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The influence of IT competency dimensions on job satisfaction, knowledge sharing, and performance across industries

Abstract:

Purpose: Knowledge sharing is essential for organizational development. Job satisfaction fosters knowledge sharing. This study aims to develop an understanding of the mutual relationship between knowledge sharing and job satisfaction when both are predicted by IT–competency dimensions such as IT operations, IT knowledge, and IT infrastructure in the context of company performance.

Methodology: The results were achieved based on the examination of 910 Polish knowledge workers with different roles and experiences across various sectors. Data were analyzed using structural equation modeling method.

Findings: The findings suggest that the company's IT-competency drives job satisfaction and knowledge sharing more strongly for IT-industry knowledge workers than for other industries. Also, stronger mediation function of knowledge sharing and job satisfaction is observed for IT-operations when the IT industry is controlled.

Originality: The main value of the study is the empirical evidence that the influence of a particular IT competency dimension varies for industries when it comes to job satisfaction and knowledge sharing processes.

Keywords: job satisfaction, knowledge sharing, IT competency, company performance, structural equation modeling, knowledge management, mediation, control variable, moderation

Introduction

Knowledge capturing, storage, and sharing are the main challenges of the knowledge economy today. A company's information technology (IT) competency is commonly regarded as crucial for the running of knowledge management processes which support decision making and influence the performance of an organization (Aydiner *et al.*, 2019). On the one hand, technology makes knowledge management processes easier. The overall effectiveness increases due to the employment of technological know-how, using a networked infrastructure, and by automatization of operations. On the other hand, technology development is continuously driven by knowledge management needs and therefore, the improvement of IT tools and IT competences never ends. According to Perez-Lopez and Alegre (2012), IT competency is a fundamental antecedent of knowledge management processes. However, Husain and Husain (2013) pointed out that knowledge sharing is determined by both organizational and individual factors. With a positive attitude toward the job, employee involvement in achieving the company's goals seems to be significantly higher and the need to share knowledge greater (Kianto *et al.*, 2016; Saeed, 2016; Kucharska and Bedford, 2019). That is why, we decided to include job satisfaction in the research which examines how IT operations, IT knowledge, and IT infrastructure mediated by knowledge sharing impact company performance. One purpose of the study is to understand the essence of knowledge sharing processes supported by technology. This study takes a new approach to look at human and technological factors and the way they affect company performance. Many previous investigations confirmed that technology is crucial for knowledge sharing and performance (Rao *et al.*, 2015; Soto-Acosta and Cegarra-Navarro, 2016; Santoro *et al.*, 2017). Also, many studies have proved that technology is not as effective as expected, and that knowledge sharing is determined by human rather than technological obstacles (Lin, 2007; Lam and Lambermont-Ford, 2010; Locker *et al.*, 2014; Al-Busaidi and Olfman, 2017). The "human factor" is often pointed out as the one being responsible for motivation-to-technology proper usage (Liao, 2011; Rode, 2016). Therefore, present-day organizations embrace human, knowledge-related, and technological factors as they contribute to company performance. All the above concepts have been broadly discussed in the literature. Not all of them were put together in the same framework or tested in the environment covered in this paper. Hence, the current study aims to combine IT competency dimensions as the "technological factor" and job satisfaction as the "motivational human factor" in one model to gain a better understanding of their mutual impact on knowledge sharing processes and thus on company performance. Moreover, including the industry factor into the investigation makes it possible to present a complete picture of company's key IT-competences responsible for the use of technology which results in effective knowledge sharing which then leads to high performance supported by the engagement of employees reflected in their levels of job satisfaction. The verification of the idea that the impact of IT competences on knowledge sharing in a company varies for different industries and job satisfaction is different for knowledge workers employed in various sectors is vital for managers responsible for the effective implementation of knowledge management strategies. Intentionally IT and Construction industries have been selected to highlight differences. Moreover, organizations' IT competency today, in the era of the network economy, is both diverse and crucial. A set of knowledge management problems such as data storage, security, and distribution (Al-Busaidi and Olfman, 2017) or even decision-support business intelligence systems (Bratianu and Vătămănescu, 2018), based on the transformation of data into information and knowledge, are solved by knowledge management (KM) processes, supported by technology infrastructure and software tools (Ho and Kuo, 2013). Knowledge sharing is essential to organizational learning and development (Kumaraswamy and Chitale, 2012). However key knowledge management processes are knowledge capturing, storage, security, and distribution, 'knowledge in action' used collectively is for company's performance more effective than static (Erickson and Rothberg, 2012). Hence, all factors supporting knowledge sharing matter and are worth to be investigated. Technology is claimed having a key role in knowledge sharing among global teams' members (Wendling *et al.*, 2013). What is more, information and communication technology (ICT) is an object of many studies which perceived as a crucial supporting factor of knowledge sharing within the majority of scientists who observe organizations today, along with culture, structure, reward systems, and trust among members what can be concluded based on the knowledge sharing literature review presented by Farooq (2018). Despite that, technology investment and development to support explicit and tacit knowledge sharing remain uneven (Ting *et al.*, 2011; Corcoran and Duane, 2017). Part of this hesitancy to commit goes back to some of the disappointing investments in massive KM systems in the early 2000s, which was pointed out by

