Knowledge sharing and individual work performance: an empirical study of a public sector organisation

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Abstract

Purpose – *The purpose of this study is to examine whether individual-level knowledge sharing (in terms of attitudes, benefit estimations, self-efficacy and actualised behaviours) affects individual work performance.*

Design/methodology/approach – *Hypotheses are tested through structural equation modelling of survey data collected from 595 members of a public organisation.*

Findings – *The findings confirm the hypothesis that knowledge-sharing propensity impacts positively on knowledge-sharing behaviour. Additionally, knowledge-sharing behaviour mediates the relationship between knowledge-sharing propensity and individual performance. The latter effect is also significant amongst the most highly educated members of the organisation but not among those with the lowest educational levels.*

Originality/value – *This paper provides insights into the knowledge-sharing–attitude–behaviour–work performance linkage. It thus addresses a relatively neglected area in knowledge management (KM) research, namely, that of individual knowledge behaviours and their performance impact, with an aim to better understand the micro-foundations of KM. It also contributes to knowledge on KM in the public sector.*

Keywords *Knowledge sharing, Individual work performance, Knowledge-Sharing behaviour, Micro-Foundations, Public organisation*

Paper type *Research paper*

Introduction

Nowadays, public sector organisations are widely regarded as knowledge-based organisations that focus on developing and providing knowledge services for stakeholders (Luen and Al-Hawamdeh, 2001; Huang, 2014). This means that knowledge is considered their key resource (Willem and Buelens, 2007; Sandhu *et al.*, 2011; Siong *et al.*, 2011); therefore, facilitating knowledge sharing and improving the management of knowledge are seen as critical challenges in the public sector (Silvi and Cuganesan, 2006; Kim and Lee, 2006). In the knowledge-based economy, the ability of organisations to create, transfer and adopt knowledge, rather than allocate efficiency, determines their long-run performance (Prahalad and Hamel, 1990). An increasing number of public sector organisations are therefore making an effort to set up knowledge management (KM) systems and practices to more effectively share and use the knowledge they possess. Moreover, an expanding body of research has highlighted the importance of knowledge in organisations.

KM has traditionally focused on information technology and information-driven perspectives (Davenport *et al.* 1998). Today, there is increasing recognition of the role of individuals in KM processes, as well as a greater level of interest in the people perspective of knowledge in organisations (Stenmark, 2001). This perspective acknowledges that the individuals in organisations are those who possess knowledge (Grant, 1996; Spender and Grant, 1996), and thus, the key to successfully managing knowledge is now seen as dependent on the connections between individuals in the organisation (McDermott, 1999).

There is also increasing empirical evidence highlighting the importance of people and people-related factors as key priorities in knowledge processes within organisations (Andrews and Delahaye, 2000). Among these knowledge processes, the effective sharing of relevant specialised knowledge plays a fundamental role in an organisation's competitive advantage and sustained performance (Kogut and Zander, 1996; Argote and Ingram, 2000; Wang and Noe, 2010). Therefore, the effective sharing of knowledge can be a key productivity driver in public sector organisations (Silvi and Cuganesan, 2006). Along with several recent studies (Bock and Kim, 2002; Chow and Chan, 2008; Chang and Chuang, 2011), the authors assume that knowledge-sharing behaviour is motivated and executed mainly at the individual level. In general, knowledge sharing is the contribution that individuals make to the collective knowledge of the organisation (Cabrera and Cabrera, 2002). On a fundamental level, it forms the micro-foundations that explain how knowledge is utilised to reach organisational-level outcomes (Foss *et al.*, 2010). Thus, an organisation's ability to effectively utilise its knowledge relies substantially on its people, who actually share, create and use knowledge.

However, a coherent understanding of the factors impacting knowledge sharing in terms of individual-level performance outcomes appears to be lacking (Lin *et al.*, 2006). While there are many studies discussing the drivers of individual-level knowledge sharing in organisations (Chow and Chan, 2008; Tohidinia and Mosakhani, 2009; Chang and Chuang, 2011), there is not much evidence of how the actualised knowledge-sharing behaviour eventually affects the performance of those individuals who share knowledge. This gap is also highlighted by He and Wei (2009), who suggest that previous studies tend to neglect the link between the attitude leading to the intention to share knowledge and actual knowledge-sharing behaviour. These studies either stop at the prediction of behavioural intention or directly examine a group of factors that impact actual behaviour. There is thus a need for further studies to provide more accurate explanations of the mediating role of the knowledge-sharing behaviour of individuals between knowledge-sharing propensities and performance.

Additionally, most research on knowledge sharing concentrates on private companies, with relatively few empirical studies on knowledge sharing in public sector organisations (Amayah, 2013; Sandhu *et al.*, 2011; Willem and Buelens, 2007). However, the phenomenon of knowledge sharing might have some unique characteristics in the public sector context (Yao *et al.*, 2007); for example, hierarchical structures, bureaucratic systems and the perception of knowledge being withheld as a source of power might pose additional challenges to knowledge sharing (Liebowitz and Chen, 2003). McAdam and Reid (2000) found that KM in the public sector tends to utilise more people-based approaches and focuses more on social interaction than KM in private companies. The uniqueness of the public sector suggests that it might be unwise to directly apply the results of studies conducted in private sector firms to public sector organisations and that there is a need to conduct empirical investigations of public organisations.

To address these research gaps, the present study examines whether individual-level knowledge sharing (i.e. the propensity and actualised behaviours of individuals in sharing knowledge with other organisational actors) affects individual work performance in public sector organisations. The argument put forward is that shifting the perspective from an organisational level to the level of individual employees contributing their knowledge to

"The results demonstrated that in the public sector, the propensity to share knowledge predicts the likelihood of engaging in knowledge-sharing behaviours."

> **"It can be argued that public organisations are nowadays rather knowledge-intensive, and focusing knowledge management research efforts on them would be a feasible area for research."**

others in the organisation, to a greater or lesser extent, offers a more fine-grained analytical approach that helps untangle the "black box" of knowledge-based value creation in organisations (cf. Minbaeva *et al.*, 2009). Although the importance of knowledge sharing for overall organisational performance appears to be well established in the literature (Lee and Choi, 2003; Du *et al.*, 2007; Hsu, 2008; Saenz *et al.*, 2009), there is a dearth of studies demonstrating such a relationship at the level of individuals – even though individuals are precisely those who share (or withhold) knowledge with one another within an organisation.

To examine this issue, the authors use a framework dividing individual knowledge sharing into two dimensions: the individual propensity towards sharing knowledge and the executed knowledge-sharing behaviour. In this study, knowledge sharing is referred to in the context of "sharing" as such and does not take a specific stance on the actualised transfer, as per Foss *et al.* (2010) and Chatzoglou and Vraimaki (2009). The authors then examine the impact of these on individual work performance by statistically analysing survey data collected from 595 members of a public organisation. The empirical analysis confirmed the stated hypotheses that positive knowledge-sharing propensity impacts positively on knowledge-sharing behaviour and that knowledge sharing mediates the relationship between knowledge sharing and individual performance. Moreover, the latter effect was found to be significant amongst the most highly educated members of the organisation but not amongst those with the lowest educational levels. In what follows, the authors discuss the theoretical background and hypotheses, followed by the research design and data collection. On the basis of the results and analyses, the paper ends with an analysis on the implications for research and practice.

Theoretical background and hypotheses

In this section, the authors formulate the theoretical basis for the main argument. The setting is structured around the knowledge governance perspective, specifically the notion of *micro-foundations of knowledge sharing* (Felin and Foss, 2005; Abell *et al.*, 2008; Foss *et al.*, 2009, 2010; Minbaeva, 2013). From this perspective, organisational performance is oftentimes measured with organisational-level antecedents and outcomes, while, in reality, these are formed from individual (i.e. micro-level) activities, processes, behaviours and outcomes (Felin and Foss, 2005; Abell *et al.*, 2008; Foss *et al.*, 2009, 2010; Minbaeva, 2013). This line of argumentation is then followed by focusing on knowledge-sharing propensities and behaviour at the individual level and examining the effects of this process on individuals' work performance outcomes.

