

# 科技部補助專題研究計畫成果報告 期末報告

您今天知識分享了嗎？資源保存理論觀點

計畫類別：個別型計畫

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中文摘要：根據資源保存理論觀點，擁有豐沛資源的員工，將會更主動積極的涉入知識分享活動。因此，在資源保存理論的研究視角上，本研究以跨層次的方式解釋員工的個人資源(工作敬業與內在激勵)與外在資源(轉換型領導)如何促進其知識分享行為。本研究以問卷調查方式對轉換型領導、工作敬業、內在激勵與知識分享間之關係進行探討。最後取得之有效樣本為來自33個工作群體的214位成員。實證結果顯示，員工的個人與外在資源皆會對其知識分享有正面的效益。針對個人資源部分，員工的工作敬業將能增加其內在激勵，進而提升知識分享行為。在於外在資源部分，轉換型領導在知識分享過程中扮演著促進者的角色。特別是，轉換型領導能提升工作敬業藉由提升內在激勵而提升知識分享之中介效果。在於資源保存理論的基礎之上，本研究首先提出對於擁有充沛內外資源的員工而言，知識分享將能被員工視為能主動積極涉入之活動。本研究的相關研究成果將能對知識分享研究提供一個嶄新的研究觀點與方向。

中文關鍵詞：知識分享、轉換型領導、工作敬業、資源保存理論、跨層次研究

英文摘要：According to conservation of resources (COR) theory, employees with abundant resources are supposed to actively engage in knowledge sharing. Based on the perspective of COR theory, this study adopts a multilevel approach to examine how employees' personal resources (i.e., work engagement and intrinsic motivation) and external resources (i.e., transformational leadership) promote knowledge sharing behavior. This study conducts a survey to explore the interrelationships among transformational leadership, work engagement, intrinsic motivation, and knowledge sharing. The sample includes 33 work groups consisting of 214 group members. The results show that an individual's personal and external resources are positive and benefit the promotion of knowledge sharing. As for personal resources, work engagement has a positive impact on knowledge sharing by increasing intrinsic motivation. Regarding external resources, transformational leadership acts as a facilitator for knowledge sharing. Specifically, the conditional indirect effects of work engagement on knowledge sharing through intrinsic motivation is more positive under high levels of transformational leadership, rather than low levels of transformational leadership. Based on COR theory, this is the first study to argue that knowledge sharing could be considered as an active activity and that individuals could be eager to perform knowledge sharing when they possess significant personal and external resources. The results of this study provide new insights into knowledge sharing.

英文關鍵詞：Knowledge sharing, Transformational leadership, Work engagement, Conservation of resources theory, Multilevel

research

## **Introduction**

Knowledge sharing is the foundation of successful knowledge management (Foss et al., 2010). Previous studies have exerted much effort to understand the determinants of individual knowledge sharing. Individuals might share their knowledge because of environment factors, individual characteristics and/or motivational factors (Wang and Noe, 2010). For example, in relation to environmental factors, organizational support and reward/incentive systems could prove useful in promoting individual knowledge sharing (e.g., Lu et al., 2006; Kulkarni et al., 2006). With respect to individual characteristics, certain types of personalities and higher levels of self-efficacy appear to lead to higher degrees of knowledge sharing (e.g., Cabrera et al., 2006; Lu et al., 2006); as for motivational factors, higher levels of trust are positively related to knowledge sharing (Chowdhury, 2005).

In general, previous knowledge sharing studies have provided abundant findings. However, three shortcomings still seem to exist in the extant literature. First, previous studies usually assume that knowledge sharing is essentially a passive action. Individuals are not prone to engage in knowledge sharing unless there are enough positive stimuli from external structures, like reward/incentive systems. Second, most of the knowledge sharing research supposes that since knowledge is power, engaging in knowledge sharing is likely to result in a loss of power (e.g., Davenport and Prusak, 1998; Lu et al., 2006; Liu and DeFrank, 2013). Third, although an individual's performance of knowledge sharing is supposed to be influenced by multi-level factors simultaneously, knowledge sharing research adopting a multilevel perspective is still in its initial stages (Foss et al., 2010; Wu and Lee, 2017). More research is needed on the determinants of knowledge sharing that account for its multilevel nature.

In this study, we consider knowledge sharing from a different angle. If knowledge is power, then this means that knowledge is an important resource. Therefore, people ought to be keen to accumulate knowledge (Wu and Lee, 2016). In fact, knowledge sharing is one means of accumulating knowledge; during the process of knowledge sharing, individuals have the chance to engage in mutual learning (Reinhofl et al., 2011) and thereby gain more knowledge. As a result, this study posits that knowledge sharing can also be considered an active action and a means of gaining resources. More specifically, individuals might be intrinsically motivated to actively engage in knowledge sharing to accumulate an important resource, namely knowledge. However, we know little about the process and determinants that cause individuals to actively pursue knowledge sharing.

This study applies the conservation of resources (COR) theory to discuss how individuals actively perform knowledge sharing. COR theory is a motivational theory according to which individuals strive to obtain, retain, foster, and protect valued resources (Hobfoll, 1988, 1989). COR theory has been used to discuss resource loss over a long period of time (e.g., Demerouti et al., 2004; Melamed et al., 2006; Aryee et al., 2008). Researchers in recent years have begun to consider it as an important means for understanding how people gain resources (e.g., Hakanen et al., 2011; Xanthopoulou et al., 2009; Halbesleben and Wheeler, 2015). There are three reasons why this study uses COR as the main theoretical lens. First, knowledge is an important resource and COR is the primary theory used to discuss how individuals deal with resources. Second, COR proposes the “gain spiral of resources” concept, which is suitable for discussing how individuals use current resources to promote knowledge sharing. Third, COR is a well-developed theory. In applying this theoretical lens to knowledge sharing research, this study is able to obtain a new and insightful perspective on exploring the important determinants of knowledge sharing.

