

The Motivational Drivers of Successful Knowledge Sharing: A Theoretical Model and Empirical Validation

Abstract

The purpose of this article is to investigate the impact of intrinsic and extrinsic motivation on knowledge sharing behavior in geographically dispersed firms. The study examines whether these types of motivations have an additive or conflicting effect on knowledge sharing behavior, and how they contribute to explaining knowledge sharing among employees. Drawing on a literature review, the article presents a research model and several hypotheses, which are then tested in two world-leading firms in the brokerage and high-tech industries. The study involves 289 employees and utilizes structural equation modeling for analysis. The findings suggest that there are both additive and conflicting effects between the determinants of individual knowledge sharing behavior in this context.

Keywords: knowledge sharing behavior, intrinsic motivation, extrinsic motivation, geographically dispersed firms, structural equation model.

Introduction

Knowledge is considered a strategic asset and a main source of wealth for organizations. Having realized its importance in generating competitive advantage, companies have institutionalized knowledge management practices by establishing departments and functions dedicated to it. Knowledge management is a process that aims to acquire, organize, and communicate the tacit and explicit knowledge of employees so that other employees within the organization can use it to be effective and productive in their work (Alavi and Leidner, 1999). In this process, knowledge sharing plays a particularly important role. Thus, the ability of companies to share, integrate, and apply the knowledge created and held by their employees allows them to generate a sustainable competitive advantage. For example, Xerox, Hewlett Packard, Buckman Laboratories, Chevron, Dow Chemical, Ford, and Arthur Andersen can be cited as the first companies to successfully implement knowledge management projects (Brown and Duguid, 2000).

However, it should be noted that despite the recent growth of knowledge management as an organizational practice, many initiatives in this area have not achieved the expected results. Studies that have examined the factors of failure have shown that contrary to popular belief, sharing behavior is not spontaneous and easy. Indeed, as explained by Davenport (1998), knowledge sharing is not a natural behavior, and individuals often resist sharing their knowledge with others (Bounfour, 2000).

In this context, this article builds upon existing research that explores the factors driving knowledge sharing behavior among individuals. Specifically, it approaches the subject through the lens of motivational theory, with a focus on the impact of intrinsic and extrinsic motivations. While previous studies have explored these motivations independently (Hung et al., 2011; Zhang et al., 2017; Nguyen et al., 2019; Chedid et al., 2020; Carpentier, 2021), this article takes a unique approach by examining how the two types of motivation interact, both in terms of their direct impact on behavior and potential additive or conflicting effects. By doing so, this article aims to provide a more comprehensive understanding of the underlying drivers of knowledge sharing behavior.

To achieve this, this article is structured as follows. We will begin by examining the core concepts of knowledge sharing and motivation. Drawing on this analysis, we will propose a typology of reward systems specifically designed to incentivize knowledge sharing. Next, we will analyze and discuss theoretical and empirical studies that have focused on the study of motivational factors. Based on this literature review, we will present our research model and outline our hypotheses. To test these hypotheses, we will use a quantitative approach, and then analyze and discuss the results and implications generated by this research. In conclusion, we present the limitations of our work and explore potential avenues for future research in this area.

1. Theoretical background

1.1 Knowledge sharing

While knowledge sharing has been studied extensively in recent years, however, there is no commonly accepted definition. In the context of this research, we will adopt the definition of Ipe (2003), who proposes that knowledge sharing is a behavior that consists in making knowledge available in an organization. Knowledge sharing between individuals is the process by which knowledge held by one individual is converted into a form, which can be understood, absorbed and used by other individuals. It is a social process that occurs through interactions between multiple individuals and aims to create a shared framework of understanding.

This behavior is a crucial step in the knowledge management process, marking the culmination of a process of knowledge creation and capitalization that in turn leads to the final link in the chain, which is the use and application of knowledge. As Pfeffer (2000) emphasizes, the success of a knowledge management approach is contingent upon employees not only sharing knowledge but also applying and integrating it.

According to Shannon and Weaver's (1949) theory, knowledge sharing could be understood as a flow of knowledge from a giver to one or more receivers, using a communication channel (written, verbal, electronic, etc...). This one-way flow of knowledge tends to emphasize the perspective of the giver. However, once the receiver has utilized or incorporated the shared knowledge, a second flow occurs. The two flows are known as knowledge transfer.

At the organizational level, knowledge sharing is a critical activity for any knowledge-based organization (Zack, 2003). When companies are able to effectively share, integrate, and apply knowledge across their various units, they gain a sustainable competitive advantage (Grant, 1996; Nahapiet and Ghoshal, 1998; Von Krogh, 1998; Gupta and Govindarajan, 2000). This advantage helps them reduce the risks of knowledge loss and forgetting, create new organizational knowledge through sharing and dissemination, improve the performance of work

teams and individuals, preserve intellectual assets after the departure of key employees, and avoid 'reinventing the wheel' and redundant work. Additionally, routine tasks can be completed more efficiently with shared knowledge (Nahapiet and Ghoshal, 1998; Alavi and Leidner, 1999; Faraj and Sproull, 2000; Hall, 2001; Lin et al., 2020).

Furthermore, despite numerous studies examining knowledge-sharing behavior from various perspectives : cultural, motivational, relational, and technological, they all indicate that this behavior is far from natural. In fact, many studies suggest that knowledge sharing is often associated with a loss of power and legitimacy within organizations. In this study, we will focus specifically on the motivational dimension of knowledge sharing and aim to provide an explanatory framework for this behavior within this particular perspective.

1.2 Motivation to share knowledge

Motivation is defined by Vallerand and Thill (1993) as a “*hypothetical construct used to describe the internal and/or external forces producing the initiation, direction, intensity and persistence of behavior*” (p 18). In the literature dealing with knowledge management, motivation is understood according to two main dimensions: intrinsic motivation and extrinsic motivation (Ergün and Avcı, 2018; Carpentier, 2021). These two types of motivation find their origin in works in social psychology, in particular Deci's cognitive evaluation theory (1971, 1972) and Deci and Ryan's self-determination theory (1985).

Thus, according to the first works published by Déci on the theory of cognitive evaluation: “*A person is intrinsically motivated if he performs an activity for no apparent reward except the activity itself*” (1972, p 113). Intrinsic motivation therefore means performing an activity for inherent satisfactions rather than for separate consequences. A person, intrinsically motivated, reacts for pleasure or challenge and not for rewards or because of pressures (Ryan and Deci, 2000). In research dealing with the issue of knowledge sharing and transfer, several authors define intrinsic motivation in terms of perceived pleasure and personal satisfaction (Kankanhalli et al., 2005a, Wasko and Faraj, 2005). This definition will therefore be used in this research.