Carr. At the same time, in a high-visibility article, he declared the death of IT as a competitive differentiator (Carr, 2003). It seems that this conclusion was very simplistic. While the commodity systems might have been readily available to anyone, the ability to use them effectively remained a source of competitive advantage (Metcalfe, 2004). The same scenario presents itself in IT systems supporting KM. It is worth to recall Malhotra's (2005, p. 16) opinion: "The inputs-driven paradigm considers information technology and KM as synonymous. The inputs-driven paradigm with its primary focuses on technologies such as digital repositories, databases, intranets, and, groupware systems has been the mainstay of many KM implementation projects. Specific choices of technologies drive the KM equation with primary emphasis on getting the right information technologies in place. However, the availability of such technologies does not ensure that they positively influence business performance". Bearing in mind the passage of time and rapid IT systems development and many problems still noted at the junction of KM and IT (Gunasekera and Chong, 2018), eg. set of barriers of knowledge transfer faced while agile collaborative management systems are implemented (Gou *et al*., 2018). Probably some IT competency dimensions: IT-infrastructure, IT-operations and IT-knowledge introduced by Perez-Lopez and Alegre, (2012) due to, e.g., industry differences may be more supportive for knowledge sharing, whereas others - not as much. It may depends on any factors, eg. on industry which may be characterized by knowledge intensiveness. The question we pose is: how does the influence of IT-competency vary when it comes to particular industries today? How is it related to job satisfaction? Which IT-competency dimensions support knowledge sharing the most?

To answer, accomplish the aim of the study and provide empirical evidence which will explain all the relationships described earlier, the paper starts with the formulation of a conceptual framework, based on a literature review. Next, we present the method and results of the empirical verification. The following part includes a discussion of the findings and implications for future research in this area. Finally, the conclusion gives a summary of the investigation and critique of the findings.

Conceptual framework

Organizations have seen knowledge as their most valuable competitive resource for over two decades. It is a unique differentiator that requires strategic management. Traditional sources of competitive advantage, such as basic labor and capital, are almost universally available these days. Thus, talented knowledge workers who can be named ‘independent knowledge producers’ are a company's greatest asset. To establish a defensible competitive strategy, intellectual capital (IC), or knowledge assets of the workforce, need to be identified and managed effectively (Grant, 1996; Zack, 1999). Therefore the meaning of human resource management is growing (Gope *et al.*, 2018).

Information technology (IT) is often a key component in a knowledge management (KM) strategy. While the nature of the technology can vary by the type of knowledge (and the industry, as we will discuss it), IT is seen as critical for KM processes and decision making (Aydiner *et al.*, 2019). Since its beginning, knowledge management scholarship has differentiated between explicit and tacit knowledge (Nonaka and Takeuchi, 1995; Polanyi, 1967). Explicit knowledge is more concrete, more sharable, and more codifiable in IT systems (Thomas *et al.*, 2001). Consequently, explicit knowledge is primarily managed with information technology applications. But even more personal and hard to express tacit knowledge, usually managed through methods like communities of practice or storytelling (Brown and Duguid, 1991), is increasingly lending itself to IT applications. Talent management systems, best practice or post-mortem summaries, and genius systems identifying tacit sources of expertise all make use of information technology.

Regardless of the KM circumstances, however, the actual management is a blend of IT and people. Generally speaking, we know that any information technology will have adoption and usage issues unless human interactions are well-planned. The Technology Adoption Model (TAM), for example, has established, over a broad range of applications, that perceived usefulness and perceived ease of use by those working with the technology are critical to its acceptance and wide application (Davis *et al.*, 1989). The greatest IT infrastructure, operational capabilities, and training are worth very little unless users are willing to interact with and apply the system.

IT competency dimensions

Information technology is a part of nearly all business processes today. In terms of knowledge management, IT is often an essential component, particularly with explicit knowledge systems. Knowing the value of IT competency is necessary for information management. A company’s IT competency is defined by the ways the company uses technology to manage its information effectively (Tippins and Sohi, 2003). Perez-Lopez and Alegre (2012) showed that IT competency is an important antecedent to knowledge management processes. Numerous studies have confirmed a link between technology and performance in knowledge-sharing systems (Rao *et al.*, 2015; Soto-Acosta and Cegarra-Navarro, 2016; Santoro *et al.*, 2017).

IT competency, as a concept, can be more specifically delineated. Pérez-López and Alegre (2012) described this competency in three dimensions, defined as:

- IT knowledge – it is the degree to which the organization understands the capabilities of IT to support the company's performance.
- IT operations – it relates to IT contribution to improving the effectiveness of the company's operations and decision-making.
- IT infrastructure – it reflects all elements such as hardware, software, and support staff which make acquisition, processing, storage, dissemination, and use of information possible.

Simplifying, IT-operations refers to using the information and its related resources. More specifically, access and use of information, analysis, and decision-making are specific variables used for assessment. IT-knowledge covers users' expertise. In particular, staff computer knowledge, technical expertise, and openness to IT innovation can be used to operationalize the concept. IT- infrastructure fosters knowledge spreading.

Impact of IT competency on knowledge sharing

Although the field of knowledge management does not consider data and information the same as knowledge, these intangible resources are related. Information technology has long worked with the DIKW (data, information, knowledge, wisdom) hierarchy (Ackoff, 1989) in various forms, establishing the link between these different types of intangible resources. Knowledge management is specifically about knowledge exploration, capture, and utilization through data and information can be important precursors. Knowledge transfer or sharing happens as the organization leverages identified knowledge by distributing for further use by other employees (Alavi and Leidner, 2001). As such, it is a critical component of a KM system. Without knowledge sharing, knowledge assets are never applied in practice (Hvidsten, 2016). The range of intangible resources in an IT system supports knowledge management, and so a link can be inferred between IT competency, including all constituent parts, and knowledge sharing (Ma *et al.*, 2008; Pérez-López and Junquera, 2013; Akram *et al.*, 2018). Knowledge sharing, based on the literature, can be operationalized by assessing whether the organization has an organized, accessible knowledge system, whether individuals contribute their knowledge, and whether they can find contributions from others (Gemino, Reich and Sauer, 2015; Park and Lee, 2014). More formally:

H1a: IT-knowledge positively influences knowledge sharing.
H1b: IT-operations positively influence knowledge sharing.
H1c: IT-infrastructure positively influences knowledge sharing.