According to COR theory, people will invest resources in order to obtain resources. People who have abundant resources are usually in a better position to garner more resources (Hobfoll, 1998, 2001). Knowledge is an important resource and knowledge sharing is an important way of obtaining resources. Therefore, when employees have more resources, it is easier for them to become involved in knowledge sharing. This study uses work engagement to represent an employee’s personal resources. Work engagement is considered high level personal investment in work (e.g., Macey and Schneider, 2008; Rich et al., 2010) and is defined as an active, positive, work-related state of mind that is characterized by vigor, dedication, and absorption (Schaufeli and Bakker, 2004). Engaged employees are full of energy and have abundant resources (Gorgievski and Hobfoll, 2008; Demerouti et al., 2015). According to COR theory, engaged employees have more resources to invest in obtaining further resources and so engage in more knowledge sharing compared to disengaged employees. Furthermore, this study also explores the mechanism between work engagement and knowledge sharing. Engaged employees highly value and love their work; they therefore tend to be intrinsically motivated to perform knowledge sharing. As a result, this study argues that work engagement is indirectly related to knowledge sharing via intrinsic motivation. This study will also use insights gained from self-determination theory to elaborate our COR model in relation to the construct of intrinsic motivation. According to COR theory, external resources are an important source for people (e.g., ten Brummelhuis and Bakker, 2012); thus, this study also considers the influences of employees’ external resources on their knowledge sharing performance. In this study,

employees' external resources are represented by transformational leadership, a determinant at the group level. Knowledge sharing usually occurs in a group context. Within a group, leadership has a significant impact on members' behavior, including knowledge sharing. Transformational leadership has been proven to be an effective and positive leadership style (Wang et al., 2011). Group leaders' transformational leadership could thus be considered as a supporting resource for employees. Therefore, based on COR theory, this study also argues that transformational leadership is beneficially related to knowledge sharing. Furthermore, COR theory also argues that different resources aggregate into a resource pool (Hobfoll, 2011), and therefore have a conjunctive influence. Given this, we also suppose that transformational leadership will moderate the relationship between work engagement and intrinsic motivation. The theoretical framework of this study is shown in Figure 1.

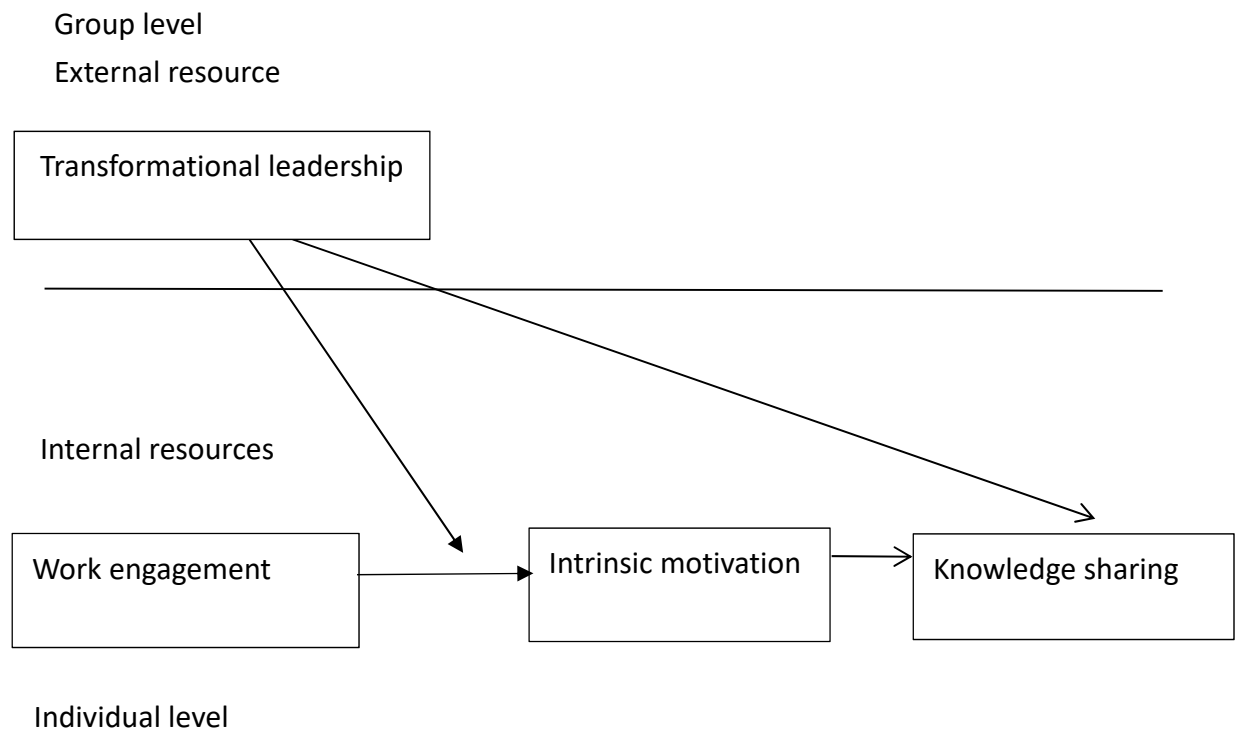


Figure 1. Research framework

The results of this study will make three theoretical contributions. First, this study assumes that knowledge sharing is an important way of obtaining knowledge. Therefore, employees might be actively motivated to pursue knowledge sharing once they have abundant resources. From the perspective of COR theory, therefore, we can explore the determinants of knowledge sharing in a new way. Second, this study

considers both work engagement and transformational leadership as important and positive resources; it responds to the call of scholars of positive organizational behavior for further study to emphasize the positive side of people as well as the impact of positive leadership. Finally, by combining COR theory and knowledge sharing research, this study further extends the theoretical application of COR theory.

## **Theoretical development**

### ***Knowledge sharing***

Knowledge sharing is a very important part of knowledge management. In the process of knowledge sharing, knowledge donation and collection occurs (Van den Hooff and De Ridder 2004; Foss et al., 2009; Reinholt et al., 2011). Knowledge donation means that knowledge possessors provide their knowledge to others. Knowledge collection refers to the fact that knowledge receivers acquire new knowledge from others. As a result, knowledge sharing provides a way for employees to teach and learn, and benefits employees by increasing their personal knowledge. Since knowledge can be seen as a valuable resource, employees somehow tend to hold onto it until they perceive that knowledge sharing will bring about some external benefit (e.g., Chowdhury, 2005; Cabrera et al, 2006; Kulkarni et al., 2006; Kim et al., 2015). For example, company reward systems could promote members' knowledge sharing activities. However, according to COR theory (Hobfoll, 1988, 1989), because knowledge is an important resource, employees should have higher levels of motivation to accumulate knowledge. Since the process of knowledge sharing provides employees with a chance for mutual learning, it becomes a good way to accumulate knowledge. In other words, employees could be actively motivated to pursue knowledge sharing because it is a good means to increase their own knowledge. As a result, knowledge sharing is not just about sharing resources, but also about gaining resources.

