han et al. (2016) confirmed that transformational leadership has an indirect effect on employees' organizational citizenship behavior, which is considered to be the main factor

affecting knowledge sharing. Taylor et al. (2015) pointed out that tacit knowledge has a correlation between transformational leadership style and transactional leadership style. Mohammadi and Boroumand (2016) confirmed a high correlation between the transformational leadership style and knowledge sharing. Therefore, the following hypothesis is generated from the above findings:

**Hypothesis 5:** Transformational leadership has a positive impact on tacit knowledge sharing.

To sum up, based on the above relationships, the research framework for this study can be developed as shown in Figure 1.



**FIGURE 1**  
**RESEARCH FRAMEWORK**

## RESEARCH METHODOLOGY

### Data Collection and Sample

In order to figure out the correlation between tacit knowledge sharing and transformational leadership, this study adopts the convenience sampling method.

According to Yamane (1967), the sample size is determined by the sample size equation as shown in the following:

$$n = \frac{N}{1 + N \times e^2},$$

where  $n$  is the sample size,  $e$  is the maximum acceptable error (5%), and  $N$  is the total size (Yamane, 1967).

The research scope of this paper is software engineers in China. Beijing, Shanghai, and Shenzhen are the top three cities with the most IT staff in China, and the numbers of IT staff in Beijing, Shanghai, and Shenzhen are about 1.4 million, 700 thousand and 700 thousand respectively (People's Daily, 2020). Thus, the estimated target population is about 2,800,000.

The sample size ( $n$ ) is

$$n = \frac{2800000}{1 + 2800000 \times 0.05^2}.$$

Software engineers in China have technical communications with each other daily through a large number of WeChat groups. In this study, "Sojump" questionnaire, a popular free online questionnaire survey platform in China, was sent to WeChat groups of software engineers in Beijing, Shanghai, and Shenzhen and 400 copies were collected.

### Measurement of Variables

The measurements of the questionnaire in this study are based on previous studies. There are several advantages to using existing scale measurements. Since the existing scales have been tested and verified by other scholars, they are often more reliable than a new measurement method (Bulmer et al., 2006). Using the same measurement method, the results can be compared with other studies using the same scale (Meadows, 2003)

All the main variables in this study were measured with the existing scales and are summarized in Table 1. This study adopted the tacit knowledge sharing scale developed by Bock et al. (2005), including 3 questions. The transactive memory system scale mainly refers to the research of Lewis (2003) to design the questionnaire, which has 15 items. The turnover intention was measured by using the 4 items of the scale which is developed by Kelloway et al. (1999). These items were measured by using a 5-point Likert scale. The measurement of transformational leadership was adopted from the global transformational leadership (GTL) scale developed by Carless, Wearing, and Mann (2000), and 9 items will be measured by a 7-point Likert scale.

<b>Variables</b>	<b>Dimension</b>	<b>Items</b>	<b>Scale</b>	<b>Reliability</b>
Tacit knowledge sharing	/	3	Likert5	0.705
Transactive memory system	Specialization	5	Likert5	0.846
	Credibility	5	Likert5	
	Coordination	5	Likert5	
Turnover intention	/	4	Likert5	0.904
Transformational leadership	/	9	Likert7	0.957

## Statistical Analysis Techniques

This study is based on quantitative research and the focus is to find out the causal relationship between antecedents such as transformational leadership, tacit knowledge sharing, transactive memory system, and turnover intention. This study used structural equation modeling (SEM), and it supplies a comprehensive statistical method to process multiple correlations while doing causal analysis (Hoyle, 2006).

Before running SEM, factor analysis was used to investigate the reliability of measures of each construct with SPSS 19. As shown in Table 1, Cronbach's alpha of 0.705 for tacit knowledge sharing, 0.846 for the transactive memory system, 0.904 for turnover intention, and 0.957 for transformational leadership was achieved, which gave sufficient internal consistency of measures within each construct. All the measurements showed the Cronbach's alpha of exceeding 0.7 in this study.

The data in this paper was tested for suitability for applied factor analysis through KMO and Bartlett's sphericity test. The results show that  $KMO=0.941 > 0.7$  and Bartlett's test of sphericity yielded a significant level of correlation was less than .001. Therefore, this is sufficient for factor analysis (Ho, 2006).

