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Factors influencing knowledge protection strategies in small businesses

Research-in-progress

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Abstract

Small and medium sized enterprises (SMEs) are major contributors to economies. SMEs depend on upon knowledge sharing and collaboration with business partners and suppliers, which makes the protection of their knowledge (known as knowledge protection or 'KP') critical. KP assists an organisation to sustain competitive advantage, as well as protect organisational knowledge from leakage outside the business. However, specific KP strategies are often not considered in SMEs as the tools required are often costly and difficult for SMEs to use. This study develops a theoretical framework to identify the factors that influence the use of KP strategies by SMEs and the roles that information and communications technologies play in these strategies. The study will examine the extent that SMEs adopt KP strategies; the strategies they use to protect their knowledge, the role of ICTs in KP strategies and, most importantly, the factors that influence the adoption of KP strategies.

Keywords. Knowledge management, knowledge protection, small and medium size enterprises, framework.

1 Introduction

Knowledge protection (KP) refers to organisational efforts to prevent knowledge "from being altered, transferred to other organizations, lost, or becoming obsolete" (Bloodgood and Salisbury 2001, p 57). In particular, small and medium sized enterprises (SMEs) depend on knowledge sharing and collaboration with business partners and suppliers, which makes knowledge protection even more critical. However, their smaller size makes its use more challenging (Estrada et al. 2015) as the tools required for KP are often limited and costly (Päällysaho and Kuusisto 2011). This study develops and refines a theoretical framework to identify the factors that influence the use of knowledge protection strategies by SMEs and the roles that information and communications technologies (ICTs) play in these strategies. KP assists an organisation to sustain competitive advantage, as well as protect organisational knowledge from spill overs and leakages. Knowledge 'spill overs refer to the exchange of knowledge among individuals and companies). Knowledge leakage is an unwanted knowledge transfer or deliberate or accidental loss of knowledge from an organisation to its competitors (Ahmad et al. 2014; Annansingh 2012). KP is mostly overlooked in SMEs even though knowledge is one of their most critical assets (Bolisani et al. 2013). The study will address these research questions:

- i. To what extent do SMEs adopt knowledge protection strategies?
- ii. What strategies, if any, do SMEs use to protect their knowledge?
- iii. What role do ICTs play in knowledge protection strategies?
- iv. What factors influence SMEs when adopting knowledge protection strategies?

This topic is important because SMEs are major contributors to economies. For instance, 47% of the Australian labour force are employed by small businesses and 23% by medium businesses (Nicholls and Orsmond 2015). They are a major source of innovation for the industries they operate within.

2 Literature review

2.1 Knowledge management

Knowledge can be broadly categorised into explicit knowledge and tacit knowledge. Explicit knowledge is easy to present in tangible form (Nonaka and Takeuchi 1995). It is mostly documented in books, documents, reports and so forth. Information that is processed, documented, structured and/or interpreted results is explicit knowledge. Explicit knowledge is relatively easily articulated, communicated, recorded and stored. Examples of explicit knowledge are company policy and procedure documents, instruction manuals, research reports and journal articles. Any new employee can access and read company policy documents and perform their job routines accordingly. Explicit knowledge sometimes can also be termed as formal knowledge (Aranda 2018).

Tacit knowledge is the knowledge held by individuals in their 'mind' and relates to perceptions, beliefs and behaviour. It derives from skills, experience, judgement, intuition and insight and cannot easily be transferred from one person to another, being shared through discussions, stories and verbal communication (Nonaka and Takeuchi 1995). The formal nature of explicit knowledge has made it easier to manage (store, retrieve and share) with the use of ICT than tacit knowledge. However, recent studies (such as Castaneda and Touslon, 2020) have found that ICT that can facilitate dialogue (e.g. by the use of videoconferencing) that can assist people to share tacit knowledge.

Knowledge management (KM) is a process to systematically manage an organization's knowledge assets (Jarrar et al. 2015). The main aim of KM is to maximize an organisation's knowledge resources (Jarrar et al. 2015) by facilitating the transfer of knowledge for the purposes of improving innovation (Alavi and Leidner 2001) and to achieve competitive advantage and economic value (Wong and Aspinwall 2005). KM processes comprise a series of steps. **Knowledge generation** is the set of processes to increase the level of an organisation's knowledge assets. **Knowledge acquisition** and **creation** are sub-processes of **knowledge generation** (Nonaka and Takeuchi 1995). The process of capturing external knowledge is knowledge acquisition. Knowledge creation is a process to develop new knowledge assets (Jarrar et al. 2015). **Knowledge sharing** is the transfer and exchange of knowledge between companies, departments or individuals (Allameh et al. 2011). Organisations need mechanisms and processes to store knowledge and retrieve it when needed (the **knowledge storage** stage) (Alavi 2000). **Knowledge codification** is a process of organising and representing knowledge and involves conversion of tacit knowledge to explicit knowledge (Kimble 2013). **Knowledge application** is where knowledge is used and integrated into organisational products and services. Finally, **knowledge protection** limits the exposure and transfer of critical organisational knowledge to outside

