

# Tacit Knowledge Transfer: Information Technology Usage in Universities

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**Abstract:** The importance of transferring tacit knowledge transfer is acknowledged in the literature, but the usage of information technology for tacit knowledge transfer is not well researched. Through a mixed methods approach, employing an online questionnaire and interviews, this study explored the perceptions of university academic staff with regards to information technology usage, specifically relating to the transfer of tacit knowledge. The study found a lack of specific tacit knowledge transfer technologies but relatively high use of communication tools, a need for training on the use of new information technology was identified and academic staff are generally quick to adapt to information technology. However, there appeared to be a lack of confidence in information technology for the transfer of tacit knowledge and staff willingness to use technology for sharing tacit knowledge was not high, exhibiting uncertainty. This study contributes to a better understanding of the usage of information technology for tacit knowledge transfer and its adaptability by university academics. The results of this study may stimulate future research by addressing sample size limitation and replication in a different organisational setting.

## 1 INTRODUCTION

Tacit knowledge is an essential resource for organisations. Tacit knowledge transfer can be facilitated through the use of information technology (Pant et al., 2018). In the current digital environment, it is difficult to separate knowledge transfer from technology. Information technology (IT) can be used to capture, store and share knowledge, also making knowledge access easier for users (O'Leary, 1998). IT plays a vital role in supporting knowledge transfer.

The use of IT for tacit knowledge transfer processes has shown to improve work-related tacit knowledge flows among employees (Sarkiünaitė & Krikdėiūnienė, 2005) and can also be effectively used for tacit knowledge transfer in geographically dispersed teams (Jones, 2016). Technology that can help in tacit knowledge transfer includes groupware, social media, skills directory, intranets, blogs, wikis, discussion forums and electronic rooms. Organisational knowledge is embedded in its tools, technology and processes, and people play an important role in the success of its knowledge transfer efforts (Argote & Ingram, 2000).

It is relatively easier to transfer tangible explicit knowledge into databases, but the transfer of intangible tacit knowledge is difficult (Brown & Duguid, 2000). However, knowledge transfer ultimately depends on the knowledge transferrer and their traits (Albino, Garavelli & Gorgoglione, 2004), especially for the transfer of tacit knowledge. It is acknowledged that the key to success in knowledge management lies in individual and organisational factors (Margilaj & Bello, 2015; Saini, Arif & Kulonda, 2018), and in technology that facilitates the creation/acquisition, packaging/embodiment, transfer, sharing and use of knowledge. However, it is vital to understand how knowledge workers engage in tacit knowledge transfer. To understand the individualistic or human factors, it is important to investigate the perceptions of knowledge workers.

The question that emerges from this background information is if technology is provided to knowledge workers, will they necessarily use it? This requires an investigation of users, who possess tacit knowledge and use IT for tacit knowledge transfer. Most prior studies have highlighted the importance of IT for the transfer of explicit knowledge only (Pant et al., 2018). There is an apparent scarcity of literature that looks at technology usage perspective for the transfer of tacit

knowledge, particularly in universities. This paper explores the perceptions of university academic staff with regards to IT usage, specifically relating to the transfer of tacit knowledge. It also looks at issues pertaining to academics' adaptability to IT.

This paper is organised as follows. First, in the literature review section, prior research is contextualised. This is followed by the research method section, which provides a rationale for the experimental design. The fourth section reports and discusses the findings. Conclusion and direction for future work are presented in the final section.

## 2 LITERATURE REVIEW

Information communication technology encompasses digital technology, communication tools, and/or networks for accessing, managing, integrating, evaluating and creating information and it can be viewed as an amalgamation of IT and telecommunications (ICT Literacy Panel, 2002). In line with this definition of information communication technology, knowledge management tools can support knowledge creation, storage and retrieval, transfer and application (Alavi & Leidner, 2001).

While the transfer of explicit knowledge is relatively easier over tacit knowledge (Smith, 2001), it is typical to expect that IT will contribute to the transfer of both explicit and tacit knowledge. The use of IT can assist in easily sharing information, making information exchange faster by increasing the speed of communication, reducing physical distances, enabling the minimisation of misinterpretation and avoid divergence (Albino et al., 2004). It is expected that IT can endow these key benefits on tacit knowledge transfer, especially when technology is used to facilitate the knowledge transfer, in the form of web portals, video-conferencing tools, expertise finder directories, blogs, newsletters, discussion groups, email and group decision support systems. Contrary to expectations, technology is an important enabler of tacit knowledge sharing and can assist in capturing, sharing and applying tacit knowledge (Chugh, 2017).

