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Organizational information systems competences in small and medium-sized enterprises

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ABSTRACT

We used resource-based theory and evidence from empirical studies to evolve a framework of IS competences in small and medium-sized enterprises (SMEs). The framework significantly improved our understanding of internal IS expertise in SMEs. We used relevant IS competence and SME literature, as well as empirical data from SME case studies. Our set of twenty two IS competences were organized around six macro competences. Each competence refers to a specific ability at the organizational rather than the individual level and they cover a broad range of activities, such as those associated with recognising business opportunities, IS planning, accessing IS knowledge, defining requirements, software and hardware sourcing, applications development, and managing relationships with IS suppliers. The framework was tested against prior literature, including studies of IS adoption, IS success, and entrepreneurial competence. Each competence was fully explained and discussed using evidence from the case studies. The framework creates a comprehensive set of IS competences that can be used in both SME practice and research.

1. Introduction

SMEs play an important role in the economy of most countries and many IS studies have focused on them since the introduction of micro-computers in the early 1980s. When compared with large enterprises, SMEs usually have a simpler structure with less specialised tasks with poor human, financial, and material resources. Most SMEs have low levels of internal IS expertise, although this varies by industry sector. While there are many high-tech SMEs, many have no IS department, no staff with formal IS training, and no IS manager [6]. In part, to make up for the lack of internal expertise, many SMEs have turned to external experts (consultants).

The lack of IS knowledge and expertise has had consequences for SMEs. For example, many have not engaged in or been slow to adopt e-commerce [8]. A low level of organizational readiness has been offered as one of the reasons for this. Organizational readiness includes the level of knowledge about the Internet by managers, as well as having the technology required in developing an e-commerce website, etc. [9]. However, there is evidence that some SMEs have been able to develop an internal level of IS expertise, particularly by gaining IS project experience over the years and by employing internal IS experts. Thus it is no longer appropriate to assume that all SMEs have low levels of internal IS expertise. Furthermore, internal IS expertise is important for IS success in SMEs [2,3].

We wished to improve our understanding of internal IS expertise in SMEs. Recent resource-based literature was used to provide insights into the contribution of organizational skills, knowledge, and other resources. A review identified five typologies of IS resources and competences. A major limitation of the typologies was that all had been developed from experiences gained in large organizations, while there is considerable empirical evidence of differences between SMEs and large firms. For example, the motivation of owner managers has often been to seek autonomy and independence, and that strategy and planning were typically short term in an SME [1]. Also, owner managers often dominate the firm and it typically has an informal structure.

As a result of the many differences between SMEs and large firms, many authors have argued that techniques and models from large firms do not apply to SMEs. Also, few models of strategy making for large firms were applicable to small firms. Furthermore, small businesses need a different type of organizational theory.

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SMEs are often resource poor, and resource based theory indicates that they will need different competences to cope with scarce resources. They may also have to rely more on external resources and thus a different set of competences are required, particularly externally focused ones. Furthermore, organization theory indicates that SMEs have a flatter/simpler structure and thus, internal co-ordination is less of an issue as there is close proximity between all staff, including owners and employees. Hence SMEs have less need for an internal competence that links IS staff with others, as in some frameworks [16]. This also touches on the concept of internal power, where politics within the firm can be a common source of concern within large organizations. Such issues are typically less important in SMEs, because the owner-manager(s) wield great power. However, SMEs can be in a relatively weak position compared with large firms when dealing with external providers, e.g., software vendors. Thus SMEs may need different competences to manage this effectively.

Thus, although our literature review identified five typologies of IS resources and competences, it seemed likely that some aspects would be different for SMEs. Furthermore, no studies had examined the applicability of the existing typologies in the SME environment. However, some research of SMEs has used resource-based theory and demonstrated its value in studying SMEs, including IS management involvement and IS technical knowledge and skills. Our study therefore attempted to create a resource-based typology for SMEs.

