



Intellectual assets and small knowledge-intensive business service firms

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Abstract

Purpose – This paper aims to focus on how small knowledge-intensive business service (KIBS) firms manage their knowledge-based processes, or what are termed “intellectual assets”.

Design/methodology/approach – The paper is based on data collected from a sample of small KIBS firms located in Scotland. The methodological approach is novel in that it utilises the results of an online benchmarking tool allowing firms to gauge their intellectual asset base in comparison with other firms.

Findings – The paper finds that approaches to the strategic management of intellectual assets vary significantly according to the size and type of KIBS firm. Differences in these approaches impact on the development of effective innovation processes, with resource deficiencies in smaller firms constraining their innovation capability.

Practical implications – It is concluded that small KIBS firms face particular challenges in managing the innovation process and establishing sustainable knowledge management practices, and may benefit from targeted policy intervention.

Originality/value – Unlike many other studies of KIBS firms, this paper focuses on how small KIBS firms manage their own knowledge processes as part of their strategic management approach for creating competitive advantage.

Keywords Intellectual assets, Knowledge-intensive business services, Small enterprises, Value creation, Absorptive capacity, Innovation, Scotland

Paper type Research paper

Introduction

This paper focuses on how small KIBS (knowledge-intensive business services) firms manage their own knowledge processes as part of their strategic management approach for creating competitive advantage. It operationalises the concept of intellectual assets, which we distinguish from intellectual capital – assets being based on ownership or proprietorship, and capital on stocks – to study a sample of small KIBS firms located in Scotland, a region of the UK with a high preponderance of small firms. The methodological approach is novel in that it utilises the results of an online benchmarking tool allowing firms to gauge their intellectual asset base in comparison with other firms. The study draws on concepts from the strategic management literature, such as the resource-based view of the firm (Wernerfelt, 1984; Barney, 1991) and absorptive capacity (Cohen and Levinthal, 1990), to understand how small KIBS firm value, accumulate, and utilise their intellectual assets.



The analysis of strategic management within a small firm environment demonstrates that such firms operating in knowledge-intensive markets face a range of challenges in seeking to ensure they are effective knowledge-creating firms, which maximise their own knowledge capabilities and strategies (Nonaka and Takeuchi, 1995). In other words, it illustrates the issues these firms face in becoming intelligent enterprises able to leverage their intellectual assets (Quinn, 1992), and demonstrates variations based on firm size and type. The following sections present an understanding of KIBS and the conceptual framework underlying the study. The methodology is followed by a presentation and interpretation of the key findings. In the concluding section we assess the implications of the findings.

Knowledge-Intensive Business Services (KIBS)

KIBS firms supply knowledge products or use knowledge to support their clients' own knowledge generation and knowledge processing activities (Miles *et al.*, 1995; Muller and Zenker, 2001; Miles, 2005). The KIBS sector covers activities such as computer services, R&D services, legal, accountancy and management services, architecture, engineering and technical services, advertising and market research (Miles, 2005). KIBS firms rely heavily on professional knowledge to supply intermediate products and services that are knowledge based, fusing general codified (recorded) information with experience and tacit knowledge (den Hertog, 2000). KIBS firms are a subset of business services and can be grouped into two main categories, namely: traditional professional services, such as professional services, advertising, marketing and architectural services; and new technology-based KIBS firms, consisting of software design, engineering services and computer-related activities (Miles, 2005).

While KIBS firms are highly diverse, there are also a number of underlying commonalities. KIBS firms are professional entities with a focus on knowledge intensiveness through the creation, accumulation or dissemination of knowledge (Miles *et al.*, 1995). This differentiates KIBS from their service counterparts, which do not rely to such an extent on knowledge as their key source of competitive advantage. Due to the high dependence on knowledge, Employees in KIBS firms are typically well qualified educationally and seek to combine codified and tacit knowledge in unique ways to produce profitable results for clients. This requirement necessarily impacts on the way KIBS firms are structured and managed (Miles *et al.*, 1995, den Hertog, 2000; Miles, 2005).

KIBS firms often work closely with clients following a "consultancy" approach to develop knowledge-based solutions for a variety of business challenges, such as information technology systems designed to facilitate change management (Muller and Zenker, 2001). The work of KIBS firms tends to be tailored to client needs and may be difficult to standardise. Furthermore, due to high knowledge-component levels, outcomes and "products" may be highly intangible necessitating high levels of competence and trust, as well as the possibility of "information asymmetry" leading to clients being unable to fully evaluate the standard of service produced (Miozzo and Grimshaw, 2005). A new source of KIBS activity is the creation of consultancy and other similar firms by professionals who have been "downsized" (Wood, 2002). Others emerge out of university departments and government laboratories. This has broadened the range of organisational structures and histories, bringing depth of experience and intense competition to the sector. KIBS firms may act as change agents

and provide benchmarking assessment, enabling clients to gain an insight into best practice and areas requiring improvement (Bessant and Rush, 1995). On the other hand, there are also pressures to distance relationships with client companies. In this scenario, KIBS are increasingly looking for ways to standardise services to benefit from economies of scale through the introduction of commodified products and services (den Hertog, 2000; Miles, 2005).