### ***Work engagement and knowledge sharing***

Work engagement refers to an active, positive, fulfilling work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli et al., 2002; Schaufeli and Bakker, 2004). Vigor refers to high levels of energy and mental resilience while working. Dedication is characterized by a sense of significance, enthusiasm, inspiration, pride, and challenge. Absorption refers to being fully concentrated and happily engrossed in one's work. This study follows the definitions provided by Schaufeli and his colleagues.

According to COR, individuals with more resources are more likely to invest in future resources (Hobfoll, 1998, 2001). This study infers that work engagement positively influences employees' knowledge sharing. Gorgievski and Hobfoll (2008) argue that work engagement is the end state of a long-term process of gaining resources. In other words, engaged employees will have abundant resources to invest in their jobs (Demerouti et al., 2015) and subsequently obtain more resources. For example, day-level work engagement is positively related to recovery level at the end of the workday (Sonnentag et al., 2012); and current work engagement can garner more job resources in the future (Hakanen, et al., 2011). Similarly, this study assumes that engaged employees have abundant resources to bring to the process of knowledge sharing in order to obtain new knowledge.

Regarding donating knowledge, since engaged employees are deeply involved in their work, they should have more work-related knowledge to provide. More importantly, because engaged employees value their work quite highly, this study believes that they tend to be more willing to provide their current knowledge in order to exchange future knowledge. Consistent with the principle of COR theory that people invest resources to gain resources (Hobfoll, 1998, 2001), this study infers that engaged employees will be more positive regarding donating knowledge compared to disengaged employees. As for knowledge collecting, because engaged employees are more energetic and dedicated to their work, they will acquire more knowledge in the process of knowledge sharing. Learning and collecting knowledge could be a challenging task for employees since new knowledge might not be in the same field as the one they are familiar with. Since engaged employees are more energetic (Gorgievski and Hobfoll, 2008), they have more resources to cope with the difficulties faced during knowledge collecting. As a result, based on the above discussion, this study expects that engaged employees are better at both knowledge donating and collecting, and experience better knowledge sharing:

Hypothesis 1: The greater the degree of work engagement the employees has, the more knowledge sharing the employee will perform.

### ***The mediating influence of intrinsic motivation***

Since engaged employees devote themselves to their work and could be involved in knowledge sharing as one way to gain more work knowledge, it is reasonable to assume that engaged employees will engage in knowledge sharing primarily based on their own interests and enjoyment. In other words, engaged employees might have a higher level of intrinsic motivation toward knowledge sharing. As a result, intrinsic



motivation toward knowledge sharing might be an important mediator in the relationship between work engagement and knowledge sharing. There might be a work engagement-intrinsic motivation-knowledge sharing causal chain relationship. Motivation is an energy resource (Hobfoll, 1998), and according to a corollary of COR theory, initial resource gains lead to future resource gains. Thus, since engaged employees have more resources at work, they have greater chances to use their current resources to obtain more motivation resources, and subsequently pursue further knowledge sharing.

In order to have a clearer explanation, we combined some insights gained from self-determination theory (SDT) (Ryan and Deci, 2000; Gagné and Deci, 2005) with COR theory in order to theorize their causal chain relationship. There are three reasons why this study chose to complement COR with SDT. First, SDT is a useful theoretical perspective when it comes to discussing the construct of intrinsic motivation (Ryan and Deci, 2000; Gagné and Deci, 2005). Second, COR theory is a relatively macro motivation theory compared to SDT. Combining these two theories can enable us to better understand how initial resources (i.e., work engagement) lead to future resource gains (intrinsic motivation). Third, applying insights from SDT to elaborate the COR model is also suggested by, and used in, previous studies (e.g., ten Brummelhuis et al., 2011; Halbesleben et al., 2014; Kammeyer-Mueller et al., 2016). Next, this study will introduce the construct of intrinsic motivation, and discuss how it mediates the relationship between work engagement and knowledge sharing. Consistent with the definition of Foss et al. (2009), intrinsic motivation in this study refers to intrinsic motivation toward knowledge sharing.

According to SDT (Ryan and Deci, 2000; Gagné and Deci, 2005), intrinsic motivation is a desire to engage in an activity because of the pleasure and interest derived from the activity itself. People will have a higher level of intrinsic motivation toward a certain activity when the psychological needs for autonomy, competence and relatedness are satisfied by engaging in the activity. In addition, since intrinsic motivation energizes individuals, it is a personal resource (Kammeyer-Mueller et al., 2016).

This study assumes that engaged employees will have a higher level of intrinsic motivation than will disengaged employees. The main reason behind this assumption is that engaged employees are more likely to have satisfied psychological needs (i.e., autonomy and competence) when it comes to knowledge sharing compared to disengaged ones. First, regarding the need for autonomy, this study believes that

engaged employees will experience more satisfaction in relation to the enhancement of their autonomy than disengaged employees will. Since engaged employees love their work (Schaufeli et al., 2002; Schaufeli and Bakker, 2004), they will autonomously try to make their work better or establish a better work environment (Bakker, 2011). As we described above, knowledge sharing could be an important means to acquire new work-related knowledge; thus, engaged employees should be autonomously motivated to engage in knowledge sharing. Thus, engaged employees should have higher degrees of satisfaction of their autonomy than disengaged ones when it comes to knowledge sharing. Second, in terms of the need for a sense of competence, this study believes that engaged employees feel more competent than disengaged employees do. Since engaged employees usually experience positive emotions, they are able to create more resources in their daily work-related tasks (Bakker and Demerouti, 2008; Bakker, 2011). It is therefore reasonable to assume that engaged employees have a better ability to mobilize and increase resources to perform knowledge sharing, or to deal with the difficulties resulting from knowledge sharing. Previous studies have also shown that engaged employees usually reach higher levels of in-role and extra-role performance (e.g., Bakker et al., 2004; Demerouti et al., 2015). As a result, engaged employees would show more confidence and feel competent in their knowledge sharing. Based on the above descriptions, engaged employees should experience and feel more satisfaction in relation to a sense of autonomy and competence when it comes to knowledge compared to disengaged employees. According to SDT (Ryan and Deci, 2000; Gagné and Deci, 2005), when psychological needs (autonomy and competence) are more fulfilled, this can lead to a higher level of intrinsic motivation. Therefore, work engagement should be positively related to intrinsic motivation toward knowledge sharing.