organisations (Dedeche 2014). Effective KP strategies can enable organisations to draw distinctions in their business processes (Tsoukas and Vladimirou 2001).

2.2 Knowledge protection

KP strategies are broadly classified into three categories: formal, semi-formal and informal (Zins 2007). **Formal** KP methods arise mostly from intellectual property protection legislation and are termed as 'formal' methods as they require legal authorization (Passi et al. 2012). These methods are effective in protecting knowledge that can be codified and embodied in products and services, for example a software program. Individuals and organisations who produce new knowledge and innovative ideas, apply for protection using some of these methods and government agencies evaluate the novelty of the knowledge and grant legal protection for exclusive use and licensing rights, usually for years (Olander 2014). Organisations believe that effective knowledge protection can enable them to draw distinctions in their business processes (Tsoukas and Vladimirou 2001). Effective organizational knowledge protection provides the ability to outperform competitors in the marketplace and prevent imitations by competitors (Brown & Duguid 1998). Examples of formal KP methods are:

- Patents: a right to exclude others from making, using, or selling an invention. They are granted for a device, substance, method or process that is inventive and useful (IP Australia 2018).
- Registered design: refers to the features of shape, configuration, pattern or ornamentation which gives a product a unique appearance and must be new and distinctive. A registered design gives an exclusive right to its owner to commercially use, license or sell it (IP Australia 2019).
- Trademark: A Trademark is a right to protect against the use of identical marks in trade for goods and services. It is a form of intellectual property protection provided to visibly recognized signs (Passi et al 2012). A trademark is used to distinguish an organization's offerings from those of another business (IP Australia 2018).
- Copyright: Copyright is a type of intellectual property that provides exclusive publication, distribution and usage rights to the author (eg books, songs, films and artwork).

Informal methods of KP are methods which are based on companies' internal policies and processes rather than legislation (Passi et al 2012). Informal methods of KP generally do not require extensive investments, validation or codifications. The implementation of informal methods generally does not require special tools and/or technologies. These methods are often attractive to SMEs (Byma and Leiponen 2006). Also, informal methods can be embedded into business routine operations. Sometimes organisations adopt informal KP methods without realizing it (Paallysaho and Kuusisto 2011). Some examples of informal KP methods are:

- Authentication: the process of verifying the identity of a person or device. Before individuals or organisations can retrieve knowledge, they must verify their identity (Miles 2000).
- Authorization: is one step after authentication, it is used to determine users access levels and privileges, such as reading, writing, updating or deleting knowledge (Miles 2000).
- Cabinet locking: placing documents, manuals or any other form of explicit knowledge in a locked cabinet. The lock could be physical or virtual (in the form of a password) (Jarrahi 2013).
- Division of work: allocating fragmented work to employees. It means decomposing business processes to separate tasks and allocating them to different employees. Thus, they only know about their fragment of work. Both secrecy and division of work are ways to reduce the risk of knowledge loss when employees leave the organisation (Paallysaho and Kuusisto 2011).
- Fast, innovative cycle: companies with fast development cycles and a continuous flow of new and innovative products and services face less risk of competitive damage because competitors cannot imitate their goods before they are updated. According to Moore (1996), this strategy is suitable for SMEs because they can respond quickly to changed market requirements.

Semi-formal methods of knowledge protection methods are methods that lie in between formal and informal methods. Some examples of semi-formal knowledge protection methods are:

- Secrecy: is to keep knowledge secret from employees and external collaborators, for example customers, suppliers and business partners. Organisations need to be careful when classifying knowledge as secret because it can negatively impact potential innovation (Miles 2000).
- Publishing: is to publish a new idea or a working practice widely so that the developer or the owner of the idea is well known as the innovator. The ethics of the business community limits the imitation of the new ideas (Päälyysaho and Kuusisto 2011).
- Restricted access to information: information could be protected by limiting the number of people who can access the sensitive information. Access could be restricted at physical or functional level, for example not allowing visitors, contractors etc in the building or by limiting access privileges to computer documents (Päälyysaho and Kuusisto 2011).