Impact of IT competency on job satisfaction

A similar relationship has been noted between IT competency and the HR function (Turulia and Baigoricm, 2018), particularly employee job satisfaction (Mariani *et al.*, 2013). Wu *et al.* (2017) and Park *et al.* (2017) proved that there is a positive correlation between job satisfaction and job performance. Job satisfaction is also closely connected with knowledge management (Rafique and Mahmood, 2018). Job satisfaction is characterized as a positive response to a work position and organizational commitment, an alignment between the employee's personal interests and what is provided by the employer (Baothamo *et al.*, 2010). Superior IT capabilities enable employees to accomplish tasks better and more quickly, increasing overall job satisfaction (Takeshita, 2003; Homburg *et al.* 2009; Jun and Cai, 2010). Referring to a study from China showing a similar effect of good-quality IT services on job satisfaction, we can propose that IT competency is positively related to job satisfaction (Jia *et al.*, 2018). In the literature, job satisfaction is typically operationalized by a series of statements reflecting on "good job," "liking my job," and job satisfaction itself (Camman *et al.*, 1983). Again, formally stated:

H2a: IT-knowledge positively influences job satisfaction.
H2b: IT-operations positively influence job satisfaction.
H2c: IT-infrastructure positively influences job satisfaction.

Impact of knowledge sharing on job satisfaction

While related to IT competency, the concepts of knowledge sharing and job satisfaction have also been tied to each other in the literature. Greater access to knowledge and employees' willingness to trade the know-how creates a positive work environment. Such a context enriches job experience and increases job satisfaction (Mohrman, 2003; Morgeson and Humphrey, 2006; Kianto *et al.*, 2016). Alternatively, it is easier to motivate satisfied workers to use knowledge systems to enable performance. Rafique and Mahmood (2018) showed the connection between job satisfaction and knowledge sharing in their comprehensive literature review and that in fact, the effect was noted for both directions. Job satisfaction influences knowledge sharing, and knowledge sharing influences job satisfaction.

Looking more deeply into the literature, the models which focused directly on the knowledge sharing to job satisfaction relationship established that the former leads to the latter (Varshney and Damanhouri, 2013; Kianto *et al.*, 2016; Malik and Kanwal, 2018). Studies showing the relationship in the opposite direction tended to be more complex, bringing in other variables such as organizational climate. Taken as an entire system, the link from job satisfaction to knowledge sharing could also be established (Yeh *et al.*, 2013; Kucharska and Bedford, 2019). In this study, we explore the more direct context (knowledge sharing to job satisfaction), especially since previous work suggests that it is a more likely direction when the impact of IT is also included (Jia *et al.*, 2018; Masa'deh *et al.*, 2019). In short:

H3: Knowledge sharing has a positive impact on job satisfaction.

Impact of job satisfaction and knowledge sharing on company performance

Finally, IT competency, knowledge sharing, and job satisfaction can be tied to organizational performance. In the literature, this relationship has different contexts. Knowledge sharing has been shown to link information technologies to innovation outcomes (Gemino *et al.*, 2015; Park and Lee, 2014; Calvo-Mora *et al.*, 2015). Effective knowledge management can lead to overall productivity growth and performance improvement (Tsai and Ghoshal, 1998; Mesmer-Magnus and DeChurch, 2009; Witherspoon *et al.*, 2013; Kianto *et al.*, 2016), and then on to organizational success (Asrar-ul-Haq and Anwar, 2016). Knowledge sharing, more specifically, has also been linked to better organizational performance (Young and Milton, 2016). Related to the previous discussion, when satisfied employees share knowledge, they obtain more opportunities to explore inputs, develop new ideas, and contribute to the organization's objectives (Wu *et al.*, 2013). Thus, job satisfaction also comes into play, it leads to better organizational performance, both through knowledge sharing (Kotter, 2008; Bakotić, 2016) and directly (Matthews *et al.*, 2018; Pang and Lu, 2018). Here, organizational performance is captured by statements concerning management's satisfaction with annual results and managers' satisfaction with the department and individual employee results (Gemino *et al.*, 2015). Summing up:

H4: Knowledge sharing has a positive impact on organizational performance.
H5: Job satisfaction has a positive impact on organizational performance.

Expected Mediations

Tanriverdi (2005) stressed that knowledge processes mediate the relationship between company's IT-competency and performance (P). That is why, based on the theoretical framework presented in Figure 1, the assumption is that job satisfaction (S) and knowledge sharing (KS) strongly mediate the relationship between company's IT capabilities and performance in the following way:

1. IT- knowledge -> KS-> S
2. IT- operations -> KS-> S
3. IT- infrastructure -> KS-> S
4. KS -> S -> P

Control variables (CVs)

Erickson and Rothberg (2012, 2017) pointed out that industries vary in levels of both explicit and tacit knowledge sharing and their impact on operating results. Other authors inspired by their work decided to include an industry factor in their studies. Based on the sample structure, two industries with equal representation have been selected to measure the influence of industry factor on knowledge sharing and job satisfaction driven by IT capabilities, i.e., the IT and construction industries. Based on what was said earlier, the following hypotheses have been formulated:

H_{cv}1a: IT industry positively influences knowledge sharing supported by IT competency

$H_{cv}1b$: IT industry positively influences job satisfaction supported by IT competency
$H_{cv}2a$: Construction industry positively influences knowledge sharing supported by IT competency
$H_{cv}2b$: Construction industry positively influences job satisfaction supported by IT competency