Hypothesis 2: The greater the degree of work engagement the employees has, the more the employee will tend to be intrinsically motivated to share knowledge.

According to COR theory, intrinsic motivation is an important personal resource because it can help an individual attain his or her goals (Hobfoll, 1989; Halbesleben et al., 2014). Intrinsic motivation toward knowledge sharing implies that individuals are actively motivated to engage in knowledge sharing, and find it to be interesting, enjoyable and joyful. In the field of organizational behavior, intrinsic motivation has already been found to have many positive outcomes, like citizenry and helping behavior (Dysvik and Kuvaas, 2008; Weinstein and Ryan, 2010), learning (Vansteenkiste et al., 2004) and becoming more involved in one's job (Gagné and Deci, 2005). Regarding the relationship between intrinsic motivation and knowledge

sharing, previous studies clearly point out that intrinsically motivated employees are more likely to engage in knowledge sharing (e.g., Cabrera et al., 2006; Foss et al., 2009; Minbaeva et al., 2012). In contrast, those employees with low intrinsic motivation might need to be pushed to share knowledge (Gagné, 2009). Therefore, consistent with previous studies, intrinsic motivation toward knowledge sharing will have a positive influence on knowledge sharing. Combining this inference with Hypothesis 2, we argue that engaged employees are positively related to intrinsic motivation, which then leads to greater knowledge sharing. This argument is consistent with the logic of COR theory: when individuals have greater resources, they have a higher chance of obtaining more resources, which then forms a gain spiral of resources (Hobfoll, 1998, 2001).

Hypothesis 3: Intrinsic motivation will mediate the relationship between work engagement and knowledge sharing.

### ***Transformational leadership***

Transformational leadership is a positive leadership style; the concept has gained a lot of attention (Wang et al., 2011). Previous studies have shown that transformational leadership can encourage and promote positive outcomes in followers (e.g., Barling et al., 2010; Skakon et al., 2010). Transformational leadership is composed of four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass, 1985; Avolio and Bass, 1991). According to COR theory, job resources are an important external resource (Hobfoll, 1998, 2001). Of these job resources, positive leadership represents one kind of important resource (Bernas and Major, 2000; Kalshoven and Boon, 2012). In this study, transformational leadership within a group represents an external resource for employees.

Previous studies have shown that transformational leadership can help followers to develop two kinds of personal resources, namely self-efficacy (Pillai and Williams, 2004; Liao and Chuang, 2007) and positive affect (Tsai et al., 2009). Both self-efficacy and positive affect are important personal and positive psychological resources (ten Brummelhuis and Bakker, 2012), and can help to promote knowledge sharing. When employees have higher levels of positive psychological resources, they will be more likely to engage in knowledge donating because they are more positive and optimistic in their view of donating knowledge. Moreover, they will have more positive thoughts and actions when involved in learning and will thus exhibit a higher level of knowledge collection. In other words, within a group, transformational leaders promote employees' positive psychological resources and this leads to greater

knowledge sharing behavior. Therefore, we argue that transformational leadership within a group is positively related to employee knowledge sharing.

Hypothesis 4: The greater the degree of transformational leadership within a group, the more employees will perform knowledge sharing.

According to COR theory (Hobfoll, 2011), an individual's resources form a resource pool and then exhibit an aggregating influence. In this study, we discuss two different kinds of resource for an employee, namely work engagement and transformational leadership, which represent a personal resource and an external resource, respectively. Based on the resource pool concept of COR theory, work engagement and transformational leadership might have a conjunctive influence on the process of knowledge sharing. More specifically, this study argues that transformational leadership might enhance the relationship between work engagement and intrinsic motivation for two reasons. First, transformational leaders can make their followers feel more supported (Liaw et al., 2010). Engaged employees have more opportunities and feel safer making their own decisions, such as engaging in knowledge sharing. Therefore, engaged employees will have a higher level of automatic satisfaction when engaging in knowledge sharing under the lead of transformational leaders than under non-transformational leaders. Second, transformational leaders tend to more positively motivate and inspire their followers (Bass, 1985; Avolio and Bass, 1991); therefore, their followers will exhibit more confidence in the workplace. Previous studies have shown that transformational leadership leads to positive psychological states in followers, such as psychological empowerment and psychological capital (Avolio et al., 2004; Barroso Castro et al., 2008; Gooty et al., 2009). Therefore, under the mentoring and coaching of transformational leaders, engaged employees will have more confidence to engage in knowledge sharing than under non-transformational leaders because they experience more positive psychological states which further strengthen their confidence in knowledge sharing. As a result, transformational leadership should positively moderate the relationship between work engagement and intrinsic motivation.

Hypothesis 5: Transformational leadership will moderate the relationship between work engagement and intrinsic motivation. When transformational leadership is high, the positive relationship between work engagement and intrinsic motivation is increased.

Furthermore, since transformational leadership strengthens the impact of work

engagement on intrinsic motivation, it could also change the indirect effect of work engagement on knowledge sharing via intrinsic motivation. Extending Hypothesis 3, we therefore argue that the mediating effect of intrinsic motivation on the relationship between work engagement and knowledge sharing will vary as a function of transformational leadership.

Hypothesis 6: The conditional indirect effect of work engagement on knowledge sharing via intrinsic motivation will be stronger when transformational leadership is high than when transformational leadership is low.

## **Methodology**

### ***Sample***

Since this study deals with an issue involving both the individual and group levels, we collected the data by the unit of the work group. In addition, previous studies have pointed out that knowledge sharing is an important activity for healthcare workers (e.g., Chang et al., 2012; Assem and Pabbi, 2016); thus, we chose healthcare work groups as the targeted sample. Since group questionnaires are more difficult to collect, this study used purposive sampling for the survey in Taiwan. The questionnaires for a work group were divided into two categories: the one for group leaders covered the basic information of the group and transformational leadership; while those for group members involved the aspects of work engagement, intrinsic motivation, knowledge sharing, control variables, and basic information on team members. To ensure the usability of the group questionnaires, and by referring to the collection approaches of group questionnaires in previous studies, a valid group questionnaire must consist of the leader questionnaire and at least three group members (e.g., Mayer et al., 2012; Wu and Lee, 2016).

