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Introduction

1.1 Background

The 'knowledge economy' is now significantly changing the structure of industry and the key determinants of competition. The knowledge economy is defined by DTI (1998, p. 1) as:

... one in which the generation and the exploitation of knowledge has come to play the predominant part in the creation of wealth. It is not simply about pushing back the frontiers of knowledge; it is also about the more effective use and exploitation of all types of knowledge in all manner of economy activity.

There is significant consensus that the knowledge economy is fundamentally based on the 'knowledge' capabilities of people (e.g. Drucker, 1997; Dougherty, 1999). It is argued that the knowledge possessed by 'staff' represent a key source of sustainable competitive advantage for individual organisations (e.g. Raich, 2002), countries (e.g. Porter, 1990; BERR and HMT, 2007) and trading blocs (e.g. EC, 2007).

The transition to knowledge economies is, to varying degrees, affecting, and being affected by, many organisations, sectors and industries. For example, evidence shows that knowledge-intensive business services account for a significant and growing proportion of economic activity in modern industrial economies (OECD, 2006; Commission of the European Communities, 2007). According to Robert Huggins Associates (2006), knowledge-based business services in 2006 account for 7.6% of the total economic output (as a percentage of total gross valued added) of the European Union (p. 1). This trend is evident in the UK. The share of knowledge-based services, for instance, in the total UK economy has risen from 5% in 1968 to 30% in 1997 (EC, 2000) and 54% of business sector value added in 1998 (DTI, 2002, p. 78). This shift towards a knowledge economy is reflected in the UK construction industry with, for example, the number of construction professional service firms rising from 19 000 in 1996 (CIC, 2003, p. 9) to 27 950 in 2005 (CIC, 2008, p. 5). Further evidence of this trend is the rise in the employment in the construction professional service firms, 'from approximately 180 000 in 1996 to 270 000 in 2005' (CIC, 2008, p. 27).

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The services offered by professional service firms are characterised by being highly knowledge intensive in nature (Løwendahl, 2000). The principal means by which this growing body of professional service firms create value is through the successful creation and management of knowledge. Robertson *et al.* (2001, p. 334), for example, stress:

Managing knowledge is a value-creating process in most organisations and is particularly important in knowledge-intensive firms.

The ‘value-creating’ performance of the construction industry, however, has often been questioned by its clients. The common perception of the construction industry is that of an industry which delivers products and services which are often of inappropriate quality, and which fail to meet client’s demands for price certainty and guaranteed delivery. The ‘Egan’ report on the UK construction industry, for example, laments that ‘too many of the industry’s clients are dissatisfied with its overall performance’ (Egan, 1998, p. 1 – emphasis added), while Fairclough (2002) has identified the need for significant performance improvement as an urgent issue.

Innovation has been described as being the principal means to bring about this improvement in the UK construction industry performance (e.g. Egan, 1998; Fairclough, 2002; Sexton and Barrett, 2003a,b; Barrett and Sexton, 2006; Brandon and Lu, 2008). The ‘Egan’ report recognised, for example, ‘the necessary service/product improvement and company profitability can be realised through *innovations* to enhance leadership, customer focus, integrated processes and teams, quality and commitment to people’ (Egan, 1998, Paragraph 17 – emphasis added). Indeed, it has been argued that ‘[in construction and civil engineering] innovation brings benefits of improved efficiency, effectiveness, quality of life, productivity and competitiveness’ (CERF, 1997, p. 43).

Successful innovation in this book is understood to be (see Section 2.5.5 and 8.2.1):

The effective generation and implementation of a new idea which enhances overall organisational performance, through appropriate exploitative and explorative knowledge capital which develops and integrates relationship capital, structure capital and human capital.

Small construction firms play an important part in improving the overall innovation performance of the construction industry. The growing role of small construction firms within the UK is evidenced by 99.8% of UK construction firms having less than 50 staff and employing 74.2% of the total construction workforce (BERR, 2006, Table 3). This structure is the same in the construction professional services sector, where 98% of the firms employ less than 50 people (CIC, 2008, p. i). In addition, construction projects typically draw together a significant number of diverse small and large construction firms with varying collaborations. It is acknowledged that large firms’ performance is significantly affected by the performance of small firms within their supply chains (e.g. Latham, 1994; Egan, 1998). Therefore, any performance improvement of large construction firms is significantly influenced by the performance of small construction professional practices.

1.2 Research Problem

The previous section has indicated that managing knowledge is a particularly crucial issue for knowledge-intensive firms (e.g. Robertson *et al.*, 2001), and recognises that innovation is a key part in improving construction performance. There is strong consensus that managing knowledge is critical for successful innovation in small professional practices. It is argued that highly qualified knowledge workers are the core catalyst for creating and managing knowledge within such companies (e.g. Alvesson, 1995). Alvesson (1995) goes on to say that knowledge workers are engaged primarily in work of an intellectual nature. To reiterate the argument set out in Section 1.1, there is a recognition that having the right human capability within construction firms is vital to achieving successful innovation and performance improvement in the construction industry (e.g. Slaughter, 1998; Seaden *et al.*, 2001; Girmscheid and Hartmann, 2002). Within this context, the capability to innovate in small professional practices is strongly linked to the motivation and ability of the knowledge worker.