Information technology, systems, policies and procedures, and organisational culture are factors that potentially affect knowledge transfer. A study by Karlsen and Gottschalk (2004) found that IT and systems and processes do not solely contribute to project success until there is an organisational culture for knowledge transfer. A Bahraini study of public and private sector organisations found that there is a

positive relationship between IT and knowledge sharing (Ismail Al-Alawi, Yousif Al-Marzooqi & Fraidoon Mohammed, 2007).

A study found that organisations used a variety of systems, such as database applications, CRM systems, ERP systems, CAD tools, intranets and business portals, to support knowledge-intensive activities but there was no explicit focus on assessing the use of technology for tacit knowledge transfer (Nevo & Chan, 2007). It called for studying knowledge management technologies that support tacit knowledge.

Tacit knowledge, in the minds of employees, is vital for the success of an organisation (Nonaka & Takeuchi, 1995) and it can be captured, stored and transferred using technology (Al-Qdah & Salim, 2013). However, there is an argument around the use of traditional technologies for tacit knowledge transfer but contemporary technologies such as social networks, blogs and wikis have found support for the sharing of tacit knowledge (Panahi, Watson & Partridge, 2016).

Perceived usefulness and perceived ease of use are important influencing factors that users consider for the usage of any technology (Davis, 1989). On the other hand, adaptability implies the modification of behaviour in response to environmental and system changes and changing requirements (Patten et al., 2005). People are important elements for the use (and success) of technology. Understanding their belief about IT usage can provide better insights. As newer technology is introduced, the ability to adapt to technological changes becomes crucial (Keillor, Pettijohn & d'Amico, 2001).

## 3 RESEARCH METHOD

Tashakkori and Creswell (2007) have defined the mixed methods approach as 'research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry' (pg. 4). In almost every applied social research project, there is value in consciously combining both qualitative and quantitative methods in what is referred to as a mixed methods approach (Trochim & Donnelly, 2007). When addressing exploratory questions, mixed methods research is considered better than a single approach (Teddle & Tashakkori, 2009). Adopting a mixed method approach would allow mixing and matching components that would offer the best chance of answering the questions raised by this

paper. Furthermore, Onwuegbuzie and Leech (2004) stated that ‘in many cases the goal of mixing is not to search for corroboration but rather to expand on our understanding’ (pg.19). Hence, a mixed methods research approach was adopted.

The study was administered in two phases. The first phase involved the administration of a custom-designed online questionnaire to academics in four Australian public universities. The questionnaire comprised of close-ended Likert scale format questions, which used a 6-point scale. The second phase involved in-depth structured 30 to 40-minute face-to-face interviews with academics. The first phase gathered quantitative data, whereas the second phase gathered qualitative data. One hundred forty-one respondents responded to the online questionnaire that was emailed to the universities’ academic mailing list. Eight interviews were conducted, comprising of two academics (a lecturer or senior lecturer and an associate professor or professor) from each university.

The questions analysed in this paper have been drawn from a larger study previously carried out by the author, but the novelty lies in the focus of assessing usage of technology for tacit knowledge transfer, something which was not reported earlier nor was this set of data used before. Presenting all the findings of the large study was not possible without breaking it down into meaningful portions to draw relevant inferences.

Considering the nature of the data required and the research questions, the survey amongst many other aspects explored the technology dimension. In doing so, it specifically focussed on exploring the use of information and communication technologies and academics’ adaptability to IT for tacit knowledge transfer. The interview questions were designed to assess whether there were any technologies in the universities that aid tacit knowledge transfer and identify academics’ adaptation to IT implemented by the universities.

#### 4 FINDINGS AND DISCUSSION

The analysis examines the use of technology for tacit knowledge sharing, training on new technologies, adaptation to IT, accessibility to documentation and application software. Descriptive statistics of these questions are outlined in table 1.

As shown in table 1, 61% of the surveyed academics believe their universities make effective use of various means of IT for developing better communication between staff, students and

management with a mean response of 3.56. The response is negatively skewed at skewness statistics (-.554), showing most of the responses were on the side of agreement. A previous study that found that over three-quarters of the respondents showed consensus that their workplace provided different information technologies to share knowledge, thus also demonstrating an awareness of the importance of knowledge sharing (Ismail Al-Alawi et al., 2007). It appears staff need to be made aware of the nexus between communicative and tacit knowledge sharing tools. Intranet, email service, bulletin boards, and electronic forums are different technologies that facilitate inter and intraorganisational knowledge sharing (Song, 2002), and these are communication tools too.