The authors contacted the hospitals via telephone to ask whether they were willing to participate in this study; a medical center and a regional hospital agreed to join this research. Due to the suggestion from the hospitals, as medical doctors' are highly professional and their workload is extremely high, this study does not include the sample of medical doctors. Questionnaires were sent to the hospitals via delivery or in person after confirming the number of healthcare work groups that could participate in the study. After excluding incomplete questionnaires, there remained 33 usable work group data, including 33 group leader questionnaires and 214 group member

questionnaires. The average workgroup size is 11.7 people. As for group leaders, the mean age is 35.19 and 97 percent of group leaders have an associate's degree or above. The mean working tenure of group leaders is 10.76 years. Regarding group members, the mean age is 27.74 and 95.8 percent of group members have an associate's degree or above. The mean working tenure of group members is 6.10 years.

### ***Measurements***

A seven-point scale was used for all of the measures in this study. The response options are from 1 = "strongly disagree" to 7 = "strongly agree."

**Knowledge sharing.** The scale developed by Van de Hooff and De Ridder (2004) was adopted to measure employees' knowledge sharing; it includes 10 questions related to knowledge sharing, such as knowledge donating and knowledge collecting. Group members were responsible to evaluate their performance of knowledge sharing. Sample items like "I share my skills with colleagues within my work group." and "Colleagues within my work group tell me what they know when I ask them about it." The Cronbach's  $\alpha$  for this scale was 0.93.

**Intrinsic motivation.** Intrinsic motivation in this study mainly measures employees' intrinsic motivation toward knowledge sharing. This study adopted the items developed by Foss et al. (2009). There were three measurement items in total, which were addressed by the group members to evaluate their own intrinsic motivation, such as: what knowledge do you share with others? "I think it is an important part of my job." The Cronbach's  $\alpha$  for this scale was 0.92.

**Work engagement.** This study adopted the short version scale by Schaufeli et al. (2006). This scale is composed of nine measurement items related to the aspects of vigor, dedication, and absorption of work engagement. Sample items like: "At my work, I feel bursting with energy", "I am enthusiastic about my job", and "I get carried away when I am working", were provided to the members to evaluate their work engagement. The Cronbach's  $\alpha$  for this scale was 0.95.

**Transformational leadership.** The scale developed by Bass and Avolio (1992) was adapted to measure transformational leadership, included 12 items. Moreover, this scale was offered to the group leaders to evaluate their transformational leadership. Sample items like "I make others feel good to be around me", and "I express with a few simple words what we could and should do." The Cronbach's  $\alpha$  for this scale was

0.94.

Control variables. At the individual level, this study used member demographic variables such as age, education and working tenure as the control variables. We measured group members' age, education (measured as six levels: elementary school or below, junior high school, senior high school, associate's degree, bachelor's degree, master's degree and PhD) and number of working years. At the group level, this study also used group size and group leader demographic variables like age, education and working tenure as control variables. The method of measuring leaders' demographic variables is the same as members' method. In addition, previous studies suggested that mutual trust among group members would prompt knowledge sharing and that it is an important external resource for group members (e.g., Wu and Lee, 2016). Therefore, this study also used group trust as a control variable. Three measurement items used by Wu and Lee (2016) were adopted for members to evaluate the trust among group members. The Cronbach's  $\alpha$  for this scale was 0.82. Since group trust is a construct at the group level, we further tested the within-group agreement for group trust by computing the intraclass correlation coefficient (ICC1) and within-group inter-rater agreement (rwg). The ICC1 was 15.58 percent, while the mean value of rwg was 0.90 and the lowest value was 0.73. As a result, the values of rwg and ICC1 are well above acceptable levels (Bliese, 2000). Therefore, the aggregated measure of group trust is justified.

This study also employed a four-factor confirmatory factor analysis model for the above four measures at the individual level (i.e., knowledge sharing, intrinsic motivation, work engagement and perception of group trust). In order to keep a reasonable number of degrees of freedom, item parceling was used in the model (Bandalos, 2002). This model achieved an acceptable fit: GFI=0.95, AGFI=0.90, CFI=0.98 and RMSEA=0.059. All of the measures had composite reliability (CR) above 0.78 and average variance extracted (AVE) above 0.61. The square roots of all AVE scores were higher than any correlations of possible focal pair measures. Therefore, both convergent validity and discriminant validity were supported. Moreover, group members conducted measurements regarding the main variables that might result in a potential problem, namely common method biases. To reduce the negative effect of this problem, this study asked participants to complete the dependent variable questions before others. In addition, Harman's one-factor test (Podsakoff and Organ, 1986) also showed no serious problem regarding common method bias.

## Results

This study includes the analysis of both individual and group levels. Thus, the hierarchical linear modeling (HLM) analysis technique was applied in this study. Having a significant between-group variance in the dependent variables of interest is a basic requirement in conducting HLM models. There are two dependent variables in this study: knowledge sharing and intrinsic motivation. This study first estimated a null model for each of these two variables. The results showed that knowledge sharing ( $\tau_{00} = .14$ ,  $p < .001$ ; ICC= .16) and intrinsic motivation ( $\tau_{00} = .26$ ,  $p < .001$ ; ICC= .20) have significant between-group variance. Thus, using an HLM analysis is justified by the data. Table 1 provides the means, standard deviations, and correlations of the variables used in this study. In Table 1, we can see that knowledge sharing is highly correlated with work engagement and intrinsic motivation.

Table 1. Means, standard deviations, and correlations.