Knowledge sharing in organisations

Knowledge sharing generally refers to moving knowledge between different organisational actors, both within and between departments and hierarchical levels (Bhatt, 2001; Szulanski, 1996). The key goal of knowledge sharing amongst employees in an organisation is to transfer knowledge into organisational assets and resources (Dawson, 2001). Knowledge sharing is important because it enables the spread of knowledge as organisational collective knowledge and helps the company use available resources in an efficient and effective manner (Grant, 1996; Argote and Ingram, 2000). Furthermore, knowledge sharing leads to better utilisation of existing knowledge and is also a key to

knowledge creation (Nonaka, 1994; Kogut and Zander, 1996) and innovation (Cohen and Levinthal, 1990). The key issue from the organisational perspective is that knowledge should be transferred to where it is needed and where it can be applied to productive use. Various channels can be used in knowledge sharing: official (e.g. trainings) or unofficial (e.g. coffee table discussions), personal (e.g. work rotation) or impersonal (e.g. company databases) (Alavi and Leidner, 2001). The sharing process can occur either explicitly, through direct advisory communication, or implicitly, without the recipient being able to articulate the acquired knowledge (Argote and Ingram, 2000). Knowledge sharing is an important basis for competitive advantage in firms (Kogut and Zander, 1996; Argote and Ingram, 2000). It has been argued that encouraging knowledge sharing is the most important aspect of consciously managing knowledge (Bock and Kim, 2002). Correspondingly, several reviews in the field of KM have found knowledge sharing to be the most common concept explored in the related literature (Hislop, 2010; Edwards *et al.*, 2009).

The importance of knowledge sharing underlines the agentic power of individual employees, recognising that the individuals engaging in knowledge sharing decide how they want to utilise their skills and intellect, as well as direct their efforts on the basis of personal motivation. As knowledge is largely tacit and embedded in individual experiences (Polanyi, 1966; Nonaka), perspectives and values, it is dispersed and distributed all around the organisation (Tsoukas, 1996). Each member of the organisation is likely to have some important knowledge that no one else in the firm possesses. Sometimes, relevant knowledge is in the customer interface or marketing and sales department; other times, it is on the shop floor. Furthermore, the individual decision to either share or withhold knowledge in work-related interactions comes down to individual motivations and cannot be forced via means of management control (Spender, 1996; Käser and Miles, 2002). As knowledge sharing is mainly motivated and executed at the individual level (Bock and Kim, 2002), it should be explained by using individual-level constructs. More specifically, the argument here is that to understand the micro-foundations of organisational knowledge sharing, one has to distinguish the knowledge-sharing propensities of individuals from their knowledge-sharing behaviours. The first represents the propensity of organisational actors to share their knowledge with one another as well as organisational impersonal systems; the latter is the actualised behaviour taken to enact the intentions. The expectation is that both of these will impact the resulting performance in terms of the general individual-level work performance of the knowledge-sharing employee.

Knowledge-sharing propensity, behaviour and work performance

As argued above, knowledge-sharing activities cannot be forced; they ought to be voluntary (Käser and Miles, 2002). The authors posit that an individual's propensity to share knowledge consists of three elements: a general positive attitude towards sharing knowledge; the perceived benefits of knowledge sharing and knowledge sharing-related self-efficacy. Taken together, these three factors represent an individual's likelihood for sharing knowledge in his/her work organisation and impact the extent to which they engage in knowledge-sharing behaviours.

Concerning *knowledge-sharing attitude*, in general, an attitude is "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or

"The present study found interesting results regarding how the model works with employees of different educational levels."

"It was found that knowledge sharing only improves the work performance of more highly educated employees, while those employees with only an elementary or high school education did not seem to benefit from knowledge sharing in terms of outperforming their colleagues."

disfavour" (Eagly and Chaiken, 1993). Attitudes exert a directive influence on behaviour. Positive attitudes towards an object generally lead to behaviours that support the attitude towards the object, whereas negative attitudes are predisposed to unfavourable behaviours towards the object. A *knowledge-sharing attitude* can be defined as the degree of one's positive feelings about sharing one's knowledge (Bock and Kim, 2002). In terms of knowledge sharing, this leads to the assertion that positive attitudes towards knowledge sharing are likely to increase the propensity of knowledge-sharing behaviours.

There are several theoretical arguments supporting the attitude–behaviour linkage. According to a review of the knowledge-sharing literature (Wang and Noe, 2010), the most utilised theoretical framework for examining the impact of individual attitudes on knowledge sharing is the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975). The TRA posits that individual behaviour is grounded in the rational calculation of alternatives, and a given behaviour is more likely to the extent that an individual has positive attitudes towards it, i.e. believes that it is likely to lead to valued outcomes, and that it meets the subjective norms of the agent. The related theory of planned behaviour (TPB) (Ajzen, 1991) adds to TRA the criterion that the behaviour in question should also be subject to volitional control by the individual. Thus, according to these perspectives, an individual is likely to engage in knowledge-sharing behaviours if he/she has a positive attitude towards knowledge sharing, sees it as encouraged by the meaningful peer groups to whose opinions he/she is willing to comply and believes that he/she is competent to deliver the behaviour in question. Both the TRA and TBP have been found to be useful in analysing a variety of behaviours in social settings (Shappard *et al.*, 1988), including knowledge sharing. For example, Bock and Kim (2002); Ruy *et al.* (2003) and Tohidinia and Mosakhani (2009) found that positive attitudes were an important factor in explaining behavioural intentions to share knowledge. Furthermore, by grounding on the TRA and social capital factors in organisations, Chow and Chan (2008) found that social capital in organisations affects attitudes and norms relating to knowledge sharing, as well as the related behavioural intentions. However, it should be noted that these studies focus on the impact of knowledge-sharing attitudes towards behavioural *intentions* rather than actualised behaviours (cf. He and Wei, 2009).

Perceived benefits and costs is another explanatory factor in an individual's positive propensity towards knowledge-sharing behaviour. It is grounded in social exchange theory, which argues that actions are based on evaluations of the relative cost/benefit ratios of a given behaviour (Blau, 1964). Expected rewards might be of a monetary or non-monetary nature. For example, individuals may fear loss of superiority and knowledge ownership if they share their own personal knowledge (Bartol and Shrivastava, 2002) and therefore hoard it rather than share it with others (Wah, 2000). It would appear that the hoarding of knowledge exists especially when the sole ownership of knowledge is considered as a power resource. However, lack of knowledge sharing may simply be attributed to disengagement (Ford and Staples, 2010; Ford *et al.*, 2015), meaning that there is neither active knowledge sharing taking place nor intentional knowledge withdrawal. This can be the case especially when the individual does not perceive any benefits from sharing knowledge, which would have otherwise justified the effort of doing it without being afraid of the potential dire consequences of doing it in terms of losing ownership of that

knowledge. In sum, based on social exchange theory, it can be expected that perceived benefits will lead to an increased likelihood of knowledge-sharing behaviour, whereas perceived costs have a negative influence on engaging in knowledge sharing.

Finally, in addition to individual beliefs and attitudes regarding the consequences of a given behaviour (proposed by the TRA/TPB and social exchange theory), an *individual's perception of his/her self-efficacy* might impact the propensity to share knowledge. Self-efficacy (Bandura, 1986) means that an individual believes in his/her capacities to accomplish a given task; it is argued that people will opt to perform tasks in which their competency beliefs are high and will avoid behaviours in which they anticipate low skill levels to perform. In the context of knowledge sharing, several studies have found that knowledge sharing self-efficacy, i.e. one's confidence in the ability to provide knowledge that is valuable to others, influences knowledge-sharing behaviours. For example, Cabrera *et al.* (2006) and Lin (2007) found that confidence in one's ability to share useful knowledge leads to knowledge sharing. Similarly, Kankanhalli *et al.* (2005); Hsu *et al.* (2007) and Chen and Hung (2010) found that employees with high knowledge-sharing self-efficacy were more likely to engage in knowledge-contributing behaviour than those with low self-efficacy beliefs.