## Hypotheses Testing

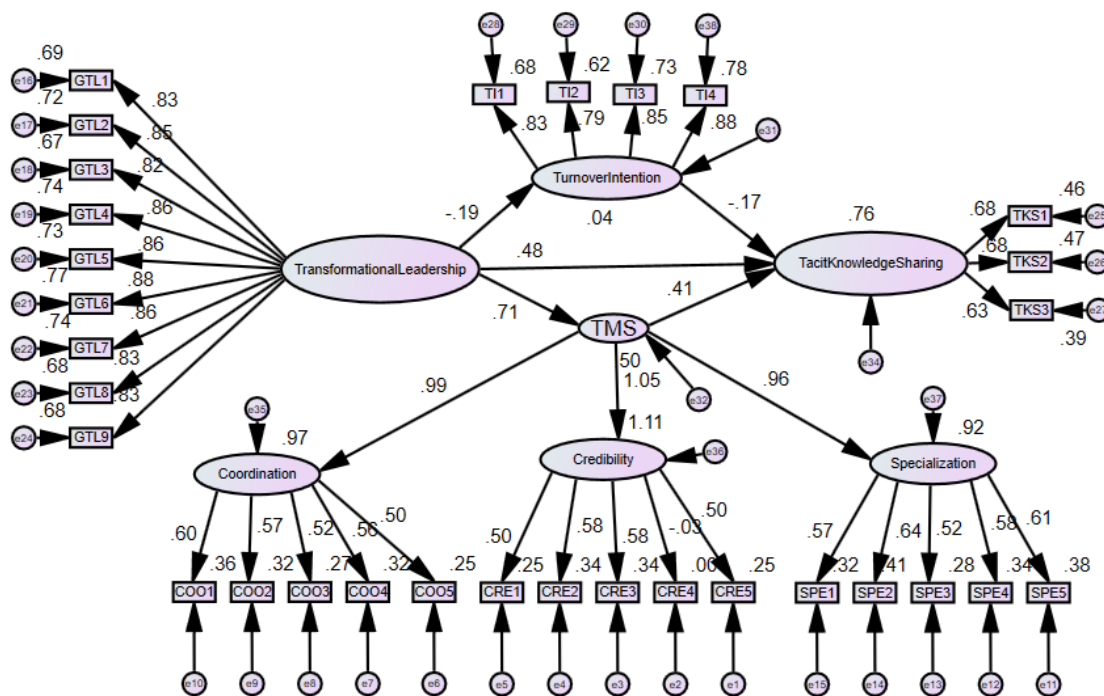
By using AMOS 24, the hypotheses were tested and the fit indices have shown .925 on CFI, .918 on TLI, and .926 on IFI. This indicates that the path model fit well and was acceptable (Ho, 2006). CMIN/DF was 2.194. RMSEA = .055 represented a good fit of the model.

According to Ho (2006), the values ranging between 0.05 and 0.08 show that the model is acceptable, and 0.08-0.10 indicates that the model is moderately fitted.

Table 2 presents the direct influences of determinants to tacit knowledge sharing. All hypotheses are supported.

Hypothesis	Estimate	S.E.	C.R.	P	Support
H1: Turnover intention ← Transformational leadership	-.159	.044	-3.583	***	Yes
H2: Tacit knowledge sharing ← Turnover intention	-.115	.032	-3.605	***	Yes
H3: TMS ← Transformational leadership	.322	.032	10.159	***	Yes
H4: Tacit knowledge sharing ← TMS	.525	.100	5.254	***	Yes
H5: Tacit knowledge sharing ← Transformational leadership	.276	.042	6.530	***	Yes

The running results of Amos in Figure 2 show the output of the standardized correlation coefficient. Transformational leadership has a significant negative effect on turnover intention, and the standardized correlation coefficient  $-0.19$  represents the effect of transformational leadership in explaining the level of turnover intention; turnover intention has a significant negative effect on tacit knowledge sharing, and the standardized correlation coefficient  $-0.17$  represents the effect of turnover intention in explaining the level of tacit knowledge sharing; transformational leadership has a significant positive effect on the transactive memory system, and the standardized correlation coefficient  $0.71$  represents the effect of transformational leadership in explaining the level of the transactive memory system; the transactive memory system has a significant positive effect on tacit knowledge sharing, and the standardized correlation coefficient  $0.41$  represents the effect of the transactive memory system in explaining the level of tacit knowledge sharing; transformational leadership has a significant positive effect on tacit knowledge sharing, and the standardized correlation coefficient  $0.48$  represents the effect of transformational leadership in explaining the level of tacit knowledge sharing.