Individual level variables	Mean	s.d.	1	2	3	4	5	6
1. Age	27.74	6.91						
2. Education	4.57	.55	.23**					
3. Working tenure	6.11	5.49	.76***	-.14*				
4. Work engagement	4.11	1.20	-.09	-.14*	.07	(.95)		
5. Intrinsic motivation	4.86	1.14	-.19**	-.05	-.06	.63***	(.92)	
6. Knowledge sharing	4.95	.93	-.15*	-.02	-.10	.49***	.59***	(.93)
Group level variables	Mean	s.d.	1	2	3	4	5	6
1. Group size	11.70	7.42						
2. Leader age	35.19	8.45	-.08					
3. Leader education	4.58	.71	.19	-.09				
4. Leader tenure	10.76	7.20	.09	.83***	-.24			
5. Group trust	5.23	0.46	-.37*	.24	-.04	.01	(.82)	
6. Transformational leadership	4.83	.81	.01	.21	.13	.20	.20	(.94)

Reliabilities are on the diagonal parentheses. \* $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.001$

Table 2 summarizes the results of testing Hypotheses 1, 2, 3 and 4 from the HLM analyses. Hypothesis 1 argues that work engagement has a positive influence on knowledge sharing. Model 1 of Table 2 demonstrates that work engagement is positively and significantly related to knowledge sharing (M1,  $\gamma = .31$ ,  $p < 0.001$ ); thus,



Hypothesis 1 is supported. Hypothesis 2 argues that work engagement has a positive influence on intrinsic motivation. Model 4 of Table 2 shows that work engagement is positively and significantly related to intrinsic motivation (M4,  $\gamma=.52$ ,  $p<0.001$ ), thus supporting Hypothesis 2. Hypothesis 3 proposes that intrinsic motivation would mediate the relationship between work engagement and knowledge sharing. This study took the approach suggested by Kenny et al. (1998) to test this mediating effect. The results in Model 2 of Table 2 indicate that when we tested the influences of work engagement and intrinsic motivation toward knowledge sharing together, intrinsic motivation has a significant impact on knowledge sharing (M2,  $\gamma=.39$ ,  $p<0.001$ ); however, the influence of work engagement is non-significant (M2,  $\gamma=.09$ , n.s.). Therefore, intrinsic motivation fully mediates the relationship between work engagement and knowledge sharing, and Hypothesis 3 is supported.

Hypothesis 4 proposes that transformational leadership has a positive impact on knowledge sharing. The results in Model 3 of Table 2 indicate that transformational leadership does not have a significant effect on knowledge sharing (M3,  $\gamma=.09$ , n.s.). Therefore, Hypothesis 4 is not supported. Hypothesis 5 proposes that transformational leadership would strengthen the relationship between work engagement and intrinsic motivation. Model 6 of Table 3 indicates that the interaction term of transformational leadership and work engagement is positively and significantly related to intrinsic motivation (M6,  $\gamma=.17$ ,  $p<0.01$ ). In addition, this study also graphs the interaction effect in Figure 2. In Figure 2, we can clearly see that the slope of the relationship between work engagement and intrinsic motivation is stronger under the condition of high transformational leadership than under the condition of low transformational leadership; thus, Hypothesis 5 is supported.

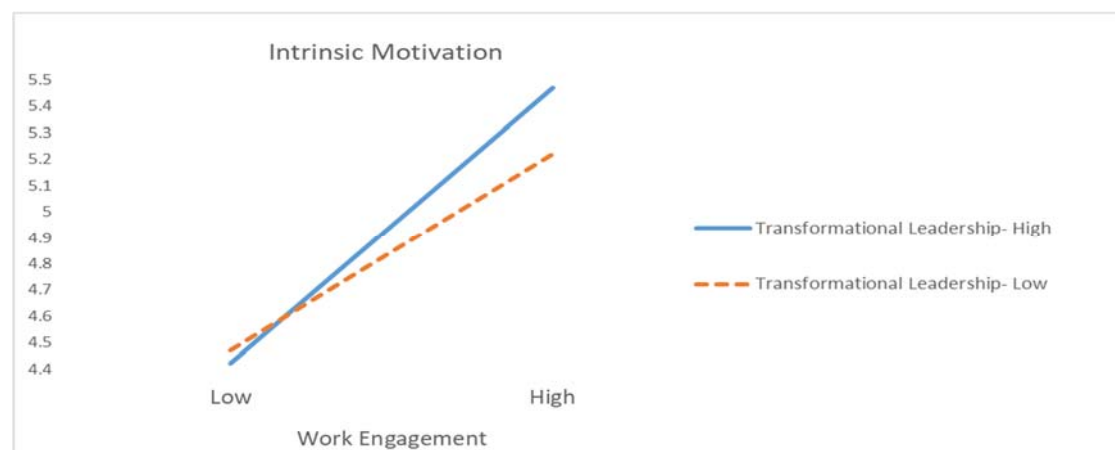
Table 2. Results of HLM analyses

Variable	Knowledge sharing			Intrinsic motivation
	Model 1	Model 2	Model 3	Model 4
Level 1				
Control variables				
Age	.01 <sup>a</sup>	.01	.01	-.03
Education	.02	-.02	-.03	.18
Tenure	-.03	-.03	-.03	.00
Work engagement	.31***	.09	.09	.52***
Intrinsic motivation		.39***	.39***	
Level 2				
Control variables				
Group size	.00	.00	.00	.01
Leader age	.00	.00	.00	.01
Leader education	.10	.16	.14	-.01
Leader tenure	.01	.00	.00	.00
Group trust	.45***	.29**	.24**	.44*
Transformational leadership			.09	
Within-group residual variance	.49	.39	.39	.63
$\Delta R^2_{\text{within-group}}$ <sup>b</sup>	31.90%	45.97%	45.90%	40.04%
Deviance	536.76	502.02	505.84	577.10

<sup>a</sup> Not standardized coefficients in HLM results. <sup>b</sup> Difference compared to the null Model.

\*p < 0.05 \*\*p < 0.01 \*\*\*p < 0.001

Figure 2. Plot of interaction between work engagement and transformational leadership on intrinsic motivation.



Hypothesis 6 proposes that high transformational leadership would strengthen an indirect effect of intrinsic motivation between work engagement and knowledge sharing. In order to test this hypothesized moderated mediation effect, this study followed the suggestion of Muller, Judd and Yzerbyt (2005) and examined three conditions accordingly: (1) a significant effect of work engagement on knowledge sharing, (2) a significant interaction between work engagement and transformational leadership on intrinsic motivation, and (3) a significant effect of intrinsic motivation on knowledge sharing. The relevant three-step analysis is shown in Table 3. As shown in Model 5 of Table 3, work engagement is positively and significantly related to knowledge sharing (M5,  $\gamma=.31$ ,  $p<0.001$ ), supporting condition 1. Next, the result of testing for Hypothesis 5 satisfied the second condition: that the interaction term of transformational leadership and work engagement has an impact on intrinsic motivation, as shown in Model 6. Finally, Model 7 reveals that intrinsic motivation is positively and significantly related to knowledge sharing (M7,  $\gamma=.40$ ,  $p<0.001$ ), lending support to condition 3. As a result, the three conditions are satisfied and Hypothesis 6 is supported. This study also used Hayes' (2013) PROCESS to estimate this conditional indirect effect and obtain bias-corrected bootstrapped confidence intervals (using 1000 bootstrap samples). The result of PROCESS shows that the difference between indirect effects (work engagement on knowledge sharing via intrinsic motivation) at the different values of transformational leadership is significantly varied with a 95% CI of [.0011, 0.1046], not including zero. Table 4 also shows that the indirect effect at a high level of transformational leadership (.2669) is stronger than the indirect effect at a low level of transformational leadership (.1859). In other words, either the result from the method of Muller et al. (2005) or PROCESS supports Hypothesis 6.