Figure 1: Conceptual Framework

Figure 1

Methodology

Data were gathered using a self-reporting questionnaire. Only respondents affiliated to a particular company for more than one year and familiar with the assessment of annual results were utterly required. The acceptance of study participants with a shorter period of the one company experience would put the risk in a quality of the answers. We selected respondents in this way to be sure that they possess the information we are looking for. Qualified respondents answered questions adapted from validated measurement scales of all constructs included in the theoretical model. The statements, sources of the scales, and their reliability assessment are presented in Appendix 1. The scales used in the study sometimes have more than one source and had to be modified to be understood by Polish respondents. The authors were looking for the best statements: clear and fitted the Polish reality. Hence, sometimes the original statements have been slightly reformulated, so reported in the Appendix1 statements can a little bit vary from the original scales. Additionally, after the pilot study, the statements were modified to make them clear for the Polish respondents who gave answers in their native language. In the next step, the Polish comments were translated back into English, and thereby their style may be slightly different from the original. It is important to remember that direct translation can bring weak measurement results of a particular scale, which is otherwise perfect for the original language.

The subjects responded to statements using a 7-point Likert scale. The final study was preceded by a pilot study involving twenty-three respondents, which made it possible to improve statements that respondents considered unclear (Hair *et al.*, 2010). The data were collected from February to June 2018 electronically, mainly through email, in which we asked human resources departments for their kind cooperation. This convenience sampling method reduced the risk of a too small sample size. The study participants were nine hundred and ten Polish employees with different roles and experiences across different industries, mostly information technology (IT), sales, finance, and construction. A majority of the respondents identified themselves as knowledge workers. 70% of the total sample worked as mid-level managers – 60%; top managers – 10%; team leaders – 8%; specialists – 19%; executive-level managers (C-suite) – 3%. Other employees were represented by 30% of the respondents. Of all the engaged employees, 38% were women, and 62% were men. 55% came from mid-sized and large companies employing above 250 persons. The following industries are represented in the study: IT (25%), construction (25%), finance (18%), health care (15%), communication and media (10%), others (7%).

The data were analyzed with a structural equation modeling method (SEM). For the theoretical model presented in Figure 1, both the Confirmatory Factor Analysis (CFA) models and the structural model were elaborated. The model was then estimated and assessed. Estimation was conducted according to the maximum likelihood method (ML). The evaluation of the data and model quality were conducted based on the following tests: normality assessment, Average Variance Extraction (AVE), CR (Composite Reliability), Cronbach α, and next: Root Mean Square Error of Approximation (RMSEA), minimum discrepancy, divided by its degrees of freedom (CMIN/DF), Comparative Fit Index (CFI), and Normed Fit Index (NFI) with the use of SPSS AMOS 25 software. Before the empirical model was measured the quality of the sample and construct measurements had proceeded. The achieved Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy index was 0.959 on p-value < 0.001 level and the total variance explained level was 90%, which is considered as very good (Bartlett, 1950). Table 1 presents the discriminant validity and correlation of constructs. To achieve discriminant validity, the average of variance extracted (AVE) estimates in each construct should exceed the squared inter-construct correlations associated with constructs in the model (Hair *et al.*, 2017).

Table 1: Factor correlation matrix with square root of the AVE on the diagonal
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Table 1

All of the correlations between constructs are less than the square root of the AVE (Fornell and Larcker, 1981). Table 2 presents the model's quality and obtained results (Model A without, and

Model B with control variables imputation). The achieved model reliability level for Model A is 4.55 and for Model B it is 3.97. In both cases, it is not higher than the reference value ≤5 (Wheaton, 1977). Model fit to the data, based on the approximation average error RMSEA at 0.063 (Model A) and 0.057 (Model B), also meets the reference value below 0.08 (Stieger and Lind, 1980; Byrne, 2016). Based on that it can be claimed that Model B goodness of fit is better, so, it justifies CVs imputation. Hence, all obtained results are presented based on Model B (Aguinis and Vandenberg, 2014; Becker *et al.*, 2016). The measures of the goodness of fit CFI and TLI are close to 1 (McDonald and Marsh, 1990; Bentler and Bonnet, 1980). What is more, AVE (Average of Variance Extracted) is higher than 0.67 and exceeds the minimum 0.5 for all loadings. CR (Composite Reliability) is higher than 0.88 for all loadings, more than the required minimum of 0.7 (Hair *et al.*, 2017). Cronbach alpha coefficient (Francis, 2001) is also higher than 0.88. Table 2 presents a comparison of the results obtained for the two models.

Table 2: Results

Table 2

Results

Table 2 presents a comparison of the results obtained for two models, i.e., Model A run without CVs, and Model B run with CVs (Aguinis and Vandenberg, 2014; Becker *et al.*, 2016). In both cases, the overall results of the hypotheses' verification are comparable. All hypotheses, except for H1c and H2b, have been confirmed. It means that the direct, positive influence of IT-infrastructure on knowledge sharing and IT-operations on job satisfaction has not been detected. Namely, the IT-infrastructure does not affect directly knowledge sharing on a significant level. Similarly IT-operations also does not directly support job satisfaction but it suggests the possible full mediated effect of knowledge sharing for IT-infrastructure and job satisfaction. Following these conclusions, mediated effects were then assessed. The results showed that the IT-infrastructure's impact on job satisfaction is fully mediated by knowledge sharing. It means that IT-operations competency of particular company increases the satisfaction of knowledge workers only if support knowledge sharing. Another mediated effect has been observed for a positive and significant relationship between IT-knowledge and job satisfaction is complementarily mediated by knowledge sharing. It means that the IT-knowledge competency stronger influence on job satisfaction when IT-knowledge competency of the organization leads to knowledge sharing. Summarizing, knowledge workers need to develop at work to be satisfied. Moreover, the indirect effect of job satisfaction is observed for the significant and positive relationship between knowledge sharing and company performance. It means that the satisfaction with the job of knowledge workers tremendously matters for company performance.