In contrast, Deci (1972) defines extrinsic motivation as follows: “*“Extrinsic motivation, refers to the performance of an activity because it leads to the external rewards (e.g. status, approval, or passing grades)”* (p 113). Unlike intrinsic motivation, which states that a task is performed for its own sake, extrinsic motivation involves performing a task in order to obtain rewards or avoid punishments (Ross, 1975). Completing a task is not an end in itself. It is rather a way to access extrinsic rewards (Ryan and Deci, 2000). The analysis of works dealing with knowledge sharing issues makes it possible to distinguish two main categories of extrinsic rewards: tangible rewards and intangible rewards (Hall, 2001; Kankanhalli et al., 2005, Voelpel and Han, 2005).

Tangible rewards refer to monetary rewards such as salary increases and bonuses, symbolic rewards such as gifts and business trips, career advancement such as job promotions, and job security job. Intangible rewards, on the other hand, essentially refer to verbal rewards received by an individual. These rewards contribute to improving his reputation and are manifested by the recognition of peers and the hierarchy who consider him an expert in his field.

Overall, understanding the different types of motivation is essential for effectively managing knowledge and promoting knowledge sharing within organizations.

To summarize, the table below presents a typology of motivation in the context of knowledge sharing, highlighting the differences between intrinsic and extrinsic motivation and their respective rewards.

Table 1: Typology of intrinsic and extrinsic rewards for knowledge sharing.

Type of motivation	Reward source	Reward nature	Reward type	Example of rewards
Intrinsic motivation	Intrinsic rewards	Intangible	Enjoyment in helping others	Personal satisfaction
Extrinsic motivation	Extrinsic rewards	Tangible	Monetary	Salary increase, bonus
			Symbolic	Trips, gifts
			Career advancement	Job promotion
			Job security	
		Intangible	Reputation	Improved reputation, verbal rewards, peer and hierarchical recognition.

2. Hypotheses and research model

We discuss below the impact of each factor on knowledge sharing behavior and then present our research model.

2.1 Intrinsic Motivation

The literature on knowledge management consider organizations as a knowledge market, regulated by the movements of knowledge supply and demand. The study conducted by van Baalen et al. in 2005 on knowledge sharing in networks via portals reveals four types of behaviors based on the presupposed balance of supply and demand for knowledge exchange. These are:

- Altruistic behavior, which is characterized by offering knowledge without expecting anything in return. The individual shares their knowledge without expressing any demands.
- Reciprocity behavior, which is characterized by significant exchange of knowledge, where the individual shares and receives knowledge in return.
- Individualism behavior, which is characterized by a lack of knowledge exchange, with very weak or absent supply and demand.
- Free-riding behavior, which is primarily characterized by a demand for knowledge. In other words, the individual uses the knowledge of others without contributing their own knowledge.

Among these four behaviors, individuals who adopt altruistic behavior express high intrinsic motivation. Analysis of previous research indicates that these individuals share their knowledge because they are altruistic and this gives pleasure and high personal satisfaction (Hall, 2001; Ko et al., 2005; Tedjamulia et al., 2005; Hung et al., 2005; Zhang et al., 2017; Ergün and Avcı, 2018; Nguyen et al., 2019; Chedid et al., 2020; Carpentier, 2021; Fischer, 2022). They do so and expect no reward (Davenport and Prusak, 1998; Boer et al., 2004). Their conception of sharing behavior is: '*What is mine is yours*' (Boer et al., 2004).

The underlying idea behind this altruistic conception of sharing is that knowledge is a public good and a common resource that should be available to the entire organization. This altruistic individual acts for the good of their organization by adopting prosocial behavior (Brief and Motowidlo, 1986; Constant et al., 1994). The pleasure felt after the act of sharing is largely sufficient to satisfy his intrinsic need.

Therefore, we hypothesize the following:

H1: Enjoyment in helping others has a positive impact on knowledge sharing.

2.2 Extrinsic motivation

2.2.1 Tangible rewards

The literature clearly emphasizes that knowledge sharing is not a natural or spontaneous behavior. What seems to be natural is the tendency of individuals to retain their knowledge (Davenport et al., 1998; Bounfour, 2000). This could be due to two main reasons. First, knowledge represents a source of power for the individual. It reinforces its legitimacy within its organization. Considered as private property, the individual is reluctant to share it : '*Knowledge is a part of me*'. Sharing means for him the loss of a private asset, a redistribution of power and therefore a threat to his job security (Davenport et al., 1998; Hansen and Nohria, 2004). Then, any act of sharing is likely to generate a cost related to the time and energy required to transmit knowledge (Ergün and Avcı, 2018).

It is in response to these two constraints that organizations have decided to reward their employees in order to compensate them for the knowledge they have agreed to share, as well as for the time and effort invested in this activity.

Nevertheless, it should be noted that research that has attempted to measure the impact of tangible rewards in the context of knowledge sharing shows that there is no consensus as to the nature of this impact. Indeed, the analysis of the literature allows us to distinguish two main categories of research.

Firstly, a first category of work that argues that tangible rewards encourage individuals to share their knowledge (Ipe, 2003; Kankanhalli et al., 2005a; Watson and Hewett, 2006; Nguyen et al., 2019; Carpentier, 2021). Indeed, the individual, by sharing his knowledge, acts for his own interest and expects to receive tangible rewards in return for the time and effort invested (Davenport and Prusak, 1998; Markus et al., 2000) . In the absence of these rewards, the individual refuses to share his knowledge because this behavior will generate only a cost and no benefit in return.

On the other hand, a second category of work highlights a null or even negative effect of tangible rewards on knowledge sharing behavior (Padilla-Melendez and Garrido-Moreno, 2012; Chedid et al., 2020; Ballesteros-Rodríguez et al., 2022). The introduction of this type of reward promotes competition between individuals (Hinds and Pfeffer, 2003), distracts their attention from the performance of their main tasks (Moore and Birkinshaw, 1998), and creates a ‘temporary compliance’ effect ', ie a temporary change in behavior; once the rewards disappear, the individual's initial behavior is resumed (Kohn, 1993).

In this research, we hypothesize that tangible rewards—monetary and symbolic, career advancement and job security—have a positive effect on knowledge sharing behaviors. In an organization related to a knowledge market, the existence of tangible rewards constitutes a counterpart of the time and the effort spent by the individual, and represents a kind of incentive and recognition from their organization.

We therefore propose the following hypothesis:

H2: Tangible rewards have a positive impact on knowledge sharing.

Moreover, while many studies have focused on examining the direct impact of motivational factors on knowledge sharing behavior, the study of the indirect impact has been lacking in these works. In other words, the examination of the interactive effects between these different motivational determinants has not been investigated. In this context, the literature in social psychology emphasizes that extrinsic motivation does not only have a direct effect on the behavior of individuals but also an indirect effect via intrinsic motivation. Contrary to certain works which have underlined that the introduction of external rewards has a destructive effect on intrinsic motivation by reducing the level of the latter (Deci 1971,1972; Deci and Ryan, 1980, 1985; Deci et al. 1999; etc.), the behaviorist approach represented by several works of psychologists (Eisenberger and Cameron, 1996; Scott, 1975), stipulates that there is no evidence as to the destructive effect of external rewards (Scott 1975). Even better, Eisenberger and Cameron (1996), analyzing 25 studies on intrinsic motivation and creativity, concluded that the destructive effect of external rewards on intrinsic motivation is a myth and not a reality. We therefore propose the following hypothesis:

H3: Tangible rewards have a positive impact on the enjoyment in helping others.