Table 1: Descriptive statistics of perceptions of technology usage relating to the transfer of tacit knowledge.

Statement	N Statistic	Mean Statistic	Std. Error	S.D. Statistic	Skewness Statistic	% Agreement
Q1. My university makes effective use of information technology (e.g. e-mail, groupware, Internet, Intranet, learning management systems and videoconferencing) for developing better communication between staff, students and management.	141	3.5674	0.09459	1.12316	-0.554	61
Q2. My university provides training and education on the use of new information technologies that they introduce to make us more adept at their usage.	140	3.4143	0.0967	1.14418	-0.459	56
Q3. I quickly adapt to information technologies implemented by the university.	141	3.8865	0.07539	0.89516	-0.562	73
Q4. My university documents policies and procedures and makes it available through the staff Intranet.	139	4.1295	0.06445	0.75981	-1.127	86.5
Q5. I feel that electronic transmission leads to an overload of information and encourages frequent changes in policies.	141	3.1915	0.10601	1.25877	0.111	37.6
Q6. It is easy to access the documents that I need within my university's databases i.e. information is well organised.	141	2.9362	0.10275	1.22014	-0.044	37.6
Q7. The policies and procedures on the staff Intranet at my university get rapidly and continually updated.	141	3.5816	0.09767	1.15978	0.203	47.5
Q8. My university provides ready access to application software (e.g. chatting, discussion groups, bulletin boards) and hardware to help me in sharing my personal experiences.	140	3.25	0.1059	1.25305	0.204	36.2
Valid N (list wise)	133					

Overall, 56% of the participants felt that training and education are provided to help in the use of new information technologies that universities introduce. This is an area that requires consideration. Training can assist in creating an awareness of knowledge sharing mechanisms (Chugh, 2012). Adaptability to new systems and processes can be seen as a global trait in both personal and changing environments (Keillor et al., 2001). Around three-quarters of the academics are quick to adapt to information technologies implemented by their university. The mean response to this statement is 3.88 with a skewness value of -.562 showing that a lot of responses are towards an agreement with the statement. Moreover, the functionality and features of technology affect the success of knowledge transfer efforts (Argote & Ingram, 2000).

At 86.5%, there is a high level of agreement with universities' tendency to document policies and procedures and then make them available through the staff Intranet with a mean response of 4.12. Table 1 shows that the average response is negatively skewed and skewness coefficient being significant at -1.127, demonstrating that most of the respondents have indicated a high level of agreement to this statement.

Only 37.6% of participants feel that electronic transmission leads to an overload of information and encourages frequent changes in policies possibly due to the ease with which changes can be implemented electronically. The mean response of this statement is 3.19, which can be interpreted as overall disagreement with the statement. This may also imply that administrative goals are shifting. This contrasts with Tang et al., (2008) who outlined that IT for knowledge and information management can lead to information overload.

37.6% of respondents agree that it is easy to access the documents they need within the university's databases, i.e. information is well-organised. The mean response to this perspective is 2.93, showing overall disagreement with the statement. Access to the documents that academics need within their university's databases is not very easy. In comparison, the situation is better regarding the rapid and continuous upgrading of policies and procedures on the staff Intranet in universities. However, only 47.5 % of the respondents agree with this viewpoint with a mean response of 3.58. Furthermore, only 36.2% respondents agree that their university provides ready access to application software (e.g. chatting, discussion groups, bulletin boards) and hardware to help them in sharing their personal experiences with a mean response of 3.25. Hence, a mix of technological and social methods are required for successful knowledge transfer (Lundberg, Lidelöw & Engström, 2017).

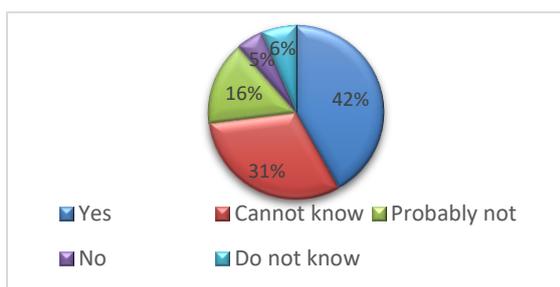


Figure 1: Can technology help in tacit knowledge transfer.