The influence of both imputed control variables, the IT (0.9***) and construction industry (0.05*), is significant for knowledge sharing. However, only the IT-industry (0.05**) significantly affects job satisfaction in the presented structure of relationships driven by a company's IT competency. Figure 2 and Table 2 present the significance of the imputed controls, whereas Figure 3a-c visualizes the conditional effect of the most significant CVs IT industry on the focal predictor (KS), using PROCESS 3.2.03 software (Hayes, 2018). To do this, the composite variables were created, based on the mean values of a particular variable's loadings. It is worth highlighting that figures 3a-c were created separately for each of the IT competency dimensions to visualize their effect on KS for the IT (Figure 3a) and the construction industry (Figure 3b). It is visible that operations are vital for knowledge sharing in the IT industry, whereas the influence of IT-knowledge is negligible, and the impact of IT-infrastructure is entirely insignificant. Looking at the entire model, we can see that the influence of IT-knowledge on KS is the strongest of all examined relationships, which means that all industries, except for the IT, need IT-knowledge to support KS with the use of technology. Operations are the most significant for knowledge sharing in the case of the IT industry. These findings confirm that IT support for knowledge processes is different for hi-tech and other companies. It is worth to highlight that even the visualization effects on KS for the construction industry (Figure 3b) seems to be more spectacular than obtained for IT (Figure 3a), the statistical test of CV significance is stronger for IT (details: Table 2, Figure 2). Namely, the knowledge sharing meaning supported by all IT- competency dimensions at work for IT industry is stronger than for construction industry. Moreover, all dimensions affect knowledge sharing in the construction industry, but they are not significant for the job satisfaction level. It means, that company's' IT-competency do not increase job satisfaction in the construction industry (Figure 2, not significant effect of "construction industry" CV). It is quite the opposite when it comes to the IT industry (Figure 2; Figure 3c). The higher the level of all IT competency dimensions, the stronger job satisfaction of IT knowledge workers in comparison with other respondents. Due to the insignificant result obtained for hypothesis Hcv2b (construction industry positively influences job satisfaction has not been confirmed), the visualization is not presented. Thanks to the imputation of CVs and the comparison of Models A and B, we can better understand the nature of the presented mediations. The mediated effect of knowledge sharing on IT-operations and job satisfaction is strong. However, the indirect effect of satisfaction on knowledge sharing and performance relationship, although still quite strong, is weaker than in model A without CVs imputation. Keeping in mind that 70% of the sample are knowledge workers, we can assume that knowledge sharing is a serious factor determining job satisfaction in this group. This result was verified by R^2=0.84 for job satisfaction influenced by KS obtained for Model B.

It is worth highlighting that the R^2=0.89 for company performance is a very good result. This means that the whole model explains 89% of company performance. The R^2=0.66 obtained for knowledge sharing suggests that there are other variables influencing knowledge sharing, which are stronger than a company's IT-competency that were omitted in the presented theoretical model. Figure 2 is a graphic presentation of the results for Model B.

Figure 2: Empirical model

Figure 2

Note: Chi-square (111)=441.17, Cmin/df= 3.97 n=910 *** p<0.001, **p<0.01, **p<0.05 (ns)-not significant ML, standardized results, RMSEA =0.057 (90%CI=0.052-0.063), CFI=0.984, TLI=0.979

Figure 3: Visualization of the industry's influence on knowledge sharing driven by each of IT competency dimensions

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Figures 3a-c

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note: 1 - IT (p< 0.001) or construction industry (p<0.05); 0 - rest of the sample

Discussion

The most surprising result, worth to discuss is the non-significant, direct influence of IT-infrastructure on knowledge sharing. Aydiner *et al.* (2019) obtained a similar result, but it referred to a company's total performance not to knowledge sharing as we did. The level of IT-infrastructure development is probably so high in Poland that it stopped making any difference to improvement of knowledge sharing processes. This conclusion is supported by the significance obtained for the imputed industry controls. The knowledge sharing and infrastructure relationships for the IT–industry (Figure 3a) are the same as in the case of other industries (the rest of the sample). The influence of IT-knowledge on knowledge sharing (KS) processes is stronger in the IT industry than in others. However, the most prominent difference is noted for IT-operations. The IT-industry is obviously the most technologically advanced. It is a perfect example which proves that IT-operations are the essence of KS processes support. With the entire theoretical structure of relationships (Figure 1) in mind, the satisfaction with an organization's IT capability is significant for the IT industry, whereas it is not significant for the construction industry.

The table shows the results in an explicit way. Both models (with and without the industry control variables) support most of the hypotheses. To be more specific, if we look at the hypotheses 1a, 1b, and 1c, it appears that the IT-competency influences knowledge sharing. However, its effect is limited to IT operations and IT knowledge, as the correlation of IT-infrastructure to knowledge sharing is not significant. One could speculate that IT systems have grown to be so reliable that effective IT departments and management are no longer unusual. Daily hardware and software support is considered commonplace and noticed only when its work fails. However, the perception that IT operations and IT knowledge are linked to knowledge sharing is unquestionable.

Similarly, the connection of IT competency to job satisfaction is significant for two of the three hypothesized relationships. Hypotheses 2a and 2c are supported (IT infrastructure and IT knowledge), while IT operations do not appear to be correlated with job satisfaction. Workers may see the IT infrastructure to be linked to job satisfaction in ways unrelated to the knowledge systems, resulting in a relationship not found in H1c. And, again, it is only speculative, but dissatisfaction with the nature of the IT operations related to job performance may be surfacing in ways that have little to do with the knowledge system—the everyday record-keeping or task-management systems may be rated differently than the knowledge system itself. But, again, two of the three components of IT competency are clearly related to job satisfaction in both models.