For our study, SMEs were defined as independent firms with up to 500 employees. The European Community defines *micro* companies (from 1 to 10 employees), *small* firms (from 11 to 50 employees), and *medium-size* companies (from 51 to 250 employees, but it used to be 500 employees). In 2008, the American Small Business Administration defined a small business as a firm that was independently owned and operated, and had 500 or fewer employees for most manufacturing and mining industries. However, in a few industries it permitted up to 750, 1000 or 1500 employees, while wholesale trade industries must have less than 100 employees.

2. Resource-based theory and IS adoption and success in SMEs

Resource-based theory was developed to explain how organizations achieve and sustain competitive advantage. It focuses on the idea of costly-to-copy attributes of the firm as an essential way to achieve superior performance. According to resource-based theory, resources that are valuable, cannot be easily purchased, require a long learning process or are the result of the corporate culture, are more likely to be unique to the enterprise and difficult to imitate by competitors.

Resource-based theory has gained prominence in recent years as there is growing evidence that a resource-based approach may help in understanding how IS resources can influence firm performance [11,13]. The concepts of resource, competence and capability have been extensively discussed and a wide range of definitions can be found [7,12]. However, there is a lack of consensus about these concepts.

We followed the definitions of resources, competences and capabilities adopted by others [12]. *Resources* were defined as "stocks of available factors owned by the firm". Thus they can include knowledge, financial, and physical assets. *Capabilities* refer to "a firm's capacity to deploy resources, usually in combination, using organizational processes, to affect a desired end"; thus a capability can be a "meta-level construct", reflecting the ability of a firm to deliver a product or service, such as highly reliable service, product innovation, or manufacturing flexibility. *Competences* involve the ability to develop, manage and deploy resources in support of a capability. They are thus a set of skills and technologies, while capabilities are the strategic application of competences. This perspective is consistent with that of other authors looking at IS competences in SMEs.

SMEs need a range of skills, including IS, business, and general management skills. In addition, organizational processes are needed to exploit such skills (see Fig. 1).

Many SMEs lack managerial IS skills and even technical IS skills. These skills are more likely to be heterogeneously distributed amongst SMEs than in larger enterprises, which typically have a large IS department. The lack of resources or
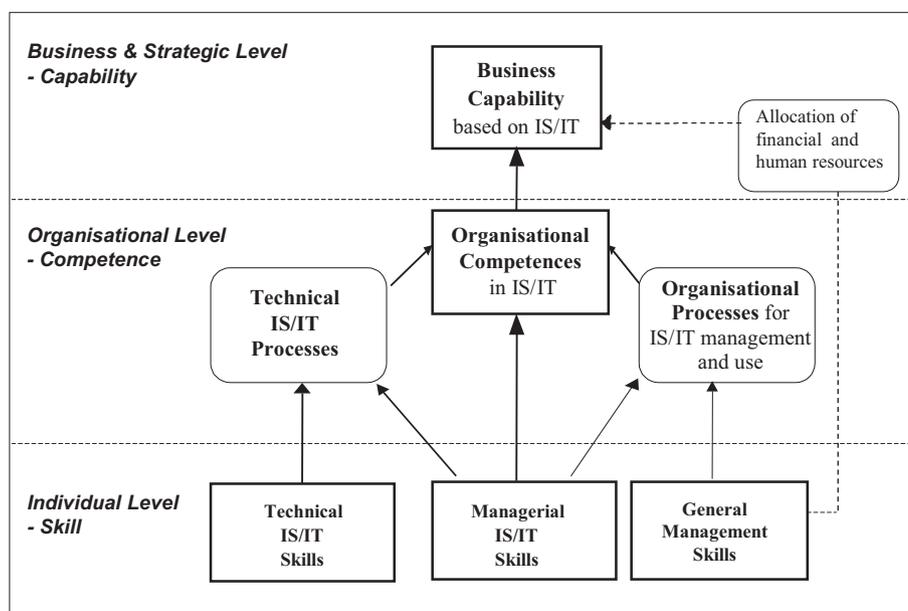

Fig. 1. A resource-based model to understand the successful adoption and use of IS/IT in SMEs.
Adapted from Caldeira and Ward [3].