- **Technical protection:** means using technologies to protect sensitive information (e.g. firewalls, encryption/decryption) (Päälyssaho and Kuusisto 2011).

ICT can be imbedded in various KP strategies adopted by businesses, such as, especially in relation to security of and access to knowledge (Shrafat 2018). ICT tools can assist in a range of semi-formal and informal KP strategies. For example, access control can be enforced by authentication and can be implemented through identification badges, biometric sensors, voice recognition or simple password protection. Other IS areas are aligned with KP. For instance, there are obvious overlaps with information security, especially in relation to the knowledge management life cycle. This study examines KP strategies and not specific technical issues associated with the security of information and knowledge (which are recognised as being important to KP). Also, open innovation encourages organisations to acquire outside sources of innovation to enhance their product lines and reduce development times. Companies increasingly rely on external knowledge and research collaborations to develop new products, services and processes. Whilst most SMEs do not necessarily concern themselves with open innovation, this study will explore both intra-organisation and inter-organisation knowledge sharing where it occurs.

2.3 Factors influencing knowledge protection

This section examines the factors that influence knowledge protection strategies. The discussion will be used as the basis for the development of the research framework.

2.3.1 Organisational and other factors

Industry sector: Industry sector plays a major role in the implementation of KP strategies. KP strategies may differ across industry sectors. For instance, 'low-tech' sectors may be drawn to informal methods of KP. Also, Bolisani, Paiola and Scarso (2013) examined the KP in knowledge intensive business services operating in three other industries: information and communication technology, design and communication and professional services. They found that the rate of usage of KP methods was generally low across these sectors. There is a direct link between knowledge reuse and protection as companies providing customized services like accounting or other financial services employ knowledge protection mechanisms more frequently than others. The study has found that KP adoption is directly proportional to innovation (Bolisani et al. 2013). A study of Finnish SMEs (Olander et al. 2011) found that SMEs operating in different industries adopted different KP strategies.

Location: The geographic location of an industry can potentially has a direct impact on its use of KP strategies. Although there is no study specifically focusing on the relationship between geographic location and KP implementation, it is known that there have been differences in the use of ICTs by SMEs in metropolitan and rural areas (Galloway and Mochrie 2005).

2.4 Small and Medium Sized Enterprises

Definitions of SMEs vary widely across regions. In Australia, businesses which employ 1-19 employees are termed small businesses and those with 20-199 employees as medium sized organisations (ABS 2017). Thus, SMEs have 1-199 employees. SMEs are characterised by:

Limited Resources: This is especially the case with new start-ups, who do not have strong base of investors and bankers and depend on owners to generate resources (UkEssays 2018).

Informal management style and relationships: The management style of SMEs is mostly informal. There is often no clear division of tasks amongst employees (UkEssays 2018).

Simplicity: SMEs' small size and informality lead to simple business structures. They generally do not require board meetings or stockholder approvals to implement change (Carpenter 2017).

Flexibility: SMEs have more flexibility to quickly adapt to changes in the market and environment because of their informal structure and small size.

Dependence on individual decision makers: SMEs are usually managed by the owner, who makes the major business decisions. Thus, performance depends on the owners' skills.

Niche markets: The focus of SMEs tends to be narrow, so they usually focus on a limited number of products and services (Carpenter 2017).

Relationships: SMEs invest in small number of products and services and thus they can build strong relationships with customers and business partners (Carpenter 2017).

2.4.1 SME factors

Several SME related factors can influence the adoption of KP strategies:

Size/structure: Smaller sized businesses face a scarcity of resources like finances, time, infrastructure and skills to know if and how to introduce KP effectively, as well knowing how to assemble the limited resources that work together to create organisational capabilities (Soto-Acosta and Merono-Cerdan 2008). As noted by Faria and Sofka (2010), very large businesses tend to adopt a wide range of KP strategies. Päälyssaho and Kuusisto (2011) investigated intellectual property protection and management practices in small service firms in Finland and the United Kingdom. The study found that small firms prefer informal protection practices over formal methods. Also, small service firms pay little to no attention towards patent protection. The results also indicated that the protection of services is very difficult by means of intellectual property rights and that is why it is given least attention by small service firms. Another study by Olander, Laukkanen and Helmann (2009) demonstrated the challenges of retaining core knowledge and capturing value by SMEs in choosing between knowledge sharing and protection. According to Byma and Leiponen (2009), formal KP mechanisms go through lengthy application processes and also require extensive resource commitment. Therefore, SMEs with lesser resources do not invest in implementing formal KP methods. Small businesses also face resource constraints with regards to their use of ICTs, not always having the necessary time, skills or finances to devote to their use (Sellitto et al., 2016). This can impact on their ability to use ICTs as part of their KP strategies.