The mediation results potentially provide additional explanation, breaking out the IT-competency components and their impact on job satisfaction, as they are filtered by knowledge sharing. IT-infrastructure matters the least, with some effect on satisfaction, but having little to do with knowledge sharing and, therefore, showing no mediation. As before, this seems to suggest that IT-infrastructure is not top of mind for employees when it comes to knowledge systems, possibly something taken for granted. That makes some sense, with the low significance of its relation to job satisfaction. It is only noticed when failing to perform properly.

IT-operations factor shows full mediation in both models, little direct effect on job satisfaction, and an indirect effect through its relationship with knowledge sharing. This finding again is quite logical, as it shows that IT-operations away from knowledge systems aren't necessarily a satisfying part of the job. However, in the context of knowledge sharing associated with job satisfaction, the effect is noticeable. IT-knowledge shows both direct and indirect effects related to job satisfaction. As this aspect is most connected with the usefulness of IT systems, especially in the knowledge sharing context, the conclusion is easily justified.

The knowledge sharing/job satisfaction relationship posed in H3 is also strongly supported in both models. Hypotheses H4 (knowledge sharing and performance) and H5 (job satisfaction and performance) show the expected relationships as well. This includes a mediation which indicates both direct (knowledge sharing on performance) and indirect (knowledge sharing on job satisfaction on performance) effects. The full conceptual model with results is illustrated in Figure 2.

As indicated in Figure 2 and Table 2, results for Model B, the control variables are generally significant. They reach different levels, however. The IT industry has the most significant relationship with knowledge sharing and a slightly less, but still significant relationship with job satisfaction. The construction industry has a relationship with knowledge sharing, which is of lower significance, but no apparent connection to job satisfaction. Figures 3 a-c visualize these differences. None of the results is surprising. As noted earlier, it is common knowledge that differences in knowledge levels and the use of knowledge management across industries exist. In earlier work, IT was identified as an industry with relatively high requirements for knowledge, both explicit and tacit (Erickson and Rothberg, 2012). Construction, on the other hand, typically has less sharable knowledge, dependent on tacit knowledge passed along in a person-to-person manner, which is more difficult to measure. The study has delivered the evidence to support this knowledge. The overall conclusion that IT-competency relationships with knowledge sharing and job satisfaction differ by industry has been confirmed thanks to the above investigation.

Practical implications

The findings of this study suggest that infrastructure is not a significant value-added IT-competency when it comes to knowledge sharing, whereas IT-knowledge and IT-operations are. This means that infrastructure should be perceived as a necessary but not sufficient factor to ensure knowledge-sharing flows in organizations. Technology means nothing if companies do not know how to integrate it with their business operations. Even so, technology investment and development to support explicit and tacit knowledge sharing remain uneven (Ting-Toomey, 2012; Corcoran and Duane, 2017). Part of this hesitancy to commit dates back to some of the disappointing investments in massive KM systems in the early 2000s, which was pointed out by Carr. In light of the presented study, bearing in mind the IT industry results, our findings seem to confirm that technology investment on knowledge sharing is still disappointing. The influence of IT-infrastructure on knowledge-sharing processes is controlled by IT-operations and IT-knowledge. The results advocate the need for the integration of IT and business operations when building effective knowledge-sharing processes. Namely, overinvestment in this context should be understood as investments in IT-knowledge supporting systems, developed solely on the basis of IT-competency, without efficient connection to business operations. Moreover, the industry factor significantly affects knowledge-sharing processes. Consequently, from a practical point of view, different business operations define a different kind of IT-dimension investments. Knowledge sharing is a serious factor influencing job satisfaction of knowledge workers. At the same time, it strongly impacts company performance. With regard to business practices, it simply means that by increasing IT-knowledge and developing IT-operations among employees, companies indirectly increase their job satisfaction thanks to more effective knowledge sharing.

Knowledge workers are a unique group. The main input, tool, and output of their work is knowledge. Effective knowledge sharing facilitates personal development and increases their job satisfaction. It is a double win for the company, especially in the IT industry.

Limitation and further research

Although the sample group was relatively large, the study did not include a random sample, which ensured a respectable sample size and representation across different types of jobs in the targeted industries, however, limited the extensibility of the results. Respondents participated in the survey voluntarily and completed self-report questionnaires. It is possible that even if they were working in the same company since their opinions can vary. However, this is a common feature of all social science research (Babbie, 2013) – it is as human nature. The study is also specific to Poland. The results are interesting in and of themselves but, again, are not necessarily extendable beyond Poland. Future research should include other countries to establish how similar or different Poland might be. Comparisons with other countries in Europe, more developed countries or developing countries, could provide additional useful perspectives. As important as these results are, there is tremendous potential in verifying the results with similar studies from other industries, taking into account other points of view. Results may differ depending on how technologically developed in terms of the IT-competency the industries are. Other organizational factors beyond industry, such as size or experience, may also matter.

Conclusions

The present study was designed to determine the relationship between IT competency, knowledge sharing, job satisfaction, and organizational performance. IT competency has been established in the literature as a key component of knowledge management. It is specifically defined as IT infrastructure, IT operations, and IT knowledge. Overall, the study confirms that there is a strong dependency (direct or indirect) between these variables and knowledge sharing (except for infrastructure) as well as job satisfaction. The study also supports the impact of knowledge sharing on job satisfaction and demonstrates the influence of all the variables on organizational performance. Moreover, results advocate the strong need for the integration of IT and business operations. Namely, investments in IT-knowledge supporting systems, developed solely based on IT-competency, without efficient connection to business operations when building effective knowledge-sharing processes. In a diverse set of Polish businesses, the whole range of relationships in the conceptualization has been largely confirmed.