Taking into account the argumentation thus far, the authors suggest the first hypothesis:

H1. Positive knowledge-sharing propensity is positively associated with knowledge-sharing behaviour.

The second key concept in the model presented here is a definition of knowledge-sharing behaviour as action in which employees spread relevant information to other employees within their organisation (Bartol and Shrivastava, 2002). It concerns the actualised behaviours taken to share one's experiences with colleagues or the organisation at large, either in codified or non-codified forms of knowledge.

There are three main lines of argumentation that suggest that knowledge-sharing behaviour leads to increased individual-level work performance. First, sharing significant amounts of relevant knowledge typically serves as a function of a person's expertise. Maintaining and developing a specific bundle of skills in an organisational setting requires utilising those skills repeatedly (Winter, 2003). This is connected to knowledge sharing, in that, the sharing of knowledge on relevant issues with other organisational members signals the beneficial utilisation of relevant skills and competences, as other members have deemed receiving such knowledge useful. Furthermore, sharing relevant knowledge across organisations signals individuals' expertise in relation to other actors and could open up additional possibilities for utilising this knowledge in ways that lead to improved job performance. Second, sharing considerable amounts of relevant knowledge in an organisation improves the organisational embeddedness and influence of that particular actor. It has been found that the higher the amount of useful knowledge shared by a particular individual in an organisation, this individual becomes a more visible and desirable source of knowledge (Cross and Gray, 2013). In a modern organisational environment where the key value-creating resource is knowledge, these central knowledge "hubs" possess great influence and legitimacy through their networks and, consequently, have greater potential for higher individual job performance. Third, based on social capital theory, knowledge sharing often (while not always) leads to reciprocity (Nahapiet and Ghoshal, 1998; Schultz, 2001). In general, the norm of reciprocity is one of the key components of the moral codes within social systems (Černe *et al.*, 2014), which means that employees who share significant amounts of work-related knowledge are also more likely to receive relevant knowledge in the same process. However, knowledge sharing is not always reciprocated and might exhibit a level of asymmetry (Cabrera and Cabrera, 2002). At the same time, knowledge itself is an organisational and collective phenomenon (Spender, 1996), and the sharing of that knowledge links the sharer and the recipient into an interactive context where the value of the knowledge is put under collective scrutiny and, often, under discourse (Tsoukas, 1996). The authors thus argue that individuals who share considerable

amounts of knowledge are more likely to be connected to the relevant knowledge generated by other organisational actors and can use such knowledge to perform better in their daily work assignments. The contention here is that this increased connectivity and reach of relevant intra-organisational knowledge will very likely lead to enhanced work performance.

Grounded on these arguments, the second hypothesis is formulated:

H2. Knowledge-sharing behaviour is positively associated with individual performance.

Finally, the authors argue that knowledge-sharing behaviour mediates the relationship between knowledge-sharing propensity and individual work performance. Here, the contention is that the propensity towards knowledge sharing does not only explain why some employees perform better at their jobs than others. According to TRA, the propensity to do something should lead to actual behaviour and that it is only through realised behaviour that actual performance can be affected. Similarly, so as to impact organisational knowledge processes, the propensity for knowledge sharing (including attitudes, utility expectation and self-effectiveness) needs to lead to behaviour. While the causal relationship between propensity and behaviour is accepted as given in everyday thinking, the extensive research conducted in the field of social psychology has demonstrated that people's attitudinal propensities tend not to accurately predict their future behaviours, for example, in the fields of health (e.g. smoking, using condoms) and ecology (e.g. recycling). Rather, they impact behavioural intentions, which then impact actualised behaviours, as illustrated by the TRA and TPB (Fishbein and Ajzen, 1975; Ajzen, 1991). Thus, acknowledging that the linkage between the propensity towards knowledge sharing and actualised behaviours is mediated by behavioural intentions makes it reasonable that the path from propensity to performance is far from self-evident. This is illustrated by the fact that in the literature search conducted for this research, the authors found no previous studies examining the full path from knowledge-sharing propensity to behaviour and then performance. For instance, among the existing studies examining the link between knowledge-sharing motivation and some performance variables, Husted *et al.* (2006) measured motivation on the individual level but performance on the organisational level.

In organisational reality, these phenomena work in parallel. Employees with a positive propensity towards knowledge sharing realise it through their behaviour, and that behaviour affects their work performance. As work performance in contemporary organisations is linked directly to the knowledge content of employees, and for the reasons laid out in the earlier hypotheses, the authors expect this mediation link to be a strong predictor of individual work performance. Based on the discussions thus far, the mediation hypothesis is posited as follows:

H3. Knowledge-sharing behaviour mediates the relationship between positive knowledge-sharing propensity and individual work performance.

Methods

Data collection and sampling

Using a Web-based questionnaire, the research data were collected in 2011 from employees of a city-based organisation located in South-East Finland. There were 5,086 employees altogether, and 595 answered our survey, yielding a response rate of 12 per cent. Among the respondents, there were 386 (64.9 per cent) employees, 87 (14.6 per cent) experts, 77 (12.9 per cent) supervisors, 38 (6.3 per cent) unit directors and seven (1.1 per cent) belonged to the top management group of the city. A total of 489 (82.1 per cent) were female, and 106 (17.8 per cent) were male. The analysis of the subsamples yielded the following educational categories: elementary (94), high school (221), vocational (152) and university (128) education. For the most part, the questionnaire dealt with the respondents' perceptions about the presence of innovation as well as renewal-enabling and -hindering characteristics in their working environment.

Analysis

First, the authors validated the measurement model, including knowledge-sharing propensity, behaviour and individual performance by means of confirmatory factor analysis (CFA). Thereafter, structural equation modelling (SEM) was used to test each hypothesis. All cases were processed through LISREL. PRELIS was used to compute the covariance matrix. The maximum likelihood estimation method was also used. The survey relied on self-report measures. The authors therefore used Harmon's one-factor test to check for common method variance (Podsakoff and Organ, 1986) and included all the independent variables and the dependent variable in an exploratory factor analysis. The data would have had a common method bias problem if a single factor emerged that accounted for a large percentage of the variance in the resulting factors. However, no single factor emerged: the first factor accounted for 37 per cent of the total variance, and all the items retained in the factor analyses accounted for 69 per cent of the total variance.

Measures

The multi-item measures for the key constructs were adopted and modified to fit a survey-style questionnaire based on existing measures in the extant literature. The aim was to reach an empirically sound model with a high level of construct and discriminant validity, which meant that some items were dropped based on their low loadings to their respective constructs, and that the remaining items indicated a good fit with the overall model (see Table I for full list of measures and eventual empirical constructs). *Knowledge-sharing propensity* was measured by asking the respondents to answer items relating to knowledge sharing in terms of their attitude, benefits and self-efficacy on a scale from 1-7 (1 = totally disagree, 7 = totally agree). The measure was based on Collins and Smith (2006), and it covers the key facets impacting an individuals' propensity towards sharing knowledge: attitudes towards knowledge sharing, estimation of the benefits of knowledge sharing and related self-efficacy beliefs. *Knowledge-sharing behaviour* was measured by asking the respondents how frequently they shared specific types of knowledge with their organisational members on a scale from 1-7. The measure covers the sharing of different types of knowledge – tacit, implicit and explicit – and is based on Chatzoglou and Vraimaki (2009). *Individual performance* was measured by asking the respondents to compare their performance, on a scale from 1-7, with that of their colleagues who were doing similar work. This comprised items covering the key issues of overall work performance, including the substance, quality, creativity and collaboration in relation to the job profile and relative to the respondents' colleagues. The measure was adopted from Walumba *et al.* (2008). The *control variables* included four educational levels: elementary, high school, vocational and university education. This helped to control for whether one's educational level affected relative work performance.