2.2.2 Reputation

While some individuals share their knowledge because it gives them pleasure and personal satisfaction, and others do so in anticipation of receiving tangible rewards (monetary or symbolic), literature describes a third category of individuals who are willing to share their knowledge in order to receive verbal rewards in return. In other words, these individuals, when they share their knowledge, appear to be more sensitive to the recognition received from those around them (Constant et al., 1996; Davenport and Prusak, 1998; Moore and Birkinshaw, 1998; Markus et al., 2000; Wasko and al., 2004; Tedjamulia and al., 2005; Wasko and Faraj, 2005; Zhang et al., 2017; Nguyen et al., 2019; Fischer, 2022).

From a knowledge market perspective, these individuals trade their knowledge for an improvement in their reputation, receiving compliments and respect from their peers in return (Davenport and Prusak, 1998, Tedjamulia and al., 2005).

They adopt a rather particular conception of knowledge. For them, knowledge itself is not a source of power, as Crozier and Friedberg (1977) stipulate. Rather, it is the act of sharing knowledge that confers power. Sharing knowledge can lead to verbal rewards from superiors, peers, and subordinates, ultimately building a reputation as an "Expert in the professional field x" (Ardishvili et al., 2003). Sharing one's knowledge and expertise can improve an employee's reputation, and as a result, legitimize his position within his organization.

This type of reward, although intangible, is likely to have tangible benefits such as job security, promotions, and higher status (Davenport and Prusak, 1998; Wasko et al., 2004). We therefore propose the following hypothesis:

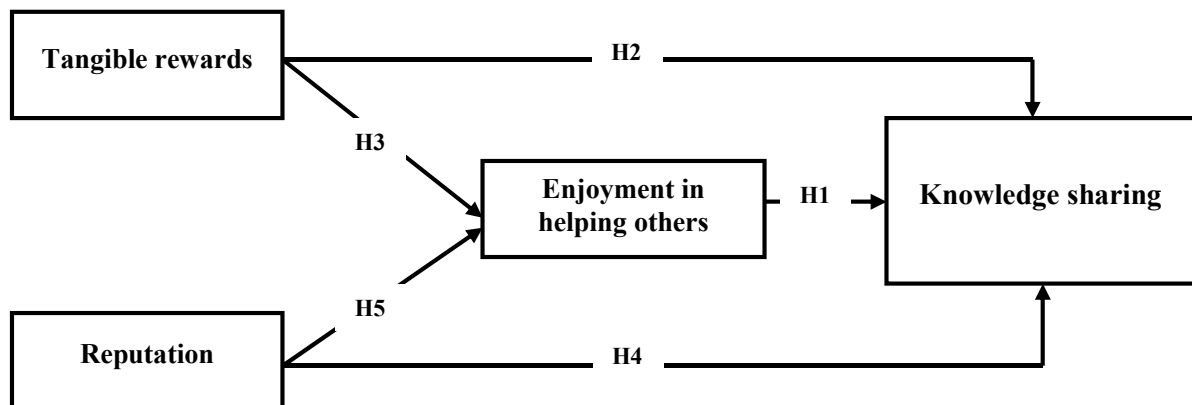
H4: Reputation has a positive impact on knowledge sharing.

We hypothesize that, like tangible rewards, this form of extrinsic motivation has a positive effect on enjoyment in helping others. Furthermore, we propose the following hypothesis:

H5: Reputation has a positive impact on the enjoyment in helping others.

After presenting all the hypotheses, we present our research model.

Figure 1: Research model



The next step is to confront the model derived from the literature with the research field.

3. Research methodology

To test our conceptual model, we adopted a quantitative approach by using a questionnaire survey to collect data from the field. This empirical positioning, which is confirmatory in nature, is consistent with the various choices made previously (Igalens and Roussel, 1998; Evrard et al., 2003), and enables us to pursue an explanatory aim by highlighting the different causal links affecting knowledge sharing behavior.

3.1 Operationalization of constructs

The four research variables were operationalized using measurement scales from the literature. To ensure contextualization and coherence with the research object and objective, some scales were modified.

The "Knowledge Sharing" variable measures the degree to which an individual feels that he share his knowledge with other members of his organization. Several measures of this variable exist in the literature without a commonly accepted one (Koh and Kim, 2004; Liao et al., 2004; de Vries et al., 2006). Among those provided by previous works, the scale of Lu et al. (2006) seems to be the most appropriate and also presents satisfactory psychometric properties. Some modifications have been made to make it applicable to this study's context.

The "Enjoyment of Helping others" variable refers to an individual's perception of the pleasure he feel in potentially helping others by sharing his knowledge. Here, the scale of Kankanhalli et al. (2005a) seems to be the most appropriate.

The "Tangible Rewards" variable refers to the importance of monetary and symbolic rewards, career advancement, and job security that individual benefits in return for sharing his knowledge. In the literature, no scale corresponds perfectly to the desired objective. That is why a composite scale, richer in terms of items, was generated from those proposed by Goodman and Darr (1998), Janz and Prasarnphanich (2003), Burgess (2005), and Kankanhalli et al. (2005).

The "Reputation" variable refers to the individual's perception of an improvement in his reputation following the sharing of his knowledge. A composite scale based on those of Kankanhalli et al. (2005) and Wasko and Faraj (2005) was generated. It has been restructured and modified to fit the study's context.

All scales were measured on a 7-point Likert scale, ranging from 1=Strongly Disagree to 7=Strongly Agree. The questionnaire was pretested in accordance with methodological recommendations, and all suggestions were taken into account before the final sending (Malhotra, 2004). The survey was distributed in both English and French using the "Backward Translation" method.

Table 1 summarizes the measurement scales used in the questionnaire.