There have been a number of reports which provide guidelines to help practitioners to improve their business performance through innovation (e.g. Constructing Excellence in the Built Environment (www.constructingexcellence.org.uk)). They have provided recommendations for practices and procedures to be adopted by the construction industry and its main stakeholders to realise step improvements in both large and small construction firms. Innovation initiatives to deliver the improvements suggested in these industry guidelines, however, inadequately address project-based, service-enhanced forms of construction enterprises (e.g. Gann and Salter, 2000). Indeed, the relevance and accessibility of many of these initiatives for small construction firms are still debatable (e.g. Miozzo and Ivory, 1998; Sexton and Barrett, 2003a,b; Wharton, 2004). Egbu *et al.* (1998, p. 605) further emphasise that ‘there still remains a great deal to be investigated and learned about organizational innovations within a construction environment. This is more so within the management domain of innovation where there is still a meagre amount of empirical studies that have given attention to the innovations in construction enterprises’.

There are three potential problems of this lack of explicit research into innovation in small professional practices. First, innovation theory tends to be based on manufacturing-based firms; rather than service-based firms in general, and on construction professional practices in particular (e.g. Sexton and Barrett, 2003a; Lu and Sexton, 2006). Innovation in manufacturing has been argued to be significantly different from innovation in services (e.g. Miles, 2000). For example, innovation in the manufacturing sector often emphasise research and development work leading to ‘technological’ novelties (e.g. Freeman, 1982; Rothwell and Zegfeld, 1982), whilst service sectors are often based on social networks leading to ‘non-technical’ innovations (e.g. Sundbo, 1999; Kandampully, 2002). It is this social network perspective which results in the service production process, and the final service, being more integrated, in both time and function, than in manufacturing (Sundbo,

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1997), with individual innovation often consisting of process, organisation, market and product dimensions (Bilderbeek *et al.*, 1994).

Second, innovation research tends to focus on non-project-based firms in relatively stable supply chains; rather than project-based firms in relatively dynamic supply chains in general, and on construction professional practices in particular. Project-based firms are defined as those which operate on the basis of projects as their products and services need to be significantly customised to meet the particular requirements of individual clients. Projects within such firms are 'singled out as basic units, so that managerial responsibilities, resources allocation . . . and accounting data are directly or indirectly defined in terms of projects or aggregation of projects' (Warglien, 2000, p. 3). Innovation in non-project-based firms has been argued to be significantly different from innovation in project-based firms (e.g. Gann, 2000; Gann and Salter, 2000). Non-project-based firms are better able, through functional hierarchy, to own and maintain innovation compared to project-based firms. These firms engage in loose-coupled horizontal transactions between project participants and which result in project teams having fragile contexts in which to commit to, and reap reward from, innovation activity (e.g. Turner and Keegan, 1999). Indeed, Gann and Salter (2000) argue that in project-based organisation, innovation activity often relies upon resources from other companies. As a consequence of their weak appropriation of economic rent, innovation in project-based firms is seen as useful, but primarily as costly and dangerous (e.g. Keegan and Turner, 2002, Sexton and Barrett, 2005).

Finally, innovation research tends to focus on large firms; rather than small firms in general, and on construction professional practices in particular (e.g. Page *et al.*, 1999). Innovation in large firms has been indicated to be significantly different from small firms (e.g. Sexton and Barrett, 2003a,b). For example, innovation capability and outcomes of large firms tend to be more mechanistic, whilst small firms are organic in nature making them more agile and responsive (e.g. Rothwell, 1989; Nooteboom, 1994; Rothwell and Dodgson, 1994). However, small firms' innovation potential is constrained by intrinsic problems which large firms do not have. Rothwell and Zegfeld (1982) identify four challenges unique to small manufacturing firms. First, limited staff capacity and capability restrict their ability to undertake appropriate research and development. Second, small firms have scarce time and resources to allocate to external interaction. This limits the flow and amount of information on which to have discussions. Third, small firms are often affected by the excessive influence of senior management. Often small firms are vulnerable to domination by a single owner or small team who may use inappropriate strategies and skills. Fourth, small firms can have difficulty in raising finance and maintaining adequate cash flow which can result in limited scope for capital or ongoing investment in innovation activity.

In conclusion, small professional practices are becoming increasingly important agents of innovation in construction. The innovation literature, however, tends to focus on manufacturing-based, large-sized and/or non-project-based organisations. This paucity of explicit research on innovation in small professional practices ushers in real risks to policy makers, academics and

industrialists of developing innovation prescriptions based on an inappropriate foundation, and thereby producing solutions for the wrong problems.

1.3 Summary and Link

This chapter has set out the background and principal focus for this book. The next chapter will contextualise the outlined research issues within the relevant general and construction-specific innovation and professional practice literature.