Table 3. Results for testing mediated moderation by transformational leadership

Variable	Knowledge sharing	Intrinsic motivation	Knowledge sharing
	Step 1	Step 2	Step 3
	Model 5	Model 6	Model 7
Level 1			
Control variables			
Age	.01 <sup>a</sup>	-.02	.01
Education	.02	.18	-.03
Tenure	-.03	.00	-.03
Work engagement (WE)	.31***	.50***	.10
Transformational leadership X WE	.01	.17**	-.09
Intrinsic motivation (IM)			.40***
Transformational leadership X WE			.05
Level 2			
Control variables			
Group size	.00	.01	.00
Leader age	.00	.01	.00
Leader education	.09	.00	.15
Leader tenure	.00	.01	.00
Group trust	.42***	.53**	.21*
Transformational leadership	.06	-.03	.07
Within-group residual variance	.49	.64	.39
$\Delta R^2_{\text{within-group}}^b$	31.36%	39.14%	45.26%
Deviance	543.14	577.98	511.69

<sup>a</sup> Not standardized coefficients in HLM results. <sup>b</sup> Difference compared to the null Model.

\*p < 0.05 \*\*p < 0.01 \*\*\*p < 0.001

Table 4 Moderated mediation test of PROCESS

Moderator	Level	Conditional indirect effect	SE	LL 95% CI	UL 95% CI
Transformational leadership	Low (-1sd)	.1859	.0600	.0851	.3071
	High (+1sd)	.2669	.0505	.1738	.3708

Note. Bootstrap sample size= 1000. CI= confidence interval; LL= lower limit; UL= upper limit.

### Discussion and conclusion

Drawing from COR theory and insights from STD, this study contributes to knowledge-sharing literature by highlighting that knowledge sharing could be one kind of active behavior when individuals possess abundant resources. For the personal resources, this study finds that both work engagement and intrinsic motivation influence knowledge sharing. In addition, intrinsic motivation plays a mediating role between work engagement and knowledge sharing. For the external resources, the results show that transformational leadership strengthens the relationship between work engagement and intrinsic motivation. Moreover, the indirect effect of work engagement on knowledge sharing through intrinsic motivation is conditional upon the level of transformational leadership.

The results of this study can contribute to the knowledge-sharing literature in several ways. First, according to COR theory and SDT, this study examined how work engagement influences knowledge sharing through intrinsic motivation. Based on the concept of the gain spiral of resources from COR theory (Hobfoll, 1998, 2001), this study proves that engaged employees can generate more intrinsic motivation and then achieve a higher level of knowledge sharing. In other words, employees' personal resources can cause a positive spiral of gaining resources and then promote knowledge sharing. Although the concept of gain spiral of resources has been used recently to explore many important issues (Halbesleben and Wheeler, 2015), none of the previous studies applied it to knowledge-sharing research. This study is the first one to provide initial evidence that the concept of the gain spiral of resources might be a useful perspective by which to explore the mechanism between personal resources and knowledge sharing. Future studies can make theoretical contributions to knowledge-sharing research based on this perspective in three ways. Firstly, future

studies can explore other important personal resources that mediate the relationship between work engagement and knowledge sharing. For example, work engagement could cause a higher level of active learning (Bakker et al., 2012) or organizational commitment (Hakanen et al., 2008), which in turn might promote knowledge sharing. Next, future studies can explore other important resources that can boost employees' work engagement. For example, according to the JD-R model, job resources (e.g., social support and learning opportunity) and personal resources (e.g., self-esteem and self-efficacy) are important determinants of work engagement (Bakker, 2011); further studies can apply these findings from the research of JD-R model into our current research framework. Finally, future studies can use some other important personal resources besides work engagement as main predictors of knowledge sharing. For instance, flourishing is an important and emerging concept in recent years. Flourishing employees are in a good state of well-being and have abundant resources (Diener et al., 2009; Demerouti et al., 2015); they might be more willing to engage in knowledge sharing.

Second, regarding the role of transformational leadership, differing from our expectation, we do not find a direct influence on knowledge sharing. One potential reason might be that group trust already accounts for most of the explanation for the direct influences from the group level. Actually, transformational leadership could have a significant impact on knowledge sharing when group trust does not add to the model of HLM as a control variable. However, this study clearly shows that transformational leadership can play an important role as a facilitator on the relationship between work engagement and intrinsic motivation. This finding is consistent with the argument of COR theory that an individual's different kind of resources could aggregate and become a resource pool which would help the individual (Hobfoll, 1998, 2001). In this study, we proved that transformational leadership, employees' external resource, could help to foster the influence of work engagement on developing intrinsic motivation. Moreover, based on the moderated mediation test, this study reveals that the indirect effect of work engagement on knowledge sharing via intrinsic motivation varies depending on the level of transformational leadership. This indirect effect is higher when the employees are led by high transformational leadership rather than low transformational leadership. In other words, in spite of transformational leadership not having a direct influence on knowledge sharing, it has a significant moderating effect. This finding has an insightful meaning for knowledge-sharing literature; it shows that positive leadership could be an important facilitator for knowledge sharing. Led by leaders with high transformational leadership, members' work engagement is more likely to develop

intrinsic motivation that in turn promotes knowledge sharing. Future studies can further explore whether other types of positive leadership, such as empowering leadership (Arnold et al., 2000) or ethical leadership (Brown et al., 2005), could also become a facilitator for knowledge sharing. Moreover, according to COR (Hobfoll, 1998, 2001), gaining positive resources could help individuals to deal with unfavorable challenges. Future studies could further explore whether transformational leadership could also act as a buffer for employees when they face harmful situations related to knowledge sharing.