As shown in figure 1, 42% of respondents feel that technology can assist in the transfer of tacit knowledge. However, this presents a lack of overall

confidence. This is in contrast to Sarkiünaitė & Krikdėiūnienė (2005), who posited that the usage of information technologies causes significant work-related tacit knowledge flows. This may perhaps also reflect a preference for face-to-face contact where tacit knowledge transfer can take place more effectively. Despite advances in technology, preference for face-to-face contact for tacit knowledge sharing was outlined by Panahi et al., (2016).

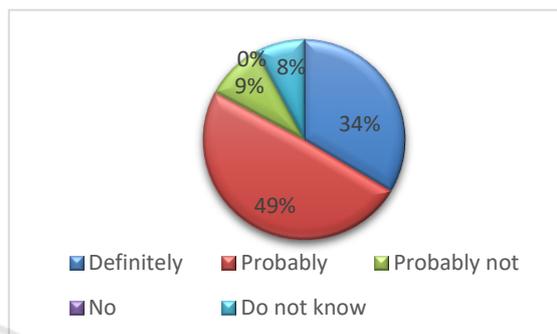


Figure 2: Academics willingness to use technology for sharing tacit knowledge.

Figure 2 indicates that 34% of the academics are willing to use technology to share their knowledge, skills and ideas with others. Universities are implementing different technologies to enhance tacit knowledge transfer (such as video conferencing, online meetings, online chat rooms, discussion forums, intranet, portals) but 49% of the participants feel that with technology they 'may be' in a position to share their knowledge, skills and ideas. This uncertainty is of concern and requires further investigation of the causes. Other participants are either not sure or probably do not believe in improved knowledge sharing with enhanced technology. However, IT is an important enabler of knowledge sharing efforts (Mitchell, 2003). Subramaniam and Venkatraman (2001) found that effective transferral and sharing of tacit knowledge involved face-to-face interaction, often complemented and enhanced with the use of IT. The use of IT to convert tacit to explicit will be a positive way of moving forward in knowledge management efforts.

Majority of the interviewees were not aware of any specific IT used by their universities to aid tacit knowledge transfer. This was also highlighted in response to question eight of the survey. The interviewees even commented about the lack of any such technology in their workplace. Some verbatim excerpts from the interviews have been reproduced below to illustrate these facts:

*'I don't see any systems or technology actually specifically for knowledge management.'*

*'There isn't any technology or computerised systems at this place that can assist tacit knowledge transfer.'*  
*'Technology used in the university-None come to mind.'*

*'Only in the extent of the expertise guide. The expertise guide simply tells people which people have this knowledge.'*

*'No, there are no technologies or systems in this University that aid in knowledge transfer.'*

*'Technology should be used, yes. That's right. We are living in the IT world. Why don't we capture this potential? I am not aware of any IT usage not that I'm aware of.'*

Lack of IT has been identified as a barrier to the successful sharing and transfer of knowledge (Asrarul-Haq & Anwar, 2016). Since information technologies can be used to improve tacit knowledge transfer, it was imperative to assess how academics adapted to any IT implemented by their university. Universities are implementing different technologies to enhance learning and teaching activities although, there is a lack of technology in the area of tacit knowledge transfer. An interviewee commented that *'there's a lot of technology floating around and I think that's happening in all universities'*.

In the arena of adaptability to IT, academics are not laggards that also resonated in response to question three of the survey. However, putting a different perspective on adapting to technology, an interviewee remarked that *'informally is the way I'm thinking of it.'* This interviewee also highlighted that *'I find it very slow and time-consuming and I've talked to people at other universities about it, too, and they've said the same thing.'* On the other hand, an interviewee felt that he was *'a quick learner, but a lonely learner.'* The lonely learner adage was used because this interviewee was able to access IT support through phone only and hence felt that geographical distance was a limitation. Not forgetting the human element, adaptability, user-friendliness and easy access were some desired capabilities users expected from a knowledge management system (Nevo & Chan, 2007).

Although 56% of respondents agreed that training is provided for new IT, it is an area that can benefit from increased training. Lack of training of academics in IT was a problem that came out in the interviews. One interviewee exemplified that *'I did figure it out by trial and error, trial and error. But I wouldn't claim that I'm on top of things, but I can get by with the changes in technology.'* Another interviewee echoed similar thoughts on the adoption

of IT by saying that *'I'm certainly not the first out there, I can tell you. I'm the third, probably – the third or fourth – and I need to find out its social benefit before I leap into it.'* Lack of individual staff capacity to use the available IT was identified as a barrier to tacit knowledge sharing (Olaniran, 2017). However, an interviewee who was more confident in the use of technology commented that *'I can't consider myself a digital native but, certainly, I feel comfortable with any IT systems.'* Action-oriented user training can contribute to improved technology implementation (Sokol, 1994).