The increasing economic focus on knowledge has spurred the growth and development of KIBS to such an extent that they have become one of the fastest growing sectors in advanced and developing economies, as well as an increasingly important source of innovation (Miles and Boden, 2000; Wong and He, 2002). For instance, in Europe the growth of KIBS has outstripped the average for all sectors and represents 8 per cent of total employment in the European Union-25. The UK is by far the biggest KIBS employer, accounting for over three million employees and 12 per cent of economic output. Much of this growth is a result of development in computer and related activities – a finding to be expected in light of the exponential growth in information and communication technologies (ICT). In general, the KIBS sector consists of relatively few international firms alongside a substantial proportion of small and micro-sized businesses, with the sector showing an extreme J-curve size structure, with over 60 per cent of enterprises consisting of sole traders, and a relatively small proportion of middle sized firms (Miles, 2005). Although the majority of enterprises within the KIBS sector are small, most of the sector's employment and production output is centred around larger KIBS businesses. Many clients are demanding to work with the same service provider around the world and as a result, some KIBS firms are expanding their international horizons to satisfy these new client demands. However, many KIBS users are also seeking increasingly high levels of specific knowledge, requiring niche or so-called “boutique” offerings – a phenomenon potentially favouring small firms (Miles, 2005).

Conceptual framework

Intellectual assets are not a new phenomenon. Over a century ago, Marshall (1890) in his “Principles of Economics” highlights knowledge as an important resource and powerful engine of production. However, its significance in shaping the economy and the way in which firms operate has rapidly grown in significance in recent years (Romer, 1990; Nonaka and Takeuchi, 1995; Huggins and Izushi, 2007). The terms intellectual assets and intellectual capital are often used interchangeably are part of the discourse examining knowledge-based resources. However, we identify differences between the two concepts. Intellectual assets are part of the stock of institutionalised knowledge a firm owns over time, while intellectual capital is the total stock of knowledge a firms may have access to at any given time (Walsh and Ungson, 1991; Subramanian and Youndt, 2005). We define intellectual assets as recordable intangible corporate assets, including assets such as the company name, reputation and goodwill to the company, as well as company brands, trade secrets, business processes and know-how. Intellectual assets are context specific and what a firm can and cannot influence depends on many factors, which may make one firm include as an intellectual asset something that another firm would not (Bontis *et al.*, 1999). In defining intellectual capital, Edvinsson (1997) provides a classification consisting of human capital, organisational capital, and customer capital. Adapting this classification, we

propose a typology of intellectual assets consisting of organisational capital, network capital, and intellectual property.

Organisational capital can be considered as the assets that remain in the confines of firms when human capital assets have left for the day (Edvinsson and Malone, 1997). Organisational capital is the “glue and skeleton” of firms, providing strength and cohesion between people and processes (Brooking, 1996). Organisational capital consists of the hardware, software, databases and organisational structure supporting workers and managers including institutionalised knowledge and codified experience (Hall, 1992; Davenport and Prusak, 1998). As Daft and Weick (1984) argue, while individuals’ come and go, firms preserve knowledge. Examples include organisational flexibility, documentation services, knowledge centres, and the use of information technologies and organisational learning capacity. On an operational level, examples of such capital include company manuals, shared drives/intranets, web sites, brands and reputation, training and induction techniques, advertising, and recognition, in terms of awards and quality standards. Organisational capital can aid in transforming tacit knowledge into explicit firm “owned” knowledge. Structuring intellectual assets with information systems can turn individual know-how into group property. Firms, therefore, can exert ownership over organisational capital, and can further develop and manage such assets to achieve sustainable competitive advantage (Teece, 2000).

Network capital is an investment in calculative relations by firms through which they gain access to knowledge to enhance expected economic returns (Huggins, 2009). Network capital consists of the business and professional network assets built by firms. These relationships can include contractual agreements, such as partnering or distribution arrangements, as well as non-formalised relationships with, for example, customers, suppliers and investors (Marr *et al.*, 2004). Network capital can provide long-term sustainable competitive advantage, and serves to improve efficiency and effectiveness in knowledge distribution. As well as relationships with suppliers and customers, examples of network capital include contact lists and databases, and external collaboration and partnerships. In other words, network capital consists of the management and investment in interactions and relationships external to the firm (Huggins, 2009).

We distinguish network capital from social capital, defined as investment in social relations by individuals through which they gain access to embedded resources to enhance expected returns (Lin, 2001). In the strategic management environment, social capital has been linked with intellectual capital based on relationships and interactions within, rather than across, firms (Nahapiet and Ghoshal, 1998). Although social capital can usually be considered as a form of intellectual capital it does not necessarily fulfill the criteria of an intellectual asset as it is embedded in individuals in the form of social obligations and mutual trust. In a small firm environment there is evidence that high levels of external interaction assists access to new knowledge, technological competency, innovativeness and competitiveness (Huggins, 2000; Thorpe *et al.*, 2005). The final element of our typology is intellectual property, consisting of patents, copyrights, trademarks, and licensing agreements. While most existing studies categorize intellectual property as element of organisational capital (Davenport and Prusak, 1998), we place it outside this domain given that it is likely to be a very specific

and distinguishing element among small firms (Miles *et al.*, 1995; Kitching and Blackburn, 1999).