Finally, this study also contributes to knowledge-sharing literature by applying the perspective of the gain spiral of COR theory into a knowledge-sharing study. Although previous studies have applied COR theory into knowledge-sharing studies (e.g., Wu and Lee, 2016; Lee et al., 2018), they focus on the cycle of loss rather than the cycle of gain. In this study, we highlight the importance of gain spiral, in that individuals with abundant resources would have more resources and opportunities to use their current resources to achieve a higher level of knowledge sharing. The results of this study remind us that there should be more research examining the positive side of individuals' resources in regard to the issue of knowledge sharing. This research direction also responds to the call from positive organizational behavior (Luthans, 2002; Luthans and Youssef, 2007; Wright and Quick, 2009): that scholars should put more attention on the positive side of employees. Thus, future studies could explore further on how positive resources of individuals help them to increase knowledge sharing. Besides the positive resources that individuals own, previous studies also show that some kinds of crossover of resources, such as the partner or leader's engagement, could increase an individual's work engagement (Bakker et al., 2005; Guterman et al., 2017). Therefore, future studies could also apply the concept of crossover of resources to elaborate on the theoretical framework of this study.

The findings of this study also have important practical implications. First, employees' work engagement could have a positive series effect on knowledge sharing. Given the positive influence of work engagement, organizations should help to increase employees' level of work engagement by providing more job-related resources. For example, organizations can establish well-designed social support, performance feedback, and skill variety for employees to increase their job resources and then increase work engagement. Moreover, this study also shows that transformational leadership can enhance the positive series effect of work engagement. Organizations should pay more attention when they select leaders for the work groups. Some of the characteristics of transformational leadership could become important criteria in the

selection. Likewise, organizations could provide leadership-training programs for current leaders in order to develop their transformational leadership skills.

### ***Limitations***

There are some limitations in this study. First, since the measurement of knowledge sharing is rated by employee self-reporting, it might be overestimated. Future studies could measure this scale by the employees' colleagues or supervisors. Second, although the hypotheses in this study imply causal relationships, all of the empirical data were collected at the same time. Future studies might consider collecting data with a longitudinal design. Third, this study only uses the sample of healthcare workers. Future studies might collect different types of samples to increase the generalization of the findings. Finally, we consider that an individual's personal and external resources have a conjoint influence such as a moderating effect. However, this study overlooks that personal resource and external resource might have a causal relation. For example, a positive leadership might enhance employees' personal resources. Future studies can further explore the causal relationship between external resources and personal resources while they discuss how employees' resources affect knowledge sharing.

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106年度專題研究計畫成果彙整表

計畫主持人：吳偉立				計畫編號：106-2410-H-231-003-SSS			
計畫名稱：您今天知識分享了嗎？資源保存理論觀點							
成果項目				量化	單位	質化 (說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等)	
國內	學術性論文	期刊論文		0	篇		
		研討會論文		0			
		專書		0	本		
		專書論文		0	章		
		技術報告		0	篇		
		其他		0	篇		
	智慧財產權及成果	專利權	發明專利	申請中	0	件	
				已獲得	0		
			新型/設計專利		0		
		商標權		0			
		營業秘密		0			
		積體電路電路布局權		0			
		著作權		0			
		品種權		0			
		其他		0			
		技術移轉	件數		0		件
	收入		0	千元			
	國外	學術性論文	期刊論文		0	篇	
			研討會論文		0		
專書			0	本			
專書論文			0	章			
技術報告			0	篇			
其他			0	篇			
智慧財產權及成果		專利權	發明專利	申請中	0	件	
				已獲得	0		
			新型/設計專利		0		
		商標權		0			
		營業秘密		0			
		積體電路電路布局權		0			
		著作權		0			
		品種權		0			
		其他		0			



	技術移轉	件數	0	件	
		收入	0	千元	
參與計畫人力	本國籍	大專生	0	人次	
		碩士生	3		聘用3位後學任職系所之研究生
		博士生	0		
		博士後研究員	0		
		專任助理	0		
	非本國籍	大專生	0		
		碩士生	0		
		博士生	0		
		博士後研究員	0		
		專任助理	0		
其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)			本研究所參與的研究生能夠在計畫執行期間學習問卷調查之執行方式，其中2位助理已經順利取得碩士學位畢業。本計畫之研究結果亦順利撰寫成文章，目前已經投至國外管理類之SSCI期刊。		

## 科技部補助專題研究計畫成果自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現（簡要敘述成果是否具有政策應用參考價值及具影響公共利益之重大發現）或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

☒ 達成目標

☐ 未達成目標（請說明，以100字為限）

☐ 實驗失敗

☐ 因故實驗中斷

☐ 其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形（請於其他欄註明專利及技轉之證號、合約、申請及洽談等詳細資訊）

論文：☐ 已發表 ☒ 未發表之文稿 ☐ 撰寫中 ☐ 無

專利：☐ 已獲得 ☐ 申請中 ☒ 無

技轉：☐ 已技轉 ☐ 洽談中 ☒ 無

其他：（以200字為限）

研究計畫已經順利執行完畢，並且將計畫成果撰寫成文章，目前已投稿至後學所屬領域(知識管理)之SSCI期刊。

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性，以500字為限）

本研究結果顯示，在工作群體中當成員擁有較高的工作敬業，將會產生較高程度的內在激勵，進而有較佳的知識分享行為。此外，轉換型領導對於成員的知識分享具有跨層次的正向干擾效果。簡言之，本研究顯示當群體成員擁有較佳的資源時，不論是內在資源或者是外在資源，皆能夠有助於提升其知識分享行為。在於資源保存理論與多層次研究基礎上，本研究率先探討工作群體中的成員擁有的資源如何促進其引發知識分享。有別於過去研究視員工知識分享為一被動之行為，本研究在資源基礎觀點之上進一步提出，對於資源豐沛員工而言，知識分享可被視為資源取得的主動積極行為而加以管理。整體而言，後學相信本研究對於知識分享領域能提供一嶄新的研究方向。

4. 主要發現

本研究具有政策應用參考價值：☒ 否 ☐ 是，建議提供機關

（勾選「是」者，請列舉建議可提供施政參考之業務主管機關）

本研究具影響公共利益之重大發現：☐ 否 ☐ 是

說明：（以150字為限）