As evident from the interviewees' comments, there is currently a dearth of systems in universities that support tacit knowledge transfer however in anticipation that such technology will be made available in the future, academics have to adapt to it rapidly. In summary, it is important to highlight that IT for knowledge transfer is here to stay and academics will have to use it in the near future (if they have not already begun). There will be a learning curve for every new technology. This interviewee's comment helps to conclude this section- *'We have to do it - no choice. Being a slow learner, medium learner, quick learner depends on your operational use of that technology.'*

## 5 CONCLUSIONS

Transfer of tacit knowledge is vital for all organisations, especially universities who create and utilise knowledge for its diverse activities. Tacit knowledge, in the form of skills and experience, is embedded in university academics. Information technology plays an important role in the facilitation of knowledge transfer, particularly that of tacit knowledge. Hence, this mixed-method study explored the perceptions of university academic staff with regards to IT usage.

Although this was an exploratory study, insights from this study provide important contributions to understanding staff perceptions about IT usage, specifically relating to the transfer of tacit knowledge and academics' issues in adapting to IT. The findings of this study have implications for researchers, practitioners and managers alike.

The findings generally indicate a positive predisposition towards IT usage, but a greater focus on introducing specific technologies that assist tacit knowledge transfer is required. A lack of tacit knowledge transfer technologies in universities was evident in the responses. Furthermore, to facilitate the transfer of tacit knowledge, training on the use of new

information technologies is needed. There appears to be a lack of confidence in the role of technologies for the transfer of tacit knowledge. Electronic transmission of information does not lead to an overload of information. The nexus between communicative and tacit knowledge sharing tools needs to be clarified. Academics are generally quick to adapt to information technologies implemented by their university. However, the uncertainty exhibited by academic staff in their willingness to use technology for sharing tacit knowledge requires further exploration.

Like any study, this one is also not free of limitations. Firstly, the qualitative sample was not sufficiently large. Secondly, the sample consisted only of academics from four Australian universities. The explorative nature of the study can also be viewed as a limitation. Hence, generalisability should be avoided. Further studies can overcome these limitations, replicate this study in a dissimilar organisational setting and explore the different IT that academics use in the knowledge management lifecycle.