Table 1: Operationalization of constructs

Construct	Items	Source
Knowledge sharing (PARK)	<ol style="list-style-type: none"> 1. In daily work, I take the initiative to share my work-related knowledge with my colleagues. 2. I keep my experience for me and don't share it with others easily (r). 3. I share my experiences and useful know-how with others. 4. Once I've learnt some new useful knowledge to work, I pass it on so as to let people benefit from it. 5. I never tell others about my expertise unless it is required by my hierarchy (r). 6. In the workplace, I pass on my knowledge by sharing it with other people. 7. As long as my colleagues need it, I share everything I know with no retention. 	Lu et al. (2006)
Enjoyment in helping others (PLAI)	<ol style="list-style-type: none"> 1. I enjoy sharing my knowledge with others. 2. I enjoy helping others by sharing my knowledge. 3. It feels good to help someone else by sharing my knowledge. 4. Sharing my knowledge with others pleases me. 	Kankanhalli et al. (2005)
Tangible rewards (RECTA)	<ol style="list-style-type: none"> 1. In my organization, knowledge sharing is rewarded. 2. In my organization, there is no monetary and/or symbolic rewards given for sharing knowledge (r). 3. In my organization, sharing knowledge enhances my performance evaluation. 4. In my organization, sharing knowledge increases my chances of being promoted. 5. It is important to be promoted, when I share my knowledge. 6. It is important to get monetary rewards, when I share my knowledge. 7. It is important to get a high incentive, when I share my knowledge. 8. It is important to get gifts, when I share my knowledge. 9. It is important to get a better job security, when I share my knowledge. 	Goodman and Darr (1998) Janz and Prasarnphanich (2003) Burgess (2005) Kankanhalli et al. (2005)
Reputation (REPUT)	<ol style="list-style-type: none"> 1. Sharing my knowledge improves my reputation within my organization. 2. In my organization, people who share their knowledge have more prestige than those who do not. 3. Sharing my knowledge improves recognition others give me. 4. When I share my knowledge, my colleagues respect me. 5. When I share my knowledge, my hierarchy gives me positive feedback. 6. I feel that sharing my knowledge improves my status in my function. 	Kankanhalli et al. (2005) Wasko and Faraj (2005)

r : reverse coded item

3.2 Sample and data collection

The administration of the measurement instrument took place online at two leading global brokerage and high-tech firms based in London and California respectively. Considered as knowledge-intensive and geographically dispersed organizations, these two companies have invested heavily on the knowledge management in order to capitalize on and better manage the knowledge flows they create.

The survey was administered online, and we received a total of 289 valid responses. The sample of the study presents the following characteristics: 57% men and 43% women; 67% are between 30 and 40 years old and 60% are graduates of a BAC+5 or more.

4. Results and Discussion

4.1 Testing the measurement model

Testing the measurement model was conducted on a database of N=289 after performing preparatory work, including examining missing values, outliers, and normality of distributions, in accordance with Churchill's (1979) recommendations. Following the structural equation method's requirement of N=200 for confirmatory analyses (Anderson and Gerbing, 1988; Tabachnick and Fidell, 1996), the overall sample was randomly allocated into two sub-samples, with N=89 for exploratory analyses and N=200 for confirmatory analyses.

Exploratory factor analysis (EFA) using principal component analysis (PCA) was performed with SPSS software (version 21.0), and confirmatory factor analysis (CFA) was performed with AMOS SPSS software (version 21.0) to study the dimensionality of the scales.

4.1.1 Exploratory factor analysis

EFA allowed for the reduction of the number of observable variables to a smaller set, while CFA confirmed the identified factors (Evrard et al., 2003).

All factorization conditions, including Bartlett's test of sphericity, the KMO test, and the diagonal of the anti-image correlation matrix, were met for the four metric variables studied. The results showed that three variables, namely "Knowledge sharing," "Enjoyment of helping," and "Reputation," were unidimensional. The "Knowledge Sharing" scale was reduced by three items, and the "Reputation" scale was reduced by one item after Varimax rotation. However, the "Tangible Rewards" variable, initially measured with nine items, was broken down into two factors: "Current level of tangible rewards" (RECTA_1, RECTA_2, RECTA_3, and RECTA_4) and "Perceived importance of tangible rewards" (RECTA_5, RECTA_6, RECTA_7, RECTA_8, and RECTA_9).

Table 2 presents the satisfactory internal consistency of all scales.

Table 2: Results of the exploratory factor analysis (EFA).

Scales	Dimensions	Items	Factor loading	% Total variance	Cronbach's
Knowledge sharing	Knowledge sharing	PARK_1	0,738	63%	0,803
		PARK_3	0,867		
		PARK_4	0,787		
		PARK_6	0,786		
Enjoyment in helping others	Enjoyment in helping others	PLAI_1	0,879	71%	0,863
		PLAI_2	0,876		
		PLAI_3	0,723		
		PLAI_4	0,883		
Tangible rewards	Current level of tangible rewards	RECTA_1	0,817	60%	0,672
		RECTA_2	0,675		
		RECTA_3	0,735		
		RECTA_4	0,570		

		RECTA_5	0,694		
		RECTA_6	0,848		
	Perceived importance of tangible rewards	RECTA_7	0,878		0,860
		RECTA_8	0,838		
		RECTA_9	0,697		
		REPUT_1	0,781		
		REPUT_2	0,754		
Reputation	Reputation	REPUT_4	0,716	55%	0,792
		REPUT_5	0,729		
		REPUT_6	0,728		

4.1.2 Confirmatory Factor Analysis

The study of model fit is the first step in Confirmatory Factor Analysis (CFA). The model under study fits well with the empirical data. In fact, absolute, incremental, and parsimony fit indices meet commonly used standards for good fit (see Table 3).

The factor structure of the different scales, derived from Exploratory Factor Analysis (EFA), is confirmed by CFA. All items are strongly correlated with the latent variables. All standardized regression coefficients are above the set threshold of 0.4, and are close to those obtained in exploratory factor analyses (see Table 4). Also, all *t*-values associated with factor loadings are significantly above 1.96.

The reliability of the scales was assessed using Jöreskog's ρ , which showed satisfactory internal consistency of the constructs. Notably, this value was similar to the score obtained for Cronbach's alpha (see Table 4).

Convergent validity for all scales was established based on Roussel et al.'s (2002) criterion, as the *t*-test associated with each factor loading was above 1.96. However, based on Fornell and Larcker's (1981) criterion, the average variance extracted did not reach the threshold of 0.5 for the variables "Current level of tangible rewards," "Perceived importance of tangible rewards," and "Reputation." Therefore, further research is needed to improve these scales (see Table 4).

Table 3: Goodness of fit of the structural model

Indices	Knowledge sharing	Enjoyment in helping others	Tangible rewards	Reputation	Recommended value
χ^2	5,965	2,215	45,018	7,17	-
ddl	2	2	19	5	-
χ^2/ddl	2,98	1,11	2,369	1,43	< 5
GFI	0,97	0,99	0,95	0,99	> 0,80
AGFI	0,93	0,97	0,90	0,96	> 0,80
RMSEA	0,100	0,023	0,083	0,047	< 0,1 voire < 0,05
NFI	0,98	0,99	0,90	0,97	> 0,90
CFI	0,99	0,99	0,94	0,99	> 0,90

Table 4 : Summary of results related to confirmatory factor analysis (CFA)