In general, the management of intellectual assets within small firms is likely to be relatively informal, while in large firms more formal modes of management are required. Small firms are typically less bureaucratic than their larger counterparts, with often few, if any, complex management systems (McAdam and Reid, 2001). This leaves small firms with less "ready made" infrastructure for the measurement, management and development of knowledge and other intangible assets (Chaston *et al.*, 2001; Ward, 2004; Thorpe *et al.*, 2005). Small firms often work in an environment of pervasive risk and high pressure (Lambe, 2002). All firms face environmental pressures, but this is magnified in a small firm, which has less control over its immediate environment. Small firms are often preoccupied not with internal efficiency and effectiveness, but with maintaining turnover and seeking new opportunities (Wiklund and Shepherd, 2003).

Some of the key differences between small and large firms in relation to intellectual assets can be summarised as follows. Small firms are less likely to register patents or hold other forms of intellectual property rights. This is most likely due not to a lack of ideas but high costs, complexity, and administrative burden. Small firms are likely, particularly during their earliest stages, to embed much of their intellectual asset base in human capital (Honig, 2001). The fundamental ideas and processes supporting small firms at this stage are likely to depend on the founder and immediate employees. High costs and small scale, particularly within service-based and knowledge based companies, will typically lead to lower quantities of tangible assets, such as machinery and buildings. Small firms are less likely to own less IT-based assets, such as complex knowledge management intranets, billing and automated procedures (Wiklund and Shepherd, 2003). Small firms, perhaps more so than larger firms, require agility and a capacity to liaise and work with external organisations (Thorpe *et al.*, 2005).

Part of the key to management success is the allocation and transparency of responsibility for certain resources and assets. With regard to intellectual assets in a large firm, this responsibility is often explicitly demarcated on a departmental basis, following the traditional vertical task specialisation organisational hierarchy (Thorpe *et al.*, 2005). This structure gives transparency to complex operational and management structures. However, in a small firm environment it is less likely that such transparency will exist. The organisational structure of a small firm is far more likely to consist of a horizontal system of cross specialisation where responsibility for asset management is more implicitly embedded within a range of employees, whose role is such that they are involved in managing a number of different resources and assets. This adds a layer of complexity that is not so evident in a large firm environment and may itself be a key feature of knowledge management in a small firm environment (Ward, 2004).

Although it is clear that firm size will be related to differences in organisational structure and management processes, a less discussed aspect are differences in the dependency of human capital embedded within each employee (Schultz, 1961; McAdam and Reid, 2001). For example, assuming each employee within a firm possesses an equal amount of human capital, an employee within a firm with only ten employees can be said to account for double the amount of total human capital in firm

with 20 employees. This means the smaller the firm, the more vulnerable it is to losing a larger proportion of its total human capital through the exit of one employee. The natural outcome of this is that transferring embedded human capital into more explicit and recordable asset forms is more important the smaller the firm. Without such transfer, firms are unable to effectively protect and consistently utilise their total stock of knowledge.

To a large extent, this system of transfer is at the heart of the intellectual asset management process. This primarily consists of the transfer of human capital, in the form of articulated and unarticulated knowledge, into intellectual assets represented by documented and accessible firm-bounded knowledge processes. Some studies have found that when human capital is insufficiently linked with intellectual capital or assets there is actually a negative association with firm capabilities (Subramanian and Youndt, 2005). As Stewart (1997) notes, in reality intangible assets do not come in “discrete wads” but as mutually reinforcing, interdependent elements that create wealth and competitive advantage. Part of this interdependence can be managed through the transformation of human capital into intellectual assets that can be exploited across the firm. Such management is central to the knowledge-based view of the firm (Grant, 1996), and knowledge management theories (Nonaka and Takeuchi, 1995).

As a means of determining the role of intellectual assets in small KIBS firms we draw on a number of concepts from the strategic management literature, such as competitive strategy, the resource-based view of the firm, value creation, competitive advantage and absorptive capacity. First, the concept of competitive strategy refers to means by which firms are able to compete more effectively to strengthen their market position (Porter, 1980). Clearly, a key means of competing effectively is through strategic planning to ensure the optimum allocation and investment of a firm’s resources. The resource-based view of the firm recognises that a firm’s resources, including their application and transferability, are critical factors in creating and sustaining competitive advantage (Wernerfelt, 1984; Barney, 1991; Rangone, 1999). Such resources include both the tangible, and intangible assets, a firm owns, or controls, and are a source of the value creation activities of firms, i.e. the means by which competitive advantage is achieved. In their review of the literature on knowledge use in SMEs, Thorpe *et al.* (2005) find that most studies adopt a resource-based view of the firm whereby competitive advantage is related to the capability of managers and entrepreneurs to successfully integrate their knowledge of markets, such as awareness of customer and supplier needs, as well as the technology, routines and norms underpinning “everyday organisational activity”.

In our model, value creation is linked to the