Measurement model, reliability and correlations

CFA was used to build and confirm the overall measurement model. Items with poor loadings were omitted; for the remaining items, the loadings were high and statistically significant (Table I). This supports the verification of the relationships between the indicators and the latent constructs. The construct reliability of all the dimensions by far exceeded the recommended level of 0.60; therefore, the model provided a reliable measurement of the construct. Furthermore, all the constructs exceeded the acceptable level of 0.70 when measured with Cronbach's alpha. The measures of extracted variance on all dimensions were also on the cut-off of 0.5 or exceeded the suggested cut-off of 0.50. In summary, the assessment of the models provided good evidence of the validity and reliability of the measured constructs as well as of the discriminant validity between the constructs (chi-square = 45.77, df = 32, $p = 0.5449$, RMSEA = 0.027, NFI = 0.985, NNFI = 0.993, CFI = 0.995, AGFI = 0.974). Note that there are statistically significant positive correlations between them all, suggesting an empirical linkage between these dimensions (Table II).

Table I Measurement items and results of CFA

Concept	*Item*	*Factor loading*	*AVE*	*CR*	α
Knowledge-sharing propensity	1. I see benefits from exchanging and combining ideas with one another	Item dropped	0.5	0.786	0.761
	2. I believe that by exchanging and combining ideas I can move new projects or initiatives forward more quickly than by working alone	Item dropped			
	3. At the end of each day, I feel that I have learned from other members from my organisation by exchanging and combining ideas	0.77[a]			
	4. I am proficient at combining and exchanging ideas to solve problems or create opportunities	Item dropped			
	5. I do not do a good job of sharing my individual ideas to come up with new ideas, products or services. (reverse coded)	Item dropped			
	6. I am capable of sharing my expertise to bring new projects or initiatives to fruition	0.81***			
	7. I am willing to exchange and combine ideas with their co-workers	0.73***			
	8. It is rare for me to exchange and combine ideas to find solutions to problems. (reverse coded)	0.42***			
Knowledge-sharing behaviour	1 Reports, official documents (explicit knowledge)	Item dropped	0.596	0.698	0.813
	2 Manuals, methodologies, models (explicit knowledge)	0.70[a]			
	3 Know-where, know-whom (implicit knowledge)	0.80***			
	4 Experience, know-how (implicit knowledge)	item dropped			
	5 Expertise from education and training (implicit knowledge)	0.81***			
Individual work performance	1 How good you are in your work compared to your colleagues	0.85[a]	0.525	0.763	0.746
	2 How effective you are in your work compared to your colleagues	0.72***			
	3 How would you estimate the quality of your work compared to your colleagues	Item dropped			
	4 How creative you are in your work compared to your colleagues	Item dropped			
	5 How good collaborative capability you have compared to your colleagues	0.56			

Notes: [a]Significance level is not available because the coefficient is fixed at 1; ***statistically significant at 0.01 significance level; ** statistically significant at 0.05 significance level

SEM was used to test the hypotheses. To test for mediation using SEM, the authors followed the suggestions of Hair *et al.* (2006). First, the base model was one of full mediation (i.e. that knowledge-sharing propensity predicts knowledge-sharing behaviour and knowledge-sharing behaviour predicts individual performance). Second, the direct effect of knowledge-sharing propensity was tested on individual performance. Finally, the authors tested the partial mediation model (whether the relationship between knowledge-sharing propensity and individual performance remained significant when knowledge-sharing behaviour is added to the model). Upon introducing knowledge-sharing behaviour in the model, the relationship

Table II Correlation matrix

Variable	*Mean*	*SD*	*1*	*2*	*3*
1. Knowledge-sharing propensity 7. Scientific (national)	5.2212	1.042	1		
2. Knowledge-sharing behaviour 8. Market (international)	5.0720	1.243	0.558***	1	
3. Individual work performance	4.7215	0.732	0.102**	0.178***	1

Notes: ***Statistically significant at 0.01 significance level; **statistically significant at 0.05 significance level

between knowledge-sharing propensity and individual behaviour turned out to be insignificant. Thus, full mediation (i.e. the base model), and not partial mediation, was supported.

Path models reflecting the posited relationship between knowledge-sharing propensity, knowledge-sharing behaviour and individual performance were estimated to test the hypotheses. The results of the path analysis are presented in Tables III–VII. To control the effect of education, the authors tested the models among four groups (elementary school, high school, higher vocational level and university education).

Results

The path coefficients and fit indices are presented in Tables III–VII (one table includes all educational levels and one for each educational level). The path models reflecting the positive relationship between knowledge propensity, knowledge sharing and individual performance were estimated to test the hypotheses.

Table III (all data included) shows significant support for the direct positive path from knowledge-sharing propensity to behaviour (the mediator) and from behaviour to individual performance. The indicators show good fit with the model. Thus, overall, the result supports *H1* (knowledge-sharing propensity is positively associated with knowledge-sharing behaviour) and *H2* (knowledge-sharing behaviour is positively associated with individual job performance).

The direct-effect model exhibits a significant association between knowledge-sharing propensity and individual performance. There is also a good fit. The mediation model shows that the paths from knowledge-sharing propensity to knowledge-sharing behaviour

Table III The fit indices and path coefficients of the tested model

Path model	*Base model Standardised coefficient*	*Direct effect Standardised coefficient*	*Mediation Standardised coefficient*
Knowledge-sharing propensity → Knowledge-sharing behaviour	0.71***		0.71**
Knowledge-sharing behaviour → Individual work performance	0.23***		0.28**
Knowledge-sharing propensity → Individual work performance		0.15***	−0.05 n.s.
Overall fit			
Chi-square (df)	45.92 (33) $p = 0.05575$	18.75 (13) $p = 0.13110$	45.77 (32) $p = 0.05449$
RMSEA	0.026	0.027	0.027
GFI	0.985	0.991	0.985
CFI	0.996	0.996	0.995
NNFI	0.994	0.993	0.993
IFI	0.996	0.996	0.995

Notes: Base model included; all educational levels, $N = 595$; ***statistically significant at 0.01 significance level; **statistically significant at 0.05 significance level

Table IV The fit indices and path coefficients of the tested model

Path model	*Base model Standardised coefficient*	*Direct effect Standardised coefficient*	*Mediation Standardised coefficient*
Knowledge-sharing propensity → Knowledge-sharing behaviour	0.821**		0.881***
Knowledge-sharing behaviour → Individual work performance	0.028 n.s.		0.159 n.s.
Knowledge-sharing propensity → Individual work performance		−0.034 n.s.	−0.171 n.s.
Overall fit			
Chi-square (df)	31.34 (33) $p = 0.55004$	8.05 (13) $p = 0.83949$	29.27 (32) $p = 0.60564$
RMSEA	0.00	0.00	0.00
GFI	0.937	0.976	0.941
CFI	0.997	1.00	0.999
NNFI	0.996	1.00	0.998
IFI	0.997	1.00	0.999

Notes: Elementary school, $N = 94$; ***statistically significant at 0.01 significance level; **statistically significant at 0.05 significance level