Constructs	Items	Standardized regression weight	t-value	SMC	Jöreskogs' ρ^2	ρ^2 vc (AVE)
Knowledge sharing	PARK_1	0,616	7,543***	0,380	0,819	0,534
	PARK_3	0,686		0,471		
	PARK_4	0,746	9,027***	0,557		
	PARK_6	0,853	8,993***	0,727		
Enjoyment in helping others	PLAI_1	0,780	9,843***	0,609	0,825	0,544
	PLAI_2	0,758		0,575		
	PLAI_3	0,594	7,710***	0,353		
	PLAI_4	0,799	10,363***	0,639		
Current level of tangible rewards	RECTA_1	0,535	5,851***	0,286	0,728	0,479
	RECTA_3	0,682	6,577***	0,465		
	RECTA_4	0,828		0,686		
Perceived importance of tangible rewards	RECTA_5	0,451	5,522***	0,207	0,787	0,435
	RECTA_6	0,742	8,661***	0,551		
	RECTA_7	0,802	9,385***	0,643		
	RECTA_8	0,700		0,490		
	RECTA_9	0,531	6,474***	0,282		
Reputation	REPUT_1	0,633	6,916***	0,401	0,786	0,430
	REPUT_2	0,614		0,377		
	REPUT_4	0,780	7,940***	0,608		
	REPUT_5	0,462	5,538***	0,214		
	REPUT_6	0,742	7,392***	0,550		

*** : significant at $p < 0,001$ ** : significant à $p < 0,01$

4.2 Testing the structural model

Most of the fit indices indicated that the initial model fit the empirical data well. However, in order to improve the model's adequacy to the data, we proceeded to the specification of it by removing three relationships that were not significant (error probability level greater than 5% and C.R coefficients less than 1.96).

The results (see table 5) show that the structural model can correctly reproduce the data collected. Thus, the $c2/ddl$, GFI, AGFI and RMSEA indices are very satisfactory. The CFI and NFI indices are close to the recommended threshold. As such, we specify that these thresholds are commonly accepted, rather than criteria for rejecting the structural model (Roussel et al., 2002). In addition, it should be noted that the NFI index is very sensitive to sample size (Roussel et al., 2002).

Table 5: Goodness of fit of the structural model

Indexes	Results	Recommended value	References
χ^2/ddl	2,143	< 5	Jöreskog (1969)
GFI	0,851	> 0,80	Etezadi-Amoli et Farhoomand (1996)
AGFI	0,814	> 0,80	Jöreskog et Sörbom (1984)
RMSEA	0,076	< 0,1 voire < 0,05	Steiger et Lind (1980) Jöreskog et Sörbom (1984)
NFI	0,778	> 0,90	Bentler et Bonett (1980)
CFI	0,866	> 0,90	Bentler (1989)

The test of the causal relationship between the variables "Enjoyment of helping others" and "Knowledge sharing" yields a coefficient of 0.82, with a probability of being wrong by accepting H1 is less than 0.001 ($p < 0.001$). Therefore, hypothesis H1 is accepted. This result indicates that the variable "Enjoyment of helping others" has a very strong positive impact on the variable "Knowledge sharing". This finding confirms the results of several previous studies (Hall, 2001; Ko et al., 2005; Tedjamulia et al., 2005; Hung et al., 2005; Zhang et al., 2017; Ergün and Avcı, 2018; Nguyen et al., 2019; Chedid et al., 2020; Carpentier, 2021; Fischer, 2022), which suggest that an individual shares knowledge because it provides him a pleasure and personal satisfaction. With his altruistic behavior, he express a very high intrinsic motivation and contribute to the conversion of his individual knowledge into organizational knowledge.

The hypothesis concerning tangible rewards was divided into two separate hypotheses due to the two-dimensional nature of the variable. The first hypothesis, H2a, examines the impact of an individual's perception of the importance of tangible rewards on knowledge sharing (RECTA_A), while the second hypothesis, H2b, explores the influence of the actual level of tangible rewards on the variable being explained (RECTA_B). The results of the structural model test show that the first causal relationship is estimated at 0.034 with a probability of being wrong in admitting H2a of 62% ($p = 0.624$). This threshold is greater than 5%, therefore the H2a hypothesis is rejected. The second relation is estimated at 0.11 with a probability of being wrong by admitting H2b of 2.3% ($p = 0.023$). This threshold is less than 5%, therefore the H2b hypothesis is accepted. Therefore, sharing behavior seems to be determined more by the current level of rewards (even if the effect is relatively small) than by the perceived importance of this type of reward.

Just like the previous hypothesis, this one has also been split into two: H3a, which examines the impact of "Perceived importance of tangible rewards" on the enjoyment in helping others (RECTA_A), and H3b, which represents the impact of "Current level of tangible rewards" on the enjoyment in helping others (RECTA_B). The results show that the first relationship is estimated at -0.25 with a probability of making an error in accepting H3a of 0.4% ($p = 0.004$). This threshold is lower than 5%, therefore hypothesis H3a is rejected. The second causal

relationship is estimated at -0.006 with a probability of making an error in accepting H3b of 93% ($p=0.932$). This threshold is much higher than 5%, therefore hypothesis H3b is rejected.

These results are particularly interesting because, while the actual level of tangible rewards seems to have no significant effect on intrinsic motivation, the perceived importance of tangible rewards appears to have a negative effect on it. In other words, this dimension of extrinsic motivation and intrinsic motivation have a conflicting effect. As the cognitive evaluation theory (Deci 1971,1972; Deci and Ryan, 1980, 1985) states, the introduction of external rewards has a destructive effect on intrinsic motivation by reducing its level.

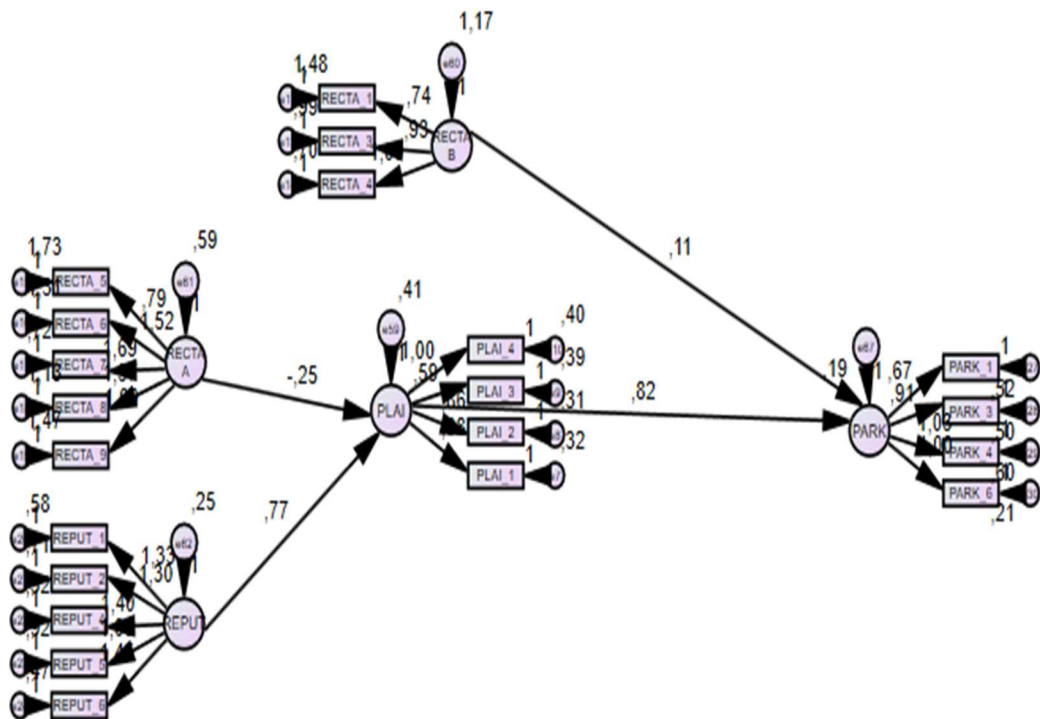
The test of the hypothesis relating to the 'Reputation' variable shows that the causal relationship between 'Reputation' and 'Knowledge sharing' is estimated at 0.035 with a probability of being wrong by accepting H4 of 79% ($p= 0.793$). This threshold is greater than 5%, therefore hypothesis H4 is rejected. The test of the hypothesis relating to the 'Reputation' variable also shows that the causal relationship going from 'Reputation' to 'Pleasure to help' is estimated at 0.77 and the probability of being wrong by accepting H5 is less than 0.001 ($p<0.001$). Hypothesis H5 is therefore accepted.