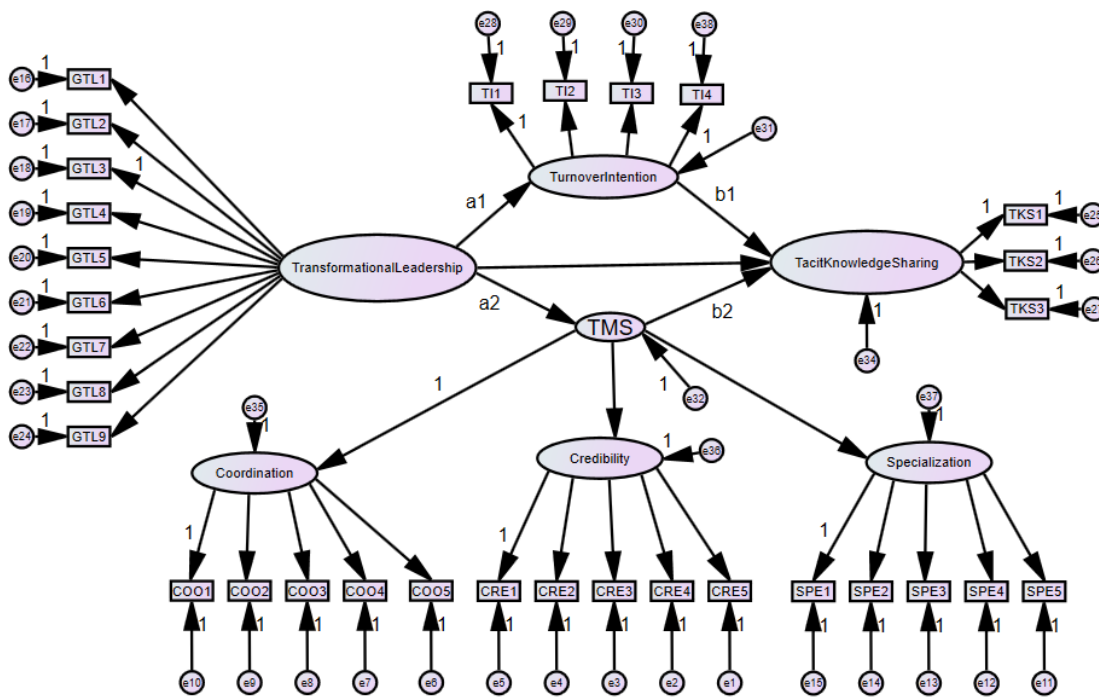


**FIGURE 2  
SEM PATH MODEL OUTPUT**

TMS=Transactive Memory System

The mediating effects were tested in this study. Cheung's (2008) study shows that the bias-corrected bootstrap confidence intervals provided by SEM perform best in the test of mediating effects, and the findings of this study suggest that Amos' BC bootstrap confidence intervals should be used to test the significance of mediating effects. (Cheung, 2008). Based on the Amos model in Figure 2, this study relied on the Amos bootstrap test procedure for mediating effects by Cheung (2008) to test the bootstrap and got the value of two-tailed significance levels for indirect effects .002, which is less than .05 and significant; the value of lower boundaries (BC) for standardized indirect effects is .196 and the value of upper boundaries (BC) for standardized indirect effects is .467, where 0 is not covered in the interval between the two values. According to the findings of the SEM mediating effect test study by Cheung (2008), the mediating effect is considered significant if 0 is not in the confidence interval (Cheung, 2008). The above tests indicate that the transactive memory system and the turnover intention as mediating variables have significant mediating effects on transformational leadership and tacit knowledge sharing.

This study further tested the multiple mediating effects by separately testing the mediating effects of 2 mediating variables inside the same SEM Amos model. Chen and Hung (2016) validated the Bayesian estimation testing method for multiple mediating effects with Amos and concluded that this multiple mediating effect testing method was convenient and effective. In this study, the paths in the Amos model are labeled a1, b1, a2, b2 according to the multiple mediating effect test procedure of Chen and Hung (2016) as shown in Figure 3.



**FIGURE 3**  
**BAYESIAN ESTIMATION IN AMOS FOR MULTIPLE MEDIATORS**

According to the test procedure of Chen and Hung (2016), User-defined estimands should be established in Amos as follows:

$$TL\_TI\_TKS = p.a1 * p.b1$$

$$TL\_TMS\_TKS = p.a2 * p.b2$$



Running the Amos model to test the bootstrap yields the results shown in Table 3, where the Parameter means TL\_TI\_TKS: the mediating effect of turnover intention on transformational leadership and tacit knowledge sharing; TL\_TMS\_TKS: the mediating effect of transactive memory system on transformational leadership and tacit knowledge sharing.