Table V The fit indices and path coefficients of the tested model

Path model	*Base model Standardised coefficient*	*Direct effect Standardised coefficient*	*Mediation Standardised coefficient*
Knowledge-sharing propensity → Knowledge sharing behaviour	0.669***		0.669***
Knowledge-sharing behaviour → Individual work performance	0.062 n.s.		0.020 n.s.
Knowledge-sharing propensity → Individual work performance		0.049 n.s.	0.042 n.s.
Overall fit			
Chi-square (df)	40.05 (33) $p = 0.18572$	14.77 (13) $p = 0.32189$	39.95 (32) $p = 0.15765$
RMSEA	0.032	0.025	0.034
GFI	0.965	0.981	0.965
CFI	0.994	0.996	0.993
NNFI	0.991	0.994	0.990
IFI	0.994	0.996	0.993

Notes: High school, $N = 221$; ***statistically significant at 0.01 significance level; ** statistically significant at 0.05 significance level

and from knowledge-sharing behaviour (mediator) to performance are significant. The statistics also reveal good fit indices for this mediation model. The path from knowledge propensity to individual performance is not significant after knowledge-sharing behaviour is introduced in the model. However, when running the models with subsamples of different educational levels (Tables IV-VII), the results show that in the case of those with an elementary or high school education, *H1* is supported but that *H2* and *H3* are rejected. Conversely, *H1*, *H2* and *H3* all find support amongst those with a vocational or university education. Taken together, this analysis supports *H1*, *H2* and *H3*: knowledge-sharing behaviour mediates the relationship between knowledge-sharing propensity and individual performance amongst those who have either a vocational or a university education.

Discussion

The results obtained from the overall dataset provide support for the three hypotheses. Knowledge-sharing propensity leads to knowledge-sharing behaviour (*H1*), and behaviour leads to improved individual job performance (*H2*). Further, the results support that knowledge-sharing behaviour acts as a moderator between propensity and performance (*H3*).

Table VI The fit indices and path coefficients of the tested model

Path model	*Base model Standardised coefficient*	*Direct effect Standardised coefficient*	*Mediation Standardised coefficient*
Knowledge sharing propensity → knowledge sharing behaviour	0.679***		0.679***
Knowledge sharing behaviour → individual work performance	0.290***		0.283**
Knowledge sharing propensity → individual work performance		0.109***	0.007 n.s.
Overall fit			
Chi-Square (df)	38.83 (33) $p = 0.22359$	15.45 (13) $p = 0.28024$	38.84 (32) $p = 0.18875$
RMSEA	0.034	0.035	0.038
GFI	0.951	0.972	0.951
CFI	0.988	0.993	0.987
NNFI	0.984	0.989	0.982
IFI	0.988	0.993	0.987

Notes: Vocational education, $N = 152$; ***statistically significant at 0.01 significance level; **statistically significant at 0.05 significance level

Table VII The fit indices and path coefficients of the tested model

Path model	*Base model Standardised coefficient*	*Direct effect Standardised coefficient*	*Mediation Standardised coefficient*
Knowledge sharing propensity → knowledge sharing behaviour	0.651***		0.651***
Knowledge sharing behaviour → individual work performance	0.248***		0.276***
Knowledge sharing propensity → individual work performance		0.138**	−0.044 n.s.
Overall fit			
Chi-Square (df)	34.88 (33) $p = 0.37889$	16.48 (13) $p = 0.22424$	34.92 (32) $p = 0.33054$
RMSEA	0.021	0.046	0.027
GFI	0.948	0.964	0.984
CFI	0.992	0.984	0.991
NNFI	0.990	0.974	0.987
IFI	0.993	0.985	0.991

Notes: University education, $N = 128$; ***statistically significant at 0.01 significance level; **statistically significant at 0.05 significance level

Interestingly, when examining the different models with various educational backgrounds, the arguments herein seemed to work only for individuals with higher education. Overall, these results contribute to the literature on organisational knowledge sharing on an individual level along the entire length of the propensity–behaviour–performance chain, which has until now remained unexplored.

It is rather intuitive to suggest that knowledge sharing leads to improved performance in the contemporary organisational context, which is based on knowledge and its utilisation (in the current case, a public organisation). However, so far, there are not many studies establishing this linkage at the level of the individual employee. Studies in inter-organisational settings have shown that knowledge sharing leads to improved firm performance (Ritala *et al.*, 2015). The present study supports a similar argument at the individual level. In relation to individuals in organisations, the results of this study suggest that "knowledge is power" in the sense that sharing expert knowledge signals a legitimate and desirable organisational position (Cross and Gray, 2013). The results also corroborate

the discussion on reciprocity and social capital (Nahapiet and Ghoshal, 1998; Schultz, 2001) by showing that sharing with others can eventually lead to focal actor benefits.

The findings relating to the educational level of the employees (that the models work only in groups with higher education) warrant further scrutiny. Considering that the more highly educated employees were more likely to conduct "knowledge work" types of tasks, whereby utilising and producing information and knowledge were key elements of the job, it makes sense that knowledge sharing would be an important issue for such employees, thereby enabling proficient performance. In the old-school way of thinking, knowledge hoarding rather than sharing was believed to benefit career advancement. Knowledge sharing was seen to weaken an employee's position, power and status in the organisation (Probst *et al.*, 2000). Moreover, today, there may be fears amongst employees that knowledge sharing may reduce their job security because employees are uncertain about the sharing objectives as well as the intentions of senior management (Lelic, 2001). Alternatively, the lack of knowledge sharing might, in many cases, be characterised as disengagement rather than hoarding. Disengagement in relation to knowledge sharing is characterised by low communication and low protection of knowledge: the individual neither actively shares nor actively withholds his/her understanding and expertise (Ford and Staples, 2010; Ford *et al.*, 2015). It is likely that this is what was being witnessed, especially among the lower- and middle-level employees of our sample, which could explain why the models did not work for these settings. However, understanding this in full requires further study.

The present findings support those of Constant *et al.* (1994), who found that employees with a higher educational level are more likely to be more favourable towards and active in knowledge sharing. Especially if the knowledge sharing was perceived in terms of sharing expertise, rather than in terms of passing on more simple information, it was more likely to take place (i.e. the propensity for information sharing depends on the form of information). Husted and Michailova (2002) argue that one reason for knowledge hoarding, or the reluctance of the knowledge transmitter to share knowledge, relates to the potential loss of value and bargaining power and, therefore, the protection of one's personal competitive advantages at work. The present results demonstrate that for employees with a higher level of education, knowledge sharing constitutes power at work, as knowledge-sharing behaviour leads to higher work performance. Conversely, for employees with a lower level of education, it might be a question of simply refraining from knowledge sharing because of disengagement (Ford *et al.*, 2015) rather than actively and intentionally withholding knowledge.

Conclusion

In this study, the authors examined the effect of knowledge-sharing propensity on knowledge-sharing behaviour and on individual work performance among employees in a public sector organisation. A hypothesis model was proposed such that knowledge-sharing behaviour mediates the linkage between propensity and performance. This model was empirically tested using a field survey of 595 members of a Finnish-based public sector organisation. The model found strong support for the stated hypotheses. The results have several theoretical and practical implications.

Implications for research

The present study makes several contributions to the literature. First, several studies have noted the lack of research on knowledge sharing in the public sector (Willem and Buelens, 2007; Syed-Ikshsan and Rowland, 2004). The present study addressed this gap by empirically examining employees in a government organisation in Finland. The results demonstrated that in the public sector, the propensity to share knowledge predicts the likelihood of engaging in knowledge-sharing behaviours. This means that extrapolating the findings of studies addressing private sector firms to public sector

organisations in terms of knowledge sharing might be more valid than previously argued (Yao *et al.*, 2007; McAdam and Reid, 2000). In fact, it can be argued that public organisations are nowadays rather knowledge-intensive, and focusing KM research efforts on them would be a feasible area for research.