The results of these two hypotheses are interesting. First, verbal rewards do not have a significant direct impact on sharing behavior. This result means that the individual, by sharing his knowledge, seeks neither recognition nor to improve his reputation. This conclusion is consistent with that of the work of Ko et al. (2005) and Kwok and Gao (2005-06) but does not confirm that of the majority of works on the 'Reputation' factor (Constant et al., 1996; Davenport and Prusak, 1998; Moore and Birkinshaw, 1998; Markus et al., 2000; Wasko et al., 2004; Tedjamulia et al., 2005; Wasko and Faraj, 2005; Zhang et al., 2017; Nguyen et al., 2019; Fischer, 2022).

However, it should be noted that if no direct effect is demonstrated, the 'Reputation' factor exerts a strong significant impact on the 'Enjoyment in helping others', and therefore an indirect impact on knowledge sharing behavior. This also means that extrinsic verbal rewards and intrinsic motivation have an additive effect as highlighted by the work of Eisenberger and Cameron (1996).

Figure 1 shows the structural model with the results of the hypothesis test.

Figure 1: Model testing results



In conclusion, we can gather the following insights regarding knowledge sharing behavior:

- Intrinsic motivation strongly determines an individual's knowledge-sharing behavior (0.82).
- The importance of tangible rewards in extrinsic motivation does not have a significant effect on knowledge-sharing behavior. However, it has a negative impact on intrinsic motivation (-0.25), leading to **conflicting and destructive effects**.
- The current level of tangible rewards has a weak positive effect (0.11) on knowledge-sharing behavior and no effect on intrinsic motivation.
- Reputation or verbal extrinsic rewards have no direct significant effect on knowledge-sharing behavior. However, this factor has a very significant indirect effect (0.77) on behavior through intrinsic motivation.
- Verbal extrinsic rewards and intrinsic motivation have an **additive effect**.

We end this discussion with some managerial implications for knowledge sharing. We suggest the following:

- Individuals should be made aware that knowledge sharing should not be perceived as a behavior that systematically leads to a loss of power, but rather as a social exchange, in which all parties involved benefit from sharing knowledge.

- Encouraging intrinsic motivation through a sharing culture based on trust, altruism, recognition, collaboration, and leadership.
- Providing verbal rewards to individuals who share their knowledge because it gives them personal satisfaction and further encourages them to share their expertise.
- Avoiding tangible monetary and symbolic rewards, which may be perceived as a means of control, thus causing a destructive effect on intrinsic motivation and then indirectly on knowledge sharing behavior.

5. Limitations and directions for futur research

While this study offers important insights, there are several limitations that need to be addressed in future research to improve the generalizability of the findings.

Firstly, the construct used to measure knowledge sharing behavior in this study only captures behavior at a single point in time. However, this behavior, according to several previous studies (Hwang et al., 2008), could evolve over time, either progressively towards intensive sharing behavior or regressively towards knowledge retention. Indeed, the organizational context of a knowledge market governed by the law of supply and demand reveals various evolving behaviors towards knowledge sharing depending on several other determinants, including leadership, expected benefits, or trust. A longitudinal study that examines the dynamic nature of knowledge sharing behavior would extend this limited view.

Secondly, while this study focuses on a knowledge-intensive organization, previous research in this area has mostly been conducted in similar organizational contexts consisting of primarily multinational companies (Ling et al., 2009; Chatterjee et al., 2021). To extend our understanding of knowledge sharing behavior, future research should consider different contexts, such as the academic environment, where there is a significant loss of knowledge due to the retirement of professors and insufficient capitalization and transfer of their expertise at the organizational level (Chedid et al., 2020; Ballesteros-Rodríguez et al., 2022).

Moreover, this study only considers the motivational perspective of knowledge sharing behavior. Future research should explore other dimensions, including leadership, collective reciprocity, perceived organizational ownership, and engagement, to provide a more comprehensive understanding of this behavior.

Lastly, while this study relied primarily on a quantitative research design that is consistent with its confirmatory nature, some of the results obtained, particularly those relating to tangible rewards, appear improbable. Therefore, a qualitative study that uses rich empirical data to provide a more in-depth understanding of the phenomenon studied, would supplement these findings and provide a more robust explanation.