In addition, the study shows a clear mediation of the knowledge sharing and job satisfaction factors, which provided us with some additional insight into how and why variables are significant (or in some cases insignificant). A couple of industry variables were also included in the second run of the model. Model B establishes that there is a relationship between the nature of the industry and knowledge sharing in particular. This relationship varies among industries, providing direct evidence that KM's impact can be different in different circumstances. All in all, the research provides interesting results in a specific setting and leaves open the possibility of extending the results to other countries and other industries.

Appendix 1: Constructs and scales

Construct	Scale	Loadings	CFA constructs validity	Adapted from
Organizational Performance (P)	P1- Head Office was satisfied with company's annual results P2- Head Office was satisfied with the company's benefits P3- Head Office assessed the company's annual results positively P4- My boss was satisfied with my results P5- Department's boss assessed the department's results positively	0.929 0.929 0.951 0.949 0.961	AVE=0.891 CR=0.976 Cronbach α=0.98	Gemino, Reich and Sauer (2015)
Job satisfaction (S)	S1-I am satisfied with my job S2-I have a good job S3-I like my job	0.963 0.932 0.938	AVE=0.891 CR=0.976 Cronbach α=0.98	Camman *et al.* (1983)
Knowledge Sharing (KS)	KS1-The company has formal mechanisms to guarantee the sharing of best practices among the different fields of the activity KS2-I shared my experience and know-how with my co-workers KS3- Overall, the access to data, information and knowledge is easy KS4-Overall, members of the company shared their experience and know-how	0.961 0.991 0.98 0.78	AVE=0.892 CR=0.961 Cronbach α=0.96	Gemino, Reich and Sauer (2015); Park and Lee (2014)
IT –knowledge (ITK)	ITK1 – Overall, our staff is knowledgeable when it comes to computer-based systems ITK2 – Our firm possesses a high degree of computer-based technical expertise ITK3 – We are very knowledgeable about new computer-based innovations	0.951 0.961 0.92	AVE=0.67 CR=0.96 Cronbach α=0.96	Pérez-López and Alegre (2012)
IT –operations (ITO)	ITO1 –We routinely utilize computer-based systems to access information from outside databases ITO2 – We use computer-based systems to analyze information ITO3 – We utilize decision-support systems frequently when managing information	0.896 0.889 0.804	AVE=0.75 CR=0.90 Cronbach α=0.89	Pérez-López and Alegre (2012)
IT –	ITI1 –Our company has a formal MIS	0.886	AVE=0.72	Pérez-López

infrastructure (ITI)	department ITI2 –Our company employs managers responsible for IT infrastructure ITI3 –Our firm creates customized software when necessary to manage information	0.876 0.772	CR=0.88 Cronbach α=0.88	and Alegre (2012)

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Table 1: Factor correlation matrix with square root of the AVE on the diagonal

	AVE	CR	Cronbach alpha	ITI	ITO	ITK	S	KS	P
ITI	0.72	0.88	0.88	**0.846**					
ITO	0.75	0.90	0.89	0.781	**0.864**				
ITK	0.67	0.96	0.96	0.491	0.559	**0.818**			
S	0.89	0.97	0.98	0.547	0.616	0.814	**0.944**		
KS	0.87	0.96	0.97	0.511	0.633	0.785	0.891	**0.932**	
P	0.90	0.98	0.99	0.509	0.591	0.765	0.917	0.880	**0.950**

Table 2: Results

Hypothesis		**Model A without CVs**				**Model B with CVs**			
		β	t-value	p-value	Hypothesis verification	β	t-value	p-value	Hypothesis verification
H1 (KS)	a	0.539	18.21	***	supported	0.53	17.56	***	supported
	b	0.471	6.65	***	supported	0.49	6.56	***	supported
	c	-0.12	-1.7	(ns)	rejected	-0.14	-1.91	(ns)	rejected
H2 (S)	a	0.22	8.79	***	supported	0.22	8.88	***	supported
	b	0.02	0.36	(ns)	rejected	0.04	0.78	(ns)	rejected
	c	0.11	2.50	**	supported	0.10	1.99	*	supported
H3		0.65	21.78	***	supported	0.64	21.36	***	supported
H4		0.25	7.23	***	supported	0.25	2.9	***	supported
H5		0.72	19.66	***	supported	0.71	7.41	***	supported
CVs	KS<-IT	NA				0.1	2.67	***	supported
	KS<-Construction					0.05	2.09	*	supported
	S<-IT					0.05	2.9	**	supported
Mediation analyzed		Total effect	Direct effect	Indirect effect	Mediation type observed	Total effect	Direct effect	Indirect effect	Mediation type observed
ITK-> KS -> S		0.57 (***)	0.22 (***)	0.35 (***)	complementary mediation	0.56 (***)	0.22 (***)	0.34 (***)	complementary mediation
ITO-> KS -> S		0.32 (***)	0.02 (ns)	0.30 (***)	full mediation	0.36 (***)	0.04 (ns)	0.32 (***)	full mediation
ITI-> KS -> S		0.04 (ns)	0.11 (ns)	-0.078 (ns)	no mediation	0.00 (ns)	0.1 (ns)	-0.1 (ns)	no mediation
KS->S->P		0.72 (***)	0.25 (***)	0.47 (***)	complementary mediation	0.71 (***)	0.25 (***)	0.46 (***)	complementary mediation
		Chi-square(88)=400.95 Cmin/df= 4.55				Chi-square(111)=441.17, Cmin/df= 3.97			

notes for the model	n=910 *** p<0.001, **p<0.01, *p<0.05, (ns)- not significant ML, standardised results, RMSEA =0.063 (90%CI=0.056-0.069), CFI=0.985, TLI=0.980	n=910 *** p<0.001, **p<0.01, **p<0.05 (ns)- not significant ML, standardised results, RMSEA =0.057(90%CI=0.052-0.063), CFI=0.984, TLI=0.979