Second, while earlier studies have already touched upon the relationship between knowledge-sharing propensity and behaviour (Bock and Kim, 2002; Ruy *et al.*, 2003; Chow and Chan, 2008; Tohidinia and Mosakhani, 2009; Reychav and Weisberg, 2010), to the authors' knowledge, this is the first empirical study examining the outcomes of this linkage on individual work performance. The mediating model herein provides novel results in this regard. In fact, based on the authors' knowledge, only Reychav and Weisberg (2009) have examined the impact of knowledge-sharing behaviour by the knowledge provider (sharer) on individual work performance. According to their results, tacit knowledge sharing had a positive impact on employee performance, while explicit knowledge sharing exerted an indirect influence, mediated by the sharing of tacit knowledge. Their model, however, did not take into account the knowledge-sharing propensity aspect of the research setting; therefore, the present results provide a more in-depth understanding by supporting and complementing these findings. Furthermore, although several studies (Bock and Kim, 2002; Ruy *et al.*, 2003; Tohidinia and Mosakhani, 2009) have demonstrated that positive attitudes towards knowledge sharing are an important factor in explaining behavioural *intentions* to share knowledge, there is a major gap in terms of the scant attention paid to the actual impact of knowledge-sharing propensity and knowledge-sharing behaviour on individual performance. The focus here on actualised behaviour helps to highlight how intentions are translated into behaviour and eventually impact work performance.

Third, the present study found interesting results regarding how the model works with employees of different educational levels. As research on the knowledge-based issues in organisations matures, it also fragments and gains deeper insights into the more specific aspects of management (Haas and Hansen, 2005). By examining the role of the educational level in the relationship between knowledge-sharing propensities and behaviours with work performance, this research deepens the emerging discussion on the micro-foundations of KM and contributes to the knowledge governance perspective (Foss *et al.*, 2010). Specifically, it was found that knowledge sharing only improves the work performance of more highly educated employees, while those employees with only an elementary or high school education did not seem to benefit from knowledge sharing in terms of outperforming their colleagues.

Implications for practice

For managers of public organisations, a key lesson in the knowledge-based view is that the role of human capital and individual employees is highly important. Individuals are no longer mere elements of a production system but owners and controllers of the most important factor of production – knowledge. The results herein present practical implications, especially for managers and professionals in knowledge-intensive organisations who endeavour to assess the role of knowledge sharing in work performance outcomes. Knowledge sharing was in general found to be positive for work performance, which is a well-recognised suggestion in the KM literature. However, as the results propose the linkage with work performance, it is worthwhile to take this into account in work design. For instance, barriers to knowledge sharing should be minimised, while efficient knowledge-sharing areas should be made available. In addition, as the propensity towards knowledge sharing eventually influences actual behaviour, it is important to focus on how to affect those propensities among organisational members, e.g. through management practices, compensation and culture. Especially interesting is the finding that the knowledge-sharing–propensity–behaviour–work performance linkage works only among the highly educated workforce.

Thus, managers should consider providing various kinds of knowledge-sharing support mechanisms and systems for different employee groups.

Limitations and further research directions

The present study has a specific research setting and survey study design that are suggestive of several limitations. First, the study did not address the underlying issues that are likely to impact the individual's propensity towards knowledge sharing (such as the individual's propensity to trust others, or organisational issues such as rewarding practices). Moreover, the study did not examine other potentially relevant antecedents such as social capital or involvement (cf. Chang and Chuang, 2011), group-based norms (Quigley *et al.*, 2007), organisational climate (Bock *et al.*, 2005) or rewards and different types of motivations (Wang and Hou, 2015). Rather, the model focused on the effects of individual propensity on actualised behaviours and work performance.

The empirical data utilised in this paper included observations from one public organisation. It may be that in other contextual settings, the knowledge-sharing–propensity–behaviour–work performance linkage might be different. The patterns might differ, especially in organisations with an explicit strategic focus on knowledge sharing, along with supporting human resources management practices such as rewarding and recognition for knowledge sharing. Testing these additional contingencies in wider contextual settings might be a fruitful avenue for further study. Also, a question left open by the present study is whether the picture might be different in the event the sharing of various types of knowledge, such as technical information and expert knowledge (Constant *et al.*, 1994), is examined.

While the research only addressed the assumed causal impact of knowledge-sharing propensity and behaviour on individual performance, it should be noted that there might also be a feedback loop from performance to propensity and behaviours. De Vries and van den Hooff (2006) found that employees who believe in their own performance ability at work are more likely to be willing and able to share knowledge with their colleagues. This might therefore be a useful area for future research.

The present study used the survey method to study the phenomenon of knowledge sharing and its performance implications. While this has certain merits, other types of research methods could provide a better understanding of the propensity–behaviour–performance linkage. For instance, laboratory experiments where knowledge-sharing situations can be tested might provide a better understanding of how knowledge sharing is reciprocated. Further, studies could utilise observational or other methods that do not rely on self-assessment, especially in examining knowledge-sharing behaviour. Knowledge-sharing instances can be documented and measured in a number of ways, including log data, observation and peer assessment.

Finally, it should be noted that the current study only addressed one dimension of the knowledge-sharing phenomenon, that of the knowledge provider/contributor. The study did not examine the knowledge-receiving/seeking part of the equation (Cummings, 2004; cf. Cummings and van Zee, 2005). Further studies should complement the present work by addressing the impact of the knowledge receiver's propensity and behaviours towards work performance. Future studies could also include the reception of knowledge as an explanatory factor in work performance. While it is intuitive to assume that knowledge sharing also leads to the reciprocal reception of relevant knowledge, the empirical inclusion of such a variable would make the research setting more robust. Also, the boundary conditions relating to the benefits of knowledge sharing could be assessed as too much knowledge sharing may lead to redundancy and additional costs (Foss *et al.*, 2010). Future research could also include multi-level models in which the individual propensity–behaviour–performance linkage would be nested within the larger organisational performance framework. Such a task is difficult to conduct empirically, but it could potentially lead to significant insights.

References

Abell, P., Felin, T. and Foss, N. (2008), "Building microfoundations for the routines, capabilities, and performance links", *Managerial and Decision Economics*, Vol. 29 No. 6, pp. 489-502.

Ajzen, I. (1991), "The theory of planned behaviour", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.

Alavi, M. and Leidner, D. (2001), "Knowledge management and knowledge management systems: conceptual foundations and research issues", *MIS Quarterly*, Vol. 25 No. 1, pp. 107-136.

Amayah, T. (2013), "Determinants of knowledge sharing in a public sector organization", *Journal of Knowledge Management*, Vol. 17 No. 3, pp. 454-471.

Andrews, K. and Delahaye, B. (2000), "Influences on knowledge processes in organizational learning: the psychological filter", *Journal of Management Studies*, Vol. 37 No. 6, pp. 2322-2380.

Argote, L. and Ingram, P. (2000), "Knowledge transfer: a basis for competitive advantage in firms", *Organizational Behavior and Human Decision Processes*, Vol. 82 No. 1, pp. 150-169.

Bandura, A. (1986), *Social Foundations of Thought and Action: A Social Cognitive Theory*, Prentice Hall, Englewood Cliffs, NJ.

Bartol, K. and Shrivastava, A. (2002), "Encouraging knowledge sharing: the role of organizational reward systems", *Journal of Leadership & Organisational Studies*, Vol. 9 No. 1, pp. 64-76.

Bhatt, G.D. (2001), "Knowledge management in organizations: examining the interaction between technologies, techniques, and people", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 68-75.

Blau, P. (1964), *Exchange and Power in Social Life*, Wiley, New York, NY.

Bock, G. and Kim, Y.G. (2002), "Breaking the myths of rewards: an exploratory study of attitudes about knowledge sharing", *Information Resources Management Journal*, Vol. 15 No. 4, pp. 14-21.

Bock, G.W., Zmud, R.W., Kim, Y.G. and Lee, J.N. (2005), "Behavioral intention formation in knowledge sharing: examining the roles of extrinsic motivators, social-psychological forces, and organizational climate", *MIS Quarterly*, Vol. 29 No. 1, pp. 87-111.