Owner/Manager: One of the characteristics of SMEs is their informal management style, where the owner of the business mostly acts as the manager as well. Top management can have a direct impact on the implementation of KP strategies (Keramati and Azadeh 2007; Lee et al. 2016). To anticipate the future needs of an organisation, managers should conduct long term strategic planning and ideally select strategies to be implemented based on challenges being faced (Keramati and Azadeh 2007). However, SMEs are typically short-term planners and conservative adopters of information technology, which often reflects the characteristics of the owner/ manager (Sellitto et al. 2016). It is reasonable to assume that KP practices will also be related to owner/ manager characteristics.

Flexibility: Small businesses are more flexible (Burgess et al. 2009) which makes it easier for them to introduce informal KP practices. As such they do not have to go through lengthy formal procedures to change approaches and may find it easier to adjust to the adoption of KP strategies.

Relationships: Strong relationships of SMEs with their suppliers and collaborators also make it easier for them to share information (e.g., open innovation), but at the same time, to protect their unique ideas and innovation from imitation they require implementation of KP strategies. (Chesbrough 2011).

3 Theoretical framework

This study examines the extent of adoption of knowledge protection strategies by SMEs. Additionally, it will develop and refine a theoretical framework to identify the factors that influence the use of KP strategies by SMEs. The framework recognises factors that influence the adoption of KP strategies, including those specific to SMEs. This study will investigate how these factors lead to the selection of different KP strategies. KP strategies can include a combination of formal, semi-formal and informal methods. Finally, different benefits can be gained from the adoption of these KP strategies can be assessed. The theoretical framework that is used for the exploratory study is illustrated in Figure 1.

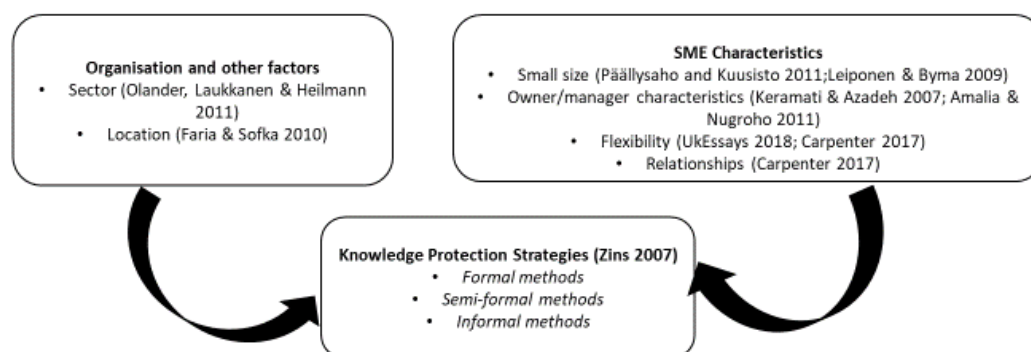


Figure 1: Proposed theoretical framework

4 Proposed methodology

The research will use an interpretivist approach with a case study methodology to address the research questions. Semi-structured face to face interviews will be conducted with owner/managers and knowledge managers of 30 Australian SMEs. The study is to be conducted across two phases. The first phase investigated three industry sectors in SMEs (and was completed as part of the PhD Integrated Year One thesis). The second phase will investigate these industries further and extend the study to two more sectors. The study analyses data using the qualitative analytic approach of themed analysis. This allows the researcher to focus on the gathered data in numerous ways. For example, the approach can report participants' experiences and/or reality or can examine how experiences, realities and events effect the range of discourses happening within society (Braun and Clarke, 2006). The theoretical framework will be modified and updated after each phase of the study.

5 Conclusion

This paper has summarised the development of a theoretical framework to examine the adoption of knowledge protection strategies by SMEs. KP is an important area of knowledge management that is currently under-researched, especially when implemented within SMEs. The framework uniquely combines the specific characteristics of SMEs with organisational and other factors to examine the factors that influence the adoption of KP strategies, and classifies these strategies into formal, semi-formal and informal areas. Additionally, the study examines how ICTs are used as part of KP strategies.

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