Bibliography

- Alavi, M. and Leidner, D. (1999), "Knowledge management systems : Emerging views and practices from the field", *Proceedings of the 32th Hawaii International Conference on System Sciences*.
- Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice : A review and recommended two-step approach", *Psychological Bulletin*, vol. 103, n°3, pp 411–423.
- Ardichvili, A., Page, V. and Wentling, T. (2003), "Motivation and barriers to participation in virtual knowledge-sharing communities of practice", *Journal of Knowledge Management*, vol. 7, n°1, pp 64-77.
- Ballesteros-Rodríguez, J., De Saá-Pérez, P., García-Carbonell, N., Martín-Alcázar, F. and Sánchez-Garvey, G. (2022), "L'influence de la motivation de l'équipe et du comportement des leaders sur le partage des connaissances scientifiques dans les universités", *Revue Internationale des Sciences Administratives*, vol 88, pp 301-316.
- Bentler, P.M. (1988), *Theory and implementation of EQS : A structural equations program*, Sage, Newbury Park, CA.
- Bentler, P.M. (1989), *EQS structural equations program manual*, BMDP Statistical Software, Los Angeles.
- Bentler, P.M. (1990), "Comparative fit indexes in structural models", *Psychological Bulletin*, vol.107, pp 238-246.
- Bentler, P.M. et Bonett, D.G. (1980), "Significance tests and goodness of fit in the analysis of covariance structure", *Psychological Bulletin*, vol.88, pp 588-606.
- Boer, N-I. , van Baalen, P.J. and Kumar, K. (2004), "The implications of different models of social relations for understanding knowledge sharing", in Tsoukas, H. and Mylonopoubs, N., *Organizations as knowledge systems : learning an dynamic capabilities*, New York Palgrave Macmillan, pp 130-153.
- Bounfour, A. (2000), "Gestion de la connaissance et systèmes d'incitation : Entre théorie du 'Hau' et du 'Ba' ", *Systèmes d'information et Management*, vol.5, n°2, pp 7-40.
- Brief, A.P. and Motowidlo, S.J. (1986), "Prosocial organizational behaviors", *Academy of Management Review*, vol. 11, n°4, pp 710-725.
- Brown, J.S. and Duguid, P. (2000), "Balancing act : How to capture knowledge without killing it", *Harvard Business Review*, May-June, pp 73-80.
- Browne, M.W. et Cudeck, R. (1993), "Alternative ways of assessing model fit", in Bollen, B.A. et Long, J.S., *Testing Structural Equation Models*, Sage, Newbury Park, CA, pp136-162.
- Burgess, D. (2005), "What motivate employees to transfer knowledge outside their unit work?", *Journal of Business Communication*, vol.42, n° 4, pp 324-348.
- Carpentier, P. (2021), "Understanding individual motivations among members of online communities", *Les Cahiers du numérique*, vol 17, pp 153-183.
- Chedid, M., Alvelos, H. and Teixeira, L. (2022), "Individual factors affecting attitude toward knowledge sharing: an empirical study on a higher education institution", *VINE Journal of Information and Knowledge Management Systems*, vol. 52 n°. 1, pp. 1-17.
- Churchill, G.A. (1979), "A paradigm for developing better measures of marketing constructs", *Journal of Marketing Research*, vol. 16, n°1, pp 64-73.
- Constant, D., Kiesler, S. and Sproull, L. (1994), "What's mine is ours, or is it ? A study of attitudes about information sharing", *Information Systems Research*, vol. 5, n° 4, pp 400-421.
- Crozier M. and Friedberg E., 1977, *L'acteur et le système*, Editions du Seuil, Paris.
- Davenport, T.H. (1998), "Some principles of knowledge management", <www.bus.utexas.edu/kman/kmprin.htm>.
- Davenport, T.H. and Prusak, L. (1998), *Working knowledge: How organizations manage what they know*, MA : Harvard Business School Press, Cambridge.

- Davenport, T.H., De Long, D.W. and Beers, M.C. (1998), "Successful knowledge management projects", *Sloan Management Review*, vol. 39, n°2, pp 43-57.
- De Vries, R.E., van den Hooff, B. and de Ridder, J. (2006), "Explaining knowledge sharing: The role of team communication styles, job satisfaction, and performance beliefs", *Communication Research*, vol.33, n°2 , pp 115-135.
- Deci, E.L. (1971), "The effects of externally mediated rewards on intrinsic motivation", *Journal of Personality and Social Psychology*, vol.18, n° 1, pp 105-115.
- Deci, E.L. (1972), "Intrinsic motivation, extrinsic reinforcement and inequity", *Journal of Personality and Social Psychology*, vol. 22, n°1, pp 113-120.
- Deci, E.L. and Ryan, R.M. (1980), "The empirical exploration of intrinsic motivational processes", *Advances in Experimental Social Psychology*, vol. 13, pp 39-80.
- Deci, E.L. and Ryan, R.M. (1985), *Intrinsic motivation and self-determination in human behavior*, Plenum Press, New York.
- Deci, E.L., Koestner, R. and Ryan, R.M. (1999), "A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation", *Psychological Bulletin*, vol.125, n° 6, pp 627-668.
- Eisenberger, R. and Cameron, J. (1996), "Detrimental effects of reward : Reality or myth ?", *American Psychologist*, vol. 51, n°11, pp 1153-1166.
- Eisenberger, R., Pierce, W.D. and Cameron, J. (1999), "Effects of reward on intrinsic motivation – Negative, neutral and positive : Comment on Deci, Koestner and Ryan (1999)", *Psychological Bulletin*, vol. 125, n°6, pp 677-691.
- Ergün, E., and Avcı, Ü. (2018), " Knowledge Sharing Self-Efficacy, Motivation and Sense of Community as Predictors of Knowledge Receiving and Giving Behaviors", *Educational Technology & Society*, 21 (3), pp 60–73.
- Etezadi-Amolo, J. et Farhoomand, A.F. (1996), "A structural model of end user computing satisfaction and user performance", *Information & Management*, vol.30, n°2, pp 65–73.
- Evrard, Y., Pras, B. and Roux, E. (2003), *Market, Etudes et recherches en marketing*, Dunod, Paris.
- Faraj, S. and Sproull, L. (2000), "Coordinating expertise in software development teams", *Management Science*, vol. 46, n° 12, pp 1554-1568.
- Fischer, C. (2022), "Motivated to share? Development and validation of a domain-specific scale to measure knowledge-sharing motives", *VINE Journal of Information and Knowledge Management Systems*.
- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, vol.18, pp 39-50.
- Goodman, P.S. and Darr, E.D. (1998), "Computer-aided systems and communities: Mechanisms for organizational learning in distributed environments", *MIS Quarterly*, December, pp 417-440.
- Grant, R.M. (1996), "Toward a knowledge-based theory of the firm", *Strategic Management Journal*, vol.17, pp 109-122.
- Gupta, A.K. and Govindarajan, V. (2000), "Knowledge management's social dimension: Lessons from Nucor steel", *Sloan Management Review*, vol. 42, n°1, pp 71-80.
- Hall, H. (2001), "Input-friendliness: Motivating knowledge sharing across intranets", *Journal of Information Science*, vol. 27, n° 3, pp 139-146.
- Hansen, M.T. and Nohria, N. (2004), "How to build collaborative advantage", *MIT Sloan Management Review*, Fall, pp 22-30.
- Hinds, P.J. and Pfeffer, J. (2003), "Why organizations don't know what they know: Cognitive and motivational factors affecting the transfer of expertise", in Ackerman, M., Pipek, V. and Wulf, V., *Beyond knowledge management : Sharing expertise*, Cambridge, MA : MIT Press, pp 3-26.