Cabrera, A. and Cabrera, E. (2002), "Knowledge sharing dilemmas", *Organisation Studies*, Vol. 23 No. 5, pp. 687-710.

Černe, M., Nerstad, C.G.L., Dysvik, A. and Škerlavaj, M. (2014), "What goes around comes around: knowledge hiding, perceived motivational climate, and creativity", *Academy of Management Journal*, Vol. 37 No. 1, pp. 172-192.

Chang, H. and Chuang, S.S. (2011), "Social capital and individual motivations on knowledge sharing: participant involvement as a moderator", *Information & Management*, Vol. 48 No. 1, pp. 9-18.

Chatzoglou, P.D. and Vraimaki, E. (2009), "Knowledge-sharing behaviour of bank employees in Greece", *Business Process Management Journal*, Vol. 15 No. 2, pp. 245-266.

Chen, C.J. and Hung, S.W. (2010), "To give or receive? Factors influencing members' knowledge sharing and community promotion in professional virtual communities", *Information & Management*, Vol. 47 No. 4, pp. 226-236.

Chow, W.S. and Chan, L.S. (2008), "Social network, social trust and shared goals in organizational knowledge sharing", *Information & Management*, Vol. 45 No. 7, pp. 458-465.

Cohen, W.M. and Levinthal, D.A. (1990), "Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, Vol. 35 No. 1, pp. 128-152.

Collins, C.J. and Smith, K.G. (2006), "Knowledge exchange and combination: the role of human resource practices in the performance of high-technology firms", *Academy of Management Journal*, Vol. 49 No. 3, pp. 544-560.

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 No. 4, pp. 400-421.

Cross, R. and Gray, P. (2013), "Where has the time gone? Addressing collaboration overload in a networked economy", *California Management Review*, Vol. 56 No. 1, pp. 50-66.

Cummings, J.N. (2004), "Work groups, structural diversity, and knowledge sharing in a global organization", *Management Science*, Vol. 50 No. 3, pp. 352-364.

Cummings, S. and van Zee, A. (2005), "Communities of practice and networks: reviewing two perspectives on social learning", *KM4D Journal*, Vol. 1 No. 1, pp. 8-22.

Davenport, T.H., DeLong, D.W. and Beers, M.C. (1998), "Successful knowledge management projects", *Sloan Management Review*, Vol. 39 No. 2, pp. 43-57.

Dawson, R. (2001), "Knowledge capabilities as the focus of organizational development and strategy", *Journal of Knowledge Management*, Vol. 4 No. 4, pp. 320-327.

De Vries, R. and van den Hooff, B. (2006), "Explaining knowledge sharing: the role of team communication styles, job satisfaction, and performance beliefs", *Communication Research*, Vol. 33 No. 2, pp. 115-135.

Du, R., Shizhong, A. and Yuqing, R. (2007), "Relationship between knowledge sharing and performance: a survey in Xi'an, China", *Expert Systems with Applications*, Vol. 32, pp. 38-46.

Eagly, A. and Chaiken, S. (1993), *The Psychology of Attitudes*, Harcourt Brace Jovanovich, Forth Worth, TX.

Edwards, J., Ababneh, B., Hall, M. and Shaw, D. (2009), "Knowledge management: a review of the field and of OR's contribution", *Journal of Operational Research Society*, Vol. 60 No. 1, pp. S114-S125.

Felin, T. and Foss, N. (2005), "Strategic organization: a field in search of micro-foundations", *Strategic Organization*, Vol. 3 No. 4, pp. 441-455.

Fishbein, M. and Ajzen, I. (1975), *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA.

Ford, D., Myrden, S. and Jones, T. (2015), "Understanding 'disengagement from knowledge sharing': engagement theory versus adaptive cost theory", *Journal of Knowledge Management*, Vol. 19 No. 3, pp. 476-496.

Foss, N., Husted, K. and Michailova, S. (2010), "Governing knowledge sharing in organizations: levels of analysis, governance mechanisms, and research directions", *Journal of Management Studies*, Vol. 47 No. 3, pp. 455-482.

Foss, N.J., Minbaeva, D.B., Pedersen, T. and Reinholt, M. (2009), "Encouraging knowledge sharing among employees: how job design matters", *Human Resource Management*, Vol. 48 No. 6, pp. 871-893.

Ford, D.P. and Staples, D.S. (2010), "Operationalizing knowledge sharing for informers", in Jennex, M. (Ed.), *Ubiquitous Developments in Knowledge Management: Integrations and Trends (Advances in Knowledge Management series)*, IGI Global, Hershey, PA.

Grant, R. (1996), "Toward a knowledge-based theory of the firm", *Strategic Management Journal*, Vol. 17 No. 1, pp. 109-122.

Haas, M. and Hansen, M. (2005), "When using knowledge can hurt performance: the value of organizational capabilities in a management consulting company", available at: http://digitalcommons.ilr.cornell.edu/articles/40 (accessed 15 January 2013).

Hair, J., Black, W., Babin, B.J., Anderson, R. and Tatham, R. (2006), *Multivariate Data Analysis*, 6th ed., Prentice Hall, NJ.

He, W. and Wei, K.K. (2009), "What drives continued knowledge sharing? An investigation of knowledge-contribution and-seeking beliefs", *Decision Support Systems*, Vol. 46 No. 4, pp. 826-838.

Hislop, D. (2010), "Knowledge management as an ephemeral management fashion?", *Journal of Knowledge Management*, Vol. 14 No. 6, pp. 779-790.

Hsu, I.C. (2008), "Knowledge sharing practices as a facilitating factor for improving organizational performance through human capital: a preliminary test", *Expert Systems with Applications*, Vol. 35 No. 3, pp. 1316-1326.

Hsu, M., Ju, T., Yen, C. and Chang, M. (2007), "Knowledge sharing behavior in virtual communities: the relationship between trust, self-efficacy, and outcome expectations, international", *Journal of Human-Computer Studies*, Vol. 65 No. 2, pp. 153-169.

Huang, K. (2014), "Knowledge sharing in a third-party-governed health and human services network", *Public Administration Review*, Vol. 74 No. 5, pp. 587-598.

Husted, K. and Michailova, S. (2002), "Diagnosing and fighting knowledge-sharing hostility", *Organizational Dynamics*, Vol. 31 No. 1, pp. 60-73.

Kankanhalli, A., Tan, B. and Wei, K. (2005), "Contributing knowledge to electronic knowledge repositories: an empirical investigation", *MIS Quarterly*, Vol. 29 No. 1, pp. 113-143.

Käser, P.A.W. and Miles, R. (2002), "Understanding knowledge activists' success and failures", *Long Range Planning*, Vol. 31 No. 5, pp. 9-28.

Kim, S. and Lee, H. (2006), "The impact of organizational context and information technology on employee knowledge-sharing capabilities", *Public Administration Review*, Vol. 68 No. 3, pp. 370-385.

Kogut, B. and Zander, U. (1996), "What firms do? Coordination, identity, and learning", *Organization Science*, Vol. 7 No. 5, pp. 502-518.

Lee, H. and Choi, B. (2003), "Knowledge management enablers, processes, and organizational performance: an integrative view and empirical examination", *Journal of Management Information Systems*, Vol. 20 No. 1, pp. 179-228.

Lelic, S. (2001), "Creating a knowledge sharing culture", *Knowledge Management*, Vol. 4 No. 5, pp. 6-9.

Liebowitz, J. and Chen, Y. (2003), "Knowledge sharing proficiencies: the key to knowledge management", in Holsapple, C.W. (Ed.), *Handbook on Knowledge Management*, Springer-Verlag, New York, NY, pp. 408-438.

Lin, L., Leung, K. and Koch, P. (2006), "Managerial knowledge sharing: the role of individual, interpersonal and organizational factors", *Management and Organisation Review*, Vol. 2 No. 1, pp. 15-41.