Figure 1

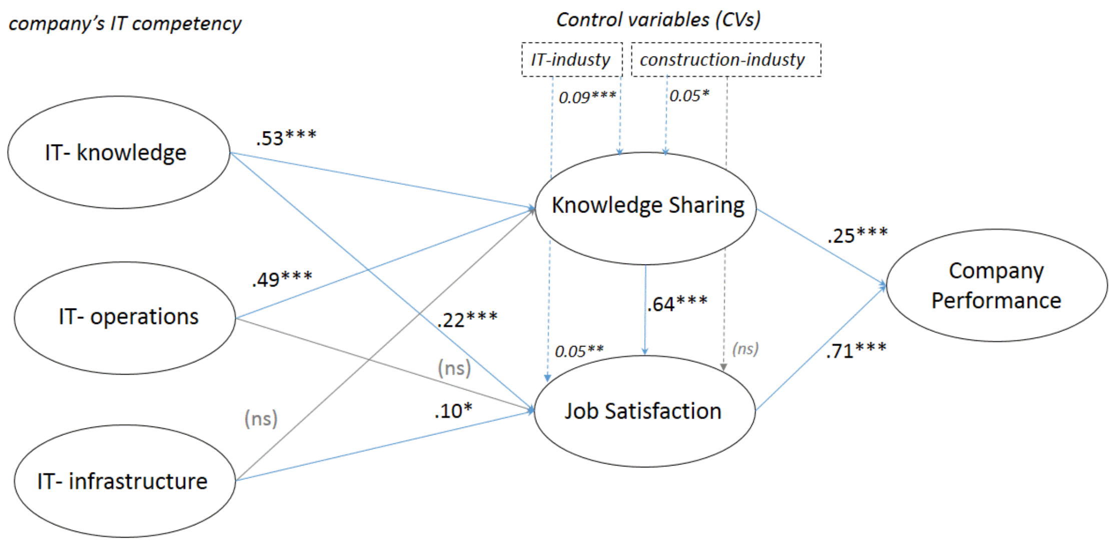

Figure 2

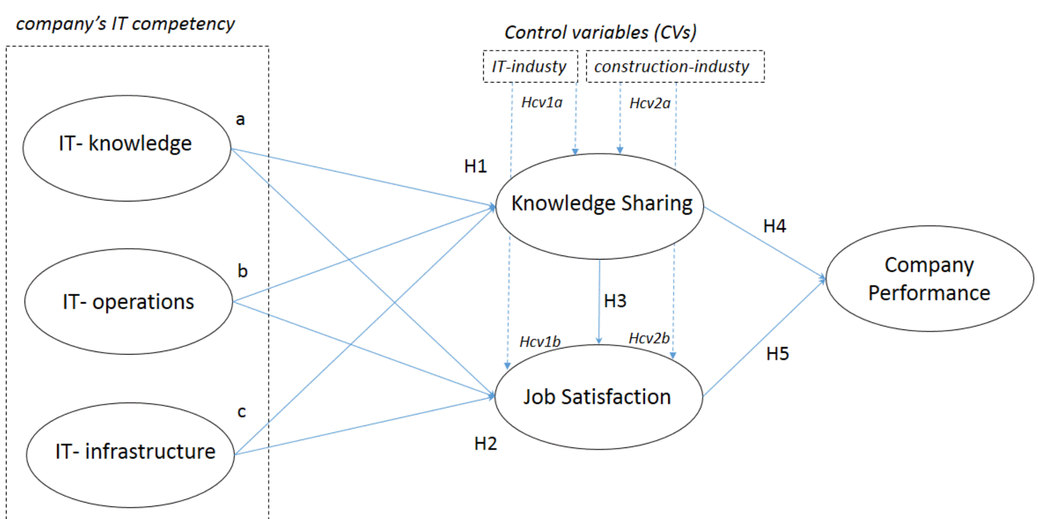

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Figure 3

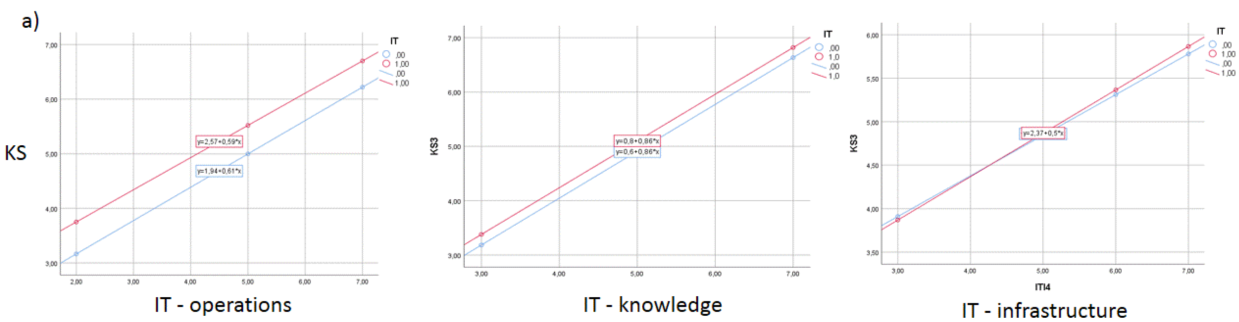

Figure 4