Parameter	Estimate	Lower	Upper	P
TL_TI_TKS	.018	.006	.041	.001
TL_TMS_TKS	.169	.086	.266	.002

As shown in Table 3, the Lower Bounds (BC) of TL\_TI\_TKS is .006 and the Upper Bounds(BC) is .041, where 0 is not covered in the confidence interval; P value = .001 < .05 significant. As explained by Chen and Hung (2016), turnover intention has significant mediating effects on transformational leadership and tacit knowledge sharing. The Lower Bounds (BC) of TL\_TMS\_TKS is .086 and the Upper Bounds (BC) is .266, where 0 is not covered in the confidence interval; P value = .002 < .05 significant. As explained by Chen and Hung (2016), the transactive memory system has significant mediating effects on transformational leadership and tacit knowledge sharing.

### **CONCLUDING REMARKS AND DISCUSSIONS**

Employee turnover will lead to the loss of tacit knowledge from the organization, which will have a serious impact on the competitiveness of the organization (Wan & Mohammad, 2016). Therefore, under the background of economic recovery and the increase of employees' turnover intention, how to retain tacit knowledge for the organization is the research aim of this paper. The first research objective of this paper is to explore the relationship between turnover intention and tacit knowledge sharing by using the case of software engineers in China. Another goal is to investigate the impact on tacit knowledge sharing by focusing on the transformational leadership style of senior managers and the transactive memory system.

Researchers believed that knowledge has become the most important strategic resource of the company (Grant, 1996). Tacit knowledge was essential to create a sustainable competitive advantage (Johannessen et al., 2001). Knowledge sharing and turnover intention are undoubtedly the most important research topics (Srivastava & Pradhan, 2019). Therefore, this paper puts forward the research hypothesis of the relationship between turnover intention and tacit knowledge sharing and further expands the hypothesis of the relationship between them and transformational leadership and transactive memory system. We use transformational leadership factors based on leadership theories and transactive memory system factors based on social exchange theories to expand the research of tacit knowledge sharing derived from knowledge management theories. We employ factor analysis to investigate the reliability of measures and use SEM to process multiple correlations while doing causal analysis.

We find that transformational leadership is significantly positively related to tacit knowledge sharing, and transactive memory system and turnover intention have significant mediating effects on transformational leadership and tacit knowledge sharing. From the findings, we find great significance for training leaders to be of transformational leadership style, improving tacit knowledge sharing, and ensuring the continuation of tacit knowledge in organizations. This study also indicates that leaders should acquire skills in transformational leadership behaviors and in reducing employees' turnover intention, thus, ensuring that the tacit knowledge of employees is kept within organizations. The findings show that organizations can promote tacit knowledge sharing through a transactive memory system.

Our study creates a different perspective of study in the field of knowledge sharing. Academically, the study of tacit knowledge sharing helps scholars to research the studies of knowledge sharing based on knowledge management theories and social exchange theories from different perspectives. Furthering the exploration into tacit knowledge sharing, this study mostly discusses and empirically verifies other related factors, such as transformational leadership, turnover intention and transactive memory system. We expand the studies on tacit knowledge sharing with certain theoretical significance and enrich the theoretical research literature in the field of tacit knowledge research. Our study has practical contributions for organizations that value knowledge management to enhance the continuation of tacit knowledge.

Our paper aims to study the behaviors of software engineers whose behaviors may not differ in different industries. Thus, an extension of our paper could study the behaviors of software engineers in different industries to check whether different industries will affect the survey results. Moreover, the survey data of this study came from China. Thus, scholars could use our approach to study the behaviors of software engineers in different countries to explore whether the results will be different in different countries. Furthermore, future research could study the impact of different leadership styles on tacit knowledge sharing.

In this paper, we use transformational leadership factor in leadership theory and transactive memory system factor based on social exchange theory to expand the research of tacit knowledge sharing. Scholars could use our approach to study other areas, for example, exchange rate (Batai, et al., 2017), capital structure (Chang, et al., 2019), transportation (Thipwong, et al., (2020), logistics service (Tran, et al., 2019). Readers may refer to Chang, et al. (2017) for other areas that scholars could apply our approach to analyze.

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