Luen, T.W. and Al-Hawamdeh, S. (2001), "Knowledge management in the public sector: principles and practices in police work", *Journal of Information Science*, Vol. 27 No. 5, pp. 311-318.

McAdam, R. and Reid, R. (2000), "A comparison of public and private perceptions and use of knowledge management", *Journal of European Industrial Training*, Vol. 24 No. 6.

McDermott, R. (1999), "Why information technology inspired but cannot deliver: knowledge management", *Sloan Management Review*, Vol. 41 No. 4, pp. 103-117.

Minbaeva, D.B. (2013), "Strategic HRM in building micro-foundations of organizational knowledge-based performance", *Human Resource Management Review*, Vol. 23 No. 4, pp. 378-390.

Minbaeva, D., Foss, N. and Snell, S. (2009), "Guest editors' introduction: bringing the knowledge perspective into HRM", *Human Resource Management*, Vol. 48 No. 4, pp. 477-483.

Nahapiet, J. and Ghoshal, S. (1998), "Social capital, intellectual capital, and the organizational advantage", *Academy of Management Review*, Vol. 23 No. 2, pp. 242-266.

Nonaka, I. (1994), "A dynamic theory of organizational knowledge creation", *Organization Science*, Vol. 5 No. 1, pp. 14-37.

Podsakoff, P. and Organ, D. (1986), "Self-reports in organizational research: problems and prospects", *Journal of Management*, Vol. 12 No. 4, pp. 531-544.

Polanyi, M. (1966), *The Tacit Dimension*, Routledge, London.

Prahalad, C.K. and Hamel, G. (1990), "The core competence of the corporation", *Harvard Business Review*, Vol. 3 No. 1, pp. 79-91.

Probst, G., Raub, S. and Rombhardt, K. (2000), *Managing Knowledge*, John Wiley & Sons, Chichester.

Quigley, N., Tesluk, P., Locke, E. and Bartol, K. (2007), "A multilevel investigation of the motivational mechanisms underlying knowledge sharing and performance", *Organization Science*, Vol. 18 No. 1, pp. 71-88.

Reychav, I. and Weisberg, J. (2009), "Good for workers, good for companies: how knowledge sharing benefits individual employees", *Knowledge and Process Management*, Vol. 16 No. 4, pp. 186-197.

Reychav, I. and Weisberg, J. (2010), "Bridging intention and behavior of knowledge sharing", *Journal of Knowledge Management*, Vol. 14 No. 2, pp. 285-300.

Ritala, P., Olander, H., Michailova, S. and Husted, K. (2015), "Knowledge sharing, knowledge leaking and relative innovation performance: an empirical study", *Technovation*, Vol. 35 No. 1, pp. 22-31.

Ruy, S., Ho, S.H. and Han, I. (2003), "Knowledge sharing behaviour of physicians in hospitals", *Expert Systems with Applications*, Vol. 25, pp. 113-122.

Sáenz, J., Aramburu, N. and Rivera, O. (2009), "Knowledge sharing and innovation performance: a comparison between high-tech and low-tech companies", *Journal of Intellectual Capital*, Vol. 10 No. 1, pp. 22-36.

Sandhu, M., Kishore, K. and Umi, K. (2011), "Knowledge sharing among public sector employees: evidence from Malaysia", *International Journal of Public Sector Management*, Vol. 24 No. 3, pp. 206-226.

Schultz, M. (2001), "The uncertain relevance of newness: organizational learning and knowledge flows", *Academy of Management Journal*, Vol. 44 No. 4, pp. 661-681.

Shappard, B.H., Hartwich, J. and Warshaw, P.R. (1988), "The theory of reasoned action: a meta-analysis of past research with recommendations for modification and future research", *Journal of Consumer Research*, Vol. 15 No. 3, pp. 325-343.

Silvi, R. and Cuganesan, S. (2006), "Investigating the management of knowledge for competitive advantage: a strategic cost management perspective", *Journal of Intellectual Capital*, Vol. 7 No. 3, pp. 309-323.

Siong, C.C., Salleh, K., Syed Noh Syed, A. and Syed-Ikhsan, S.O.S. (2011), "KM implementation in a public sector accounting organization: an empirical investigation", *Journal of Knowledge Management*, Vol. 15 No. 3, pp. 497-512.

Spender, J.C. (1996), "Making knowledge the basis of a dynamic theory of the firm", *Strategic Management Journal*, Vol. 17 No. 2, pp. 45-62.

Spender, J.C. and Grant, R. (1996), "Knowledge of the firm: overview", *Strategic Management Journal*, Vol. 17 No. 2, pp. 5-9.

Stenmark, D. (2001), "Leveraging tacit organizational knowledge", *Journal of Management Information Systems*, Vol. 17 No. 3, pp. 9-24.

Syed-Ikshsan, S. and Rowland, R. (2004), "Knowledge management in a public organization: a study on the relationship between organizational elements and the performance of knowledge transfer", *Journal of Knowledge Management*, Vol. 8 No. 2, pp. 95-111.

Szulanski, G. (1996), "Exploring internal stickiness: impediments to the transfer of best practice within the firm", *Strategic Management Journal*, Vol. 17 No. 2, pp. 27-43.

Tohidinia, Z. and Mosakhani, M. (2009), "Knowledge sharing behavior and its predictors", *Industrial Management & Data Systems*, Vol. 110 No. 4, pp. 611-631.

Tsoukas, H. (1996), "The firm as a distributed knowledge system: a constructionist approach", *Strategic Management Journal*, Vol. 17 No. 1, pp. 11-25.

Wah, L. (2000), "Making knowledge stick", in Cortada, J.W. and Woods, J.A. (Eds), *The Knowledge Management Yearbook 2000-2001*, Butterworth-Heinemann, Worburn, MA, pp. 145-156.

Walumba, F.O., Avolio, B.J. and Zhu, W. (2008), "Transformational leadership weaves its influence on individual job performance: the role of identification and efficacy beliefs", *Personnel Psychology*, Vol. 61 No. 4, pp. 793-825.

Wang, W.T. and Hou, Y.P. (2015), "Motivations of employees' knowledge sharing behaviors: a self-determination perspective", *Information and Organization*, Vol. 25 No. 1, pp. 1-26.

Wang, S. and Noe, R. (2010), "Knowledge sharing: a review and directions for future research", *Human Resource Management Review*, Vol. 20 No. 2, pp. 115-131.

Willem, A. and Buelens, M. (2007), "Knowledge sharing in public sector organizations: the effect of organizational characteristics on interdepartmental knowledge sharing", *Journal of Public Administration Research and Theory*, Vol. 17 No. 4, pp. 581-606.

Winter, S.G. (2003), "Understanding dynamic capabilities", *Strategic Management Journal*, Vol. 24 No. 10, pp. 991-995.

Yao, L., Kam, T. and Chan, S. (2007), "Knowledge sharing in Asian public administration sector: the case of Hong Kong", *Journal of Enterprise Information Management*, Vol. 20 No. 1, pp. 51-69.

Further reading

Adler, P.C. and Kwon, S.W. (2002), "Social capital: prospects for a new concept", *Academy of Management Review*, Vol. 27 No. 1, pp. 17-40.

Argote, L., McEvily, B. and Reagans, R. (2003), "Managing knowledge in organizations: an integrative framework and review of emerging themes", *Management Science*, Vol. 49 No. 4, pp. 571-582.

Macinnis, D.J., Moorman, C. and Jaworski, B.J. (1991), "Enhancing and measuring consumers' motivation, opportunity, and ability to process brand information from ads", *Journal of Marketing*, Vol. 55 No. 4, pp. 32-53.

Siemsen, E., Roth, A.V. and Balasubramanian, S. (2008), "How motivation, opportunity, and ability drive knowledge-sharing: the constraining-factor model", *Journal of Operations Management*, Vol. 26 No. 3, pp. 426-445.

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