## REFERENCES

- Al-Qdah, M. S., & Salim, J. (2013). A conceptual framework for managing tacit knowledge through ICT perspective. *Procedia Technology*, *11*, 1188-1194.
- Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, *25*(1), 107-136.
- Albino, V., Garavelli, A., & Gorgoglione, M. (2004). Organization and technology in knowledge transfer. *Benchmarking: An International Journal*, *11*(6), 584-600.
- Argote, L., & Ingram, P. (2000). Knowledge transfer: A basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes*, *82*(1), 150-169.
- Asrar-ul-Haq, M., & Anwar, S. (2016). A systematic review of knowledge management and knowledge sharing: Trends, issues, and challenges. *Cogent Business & Management*, *3*(1), 1-17.
- Brown, J. S., & Duguid, P. (2000). Balancing act: How to capture knowledge without killing it. *Harvard Business Review*, *78*(3), 73-80.
- Chugh, R. (2012). Knowledge sharing with enhanced learning and development opportunities. Paper presented at the *IEEE International Conference on Information Retrieval & Knowledge Management*, 100-104, 13-15 March, Kuala Lumpur, Malaysia.
- Chugh, R. (2017). Barriers and Enablers of Tacit Knowledge Transfer in Australian Higher Education Institutions. *International Journal of Education and Learning Systems*, *2*, 272-276.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319-340.
- ICT Literacy Panel. (2002). *Digital transformation: A framework for ICT literacy*. Retrieved from Princeton, NJ.: [http://oei.org.ar/ibertic/evaluacion/sites/default/files/biblioteca/32\\_digitaltransformacion.pdf](http://oei.org.ar/ibertic/evaluacion/sites/default/files/biblioteca/32_digitaltransformacion.pdf)
- Ismail Al-Alawi, A., Yousif Al-Marzooqi, N., & Fraidoon Mohammed, Y. (2007). Organizational culture and knowledge sharing: critical success factors. *Journal of Knowledge Management*, *11*(2), 22-42.
- Jones, N. B. (2016). Knowledge transfer and knowledge creation in virtual teams. In *Strategic management and leadership for systems development in virtual spaces* (pp. 110-122). Hershey: IGI Global.
- Karlsen, J. T., & Gottschalk, P. (2004). Factors affecting knowledge transfer in IT projects. *Engineering Management Journal*, *16*(1), 3-11.
- Keillor, B. D., Pettijohn, C. E., & d'Amico, M. (2001). The relationship between attitudes toward technology, adaptability, and customer orientation among professional salespeople. *Journal of Applied Business Research*, *17*(4), 31-40.
- Lundberg, M., Lidelöw, H., & Engström, S. (2017). Methods used in the everyday practice of construction projects for knowledge sharing and knowledge transfer. Paper presented at the *5th International Workshop When Social Science Meets Lean and BIM*, 26-27 January 2017, Aalborg, Denmark.
- Margilaj, E., & Bello, K. (2015). Critical success factors of knowledge management in Albania business organizations. *European Journal of Research and Reflection in Management Sciences*, *3*(2), 15-24.
- Mitchell, H. J. (2003). Technology and knowledge management: Is technology just an enabler or does it also add value? In *Knowledge management: Current issues and challenges* (pp. 66-78): IGI Global.
- Nevo, D., & Chan, Y. E. (2007). A Delphi study of knowledge management systems: Scope and requirements. *Information & Management*, *44*(6), 583-597.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*: Oxford university press.
- O'Leary, D. E. (1998). Knowledge-management systems: Converting and connecting. *IEEE Intelligent Systems and Their Applications*, *13*(3), 30-33.
- Olaniran, O. J. (2017). Barriers to tacit knowledge sharing in geographically dispersed project teams in oil and gas projects. *Project Management Journal*, *48*(3), 41-57.
- Onwuegbuzie, A. J., & Leech, N. L. (2004). Enhancing the interpretation of significant findings: The role of mixed methods research. *The Qualitative Report*, *9*(4), 770-792.
- Panahi, S., Watson, J., & Partridge, H. (2016). Conceptualising social media support for tacit knowledge sharing: physicians' perspectives and

- experiences. *Journal of Knowledge Management*, 20(2), 344-363.
- Pant, A., Shrestha, A., Kong, E., & Ally, M. (2018). A systematic literature mapping to investigate the role of IT in knowledge stock and transfer. Paper presented at the Proceedings of the 22nd Pacific Asia Conference on Information Systems (PACIS 2018).
- Patten, K., Whitworth, B., Fjermestad, J., & Mahindra, E. (2005). *Leading IT flexibility: anticipation, agility and adaptability*. Paper presented at the AMCIS 2005 Proceedings.
- Saini, M., Arif, M., & Kulonda, D. J. (2018). Critical factors for transferring and sharing tacit knowledge within lean and agile construction processes. *Construction Innovation*, 18(1), 64-89.
- Sarkiūnaitė, I., & Krikščiūnienė, D. (2005). Impacts of information technologies to tacit knowledge sharing: Empirical approach. *Informacijos Mokslai*, 35, 69-79.
- Smith, E. A. (2001). The role of tacit and explicit knowledge in the workplace. *Journal of Knowledge Management*, 5(4), 311-321.
- Sokol, M. B. (1994). Adaptation to difficult designs: Facilitating use of new technology. *Journal of Business and Psychology*, 8(3), 277-296.
- Song, S. (2002). An internet knowledge sharing system. *Journal of Computer Information Systems*, 42(3), 25-30.
- Subramaniam, M., & Venkatraman, N. (2001). Determinants of transnational new product development capability: Testing the influence of transferring and deploying tacit overseas knowledge. *Strategic Management Journal*, 22(4), 359-378.
- Tang, L. C., Zhao, Y., Austin, S. A., Darlington, M., & Culley, S. (2008). Overload of information or lack of high value information: Lessons learnt from construction. Paper presented at the 9th European Conference on Knowledge Management and Evaluation, Southampton, UK.
- Tashakkori, A., & Creswell, J. W. (2007). The new era of mixed methods. *Journal of Mixed Methods Research*, 1(1), 3-7.
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*: Sage Publishing.
- Trochim, W., & Donnelly, J. (2007). *The research methods knowledge base* 3rd Ed: Mason. OH: Thomson Publishing Group.