- Hung, S-Y., Lai, H-M. and Chang, W-W. (2011), “Knowledge-sharing motivations affecting R&D employees’ acceptance of electronic knowledge repository”, *Behaviour & Information Technology*, vol. 30, n°2, March–April, pp 213–230.
- Hung, Y-C., Huang, S-M., Lin, Q-P. and Tsai, M-L. (2005), “Critical factors in adopting a knowledge management system for the pharmaceutical industry”, *Industrial Management and Data Systems*, vol. 105, n° 2, pp 164- 183.
- Hwang, H.G., Chang, I-C., Chen, F.J. and Wu, S.Y. (2008), “Investigation of the application of KMS for diseases classifications: A study in a Taiwanese hospital”, *Expert Systems with Applications*, vol. 34, pp 725–733.
- Igalens, J. and Roussel, P. (1998), *Méthodes de recherche en gestion des ressources humaines*, Economica, Paris.
- Ipe, M. (2003), “Knowledge sharing on organizations: A Conceptual framework”, *Human Resource Development Review*, vol. 2, n°4, pp 337-359.
- Janz, B.D. and Prasarnphanich, P. (2003), “Understanding the antecedents of effective knowledge management: The importance of a knowledge-centred culture”, *Decision Sciences*, vol. 34, n° 2, pp 351-384.
- Jöreskog, K.G. (1969), “A general approach to confirmatory maximum likelihood factor analysis”, *Psychometrika*, vol.34, pp 183-202.
- Jöreskog, K.G. et Sörbom, D. (1984), *LISREL IV user’s guide*, Scientific Software, Mooresville.
- Kankanhalli, A., Tan, B.C.Y. and Wie, K-K. (2005a), “Contributing knowledge to electronic knowledge repositories: An empirical investigation”, *MIS Quarterly*, vol. 29, n°1, pp 113-143.
- Ko, D-G., Kirsch, L.J. and King, W.R. (2005), “Antecedents of knowledge transfer from consultants to clients in enterprise system implementations”, *MIS Quarterly*, vol. 29, n°1, pp 59-85.
- Koh, J. and Kim, Y.G. (2004), “Knowledge sharing in virtual communities: An e-business perspective”, *Expert Systems with Applications*, vol. 26, pp 155–166.
- Kohn, A. (1993), “Why incentive plans cannot work”, *Harvard Business Review*, September-October, pp 54-63.
- Kwok, S.H. et Gao, S. (2005-2006), “Attitude towards knowledge sharing behavior”, *Journal of Computer Information Systems*, Winter, pp 45-51.
- Liao, S-H., Chang, J-C., Cheng, S-C. and Kuo, C-M. (2004), “Employee relationship and knowledge sharing: A case study of a Taiwanese finance and securities firm”, *Knowledge Management Research and Practice*, vol.2, pp 24-34.
- Lin C. Y., Huang C. K., Ko C. J. (2020), “The impact of perceived enjoyment on team effectiveness and individual learning in a blended learning business course: The mediating effect of knowledge sharing”, *Australasian Journal of Educational Technology*, 36(1), 126–141
- Lu, L., Leung, K., and Koch, P.T. (2006), “Managerial knowledge sharing: The role of individual, interpersonal, and organizational factors”, *Management and Organization Review* vol.2, n°1, pp 15–41.
- Markus, L. (2001), “Toward a theory of knowledge reuse: Types of knowledge reuse situations and factors in reuse success”, *Journal of Management Information Systems*, vol.18, n°1, pp 57-93.
- Moore, K. and Birkinshaw, J. (1998), “Managing knowledge in global service firms: Centers of excellence”, *The Academy of Management Executive*, vol. 12, n°4, pp 81-92.
- Nahapiet, J. and Ghoshal, S. (1998), “Social capital, intellectual capital, and the organizational advantage”, *Academy of Management Review*, vol. 23, n°2, pp 242-266.
- Nguyen, T.-M., Nham, T.P., Froese, F.J. and Malik, A. (2019), "Motivation and knowledge sharing: a meta-analysis of main and moderating effects", *Journal of Knowledge Management*, vol. 23 No. 5, pp. 998-1016.

- Padilla-Meléndez, A. and Garrido-Moreno, A. (2012), “Open innovation in universities: What motivates researchers to engage in knowledge transfer exchanges?”, *International Journal of Entrepreneurial Behavior & Research*, vol. 18, n°4, pp. 417-439.
- Pfeffer, J. (2000), *The knowing-doing gap: How smart companies turn knowledge into action*, Boston: Harvard Business School Press.
- Ross, M. (1975), “Salience of reward and intrinsic motivation”, *Journal of Personality and Social Psychology*, vol. 32, n°2, pp 245-254.
- Roussel, P., Durrieu, F., Campoy, E. and El Akremi, A., (2002), *Méthodes d'équations structurelles : Recherche et application en Gestion*, Economica, Paris.
- Ryan, R.M. and Deci, E.L. (2000), “Intrinsic and extrinsic motivation: Classic definitions and new directions”, *Contemporary Educational Psychology*, vol.25, pp 54-67.
- Scott, W.E. (1975), “The effects of extrinsic rewards on intrinsic motivation: A critique”, *Organizational Behavior and Human Performance*, vol.14, pp 117-129.
- Shannon, C. E. and Weaver, W. (1949), *The mathematical theory of communication*, Chicago: University of Illinois Press.
- Tabachnick, B.G. and Fidell, L.S. (1996), *Using multivariate statistics*, Harper Collins, New York.
- Tedjamulia, S.J.J., Dean, D.L., Olsen, D.R. and Albrecht, C.C. (2005), “Motivating content contributions to online communities: Toward a more comprehensive theory”, *Proceedings of the 38th Hawaii International Conference on System Sciences*.
- Vallerand, R.J. and Thill, E.E. (1993), “Introduction au concept de motivation”, dans Vallerand, R.J. and Thill, E.E. (Eds), *Introduction à la psychologie de la motivation*, Editions études vivantes-Vigot, Laval (Québec), pp 3-39.
- Van Baalen, P., Bloemhof-Ruwaard, J. and van Heck, E. (2005), “Knowledge sharing in an emerging network of practice: The role of a knowledge portal”, *European Management Journal*, vol. 23, n°3, pp 300-314.
- Voelpel, S.C. and Han, Z. (2005), “Managing knowledge sharing in China: The case of Siemens ShareNet”, *Journal of Knowledge Management*, vol. 9, n°3, pp 51-63.
- Von Krogh, G. (1998), “Care in knowledge creation”, *California Management Review*, vol. 40, n°3, pp 133-153.
- Wasko, M.M. and Faraj, S. (2005), “Why should I share? Examining social capital and knowledge contribution in electronic networks of practice”, *MIS Quarterly*, vol. 29, n°1, pp 35-57.
- Wasko, M.M., Faraj, S. and Teigland, R. (2004), “Collective action and knowledge contribution in electronic networks of practice”, *Journal of the Association for Information Systems*, vol. 5, n°11-12, pp 493-513.
- Watson, S. and Hewett, K. (2006), “A multi-theoretical model of knowledge transfer in organizations: Determinants of knowledge contribution and knowledge reuse”, *Journal of Management Studies*, vol. 43, n°2, pp 141-173.
- Zack, M.H. (2003), “Rethinking the knowledge-based organization”, *MIT Sloan Management Review*, Summer, 67-71.
- Zhang, X., Liu, S., Chen, X. and Gong, Y. (2017), “Social capital, motivations, and knowledge sharing intention in health Q & A communities”, *Management Decision*, 55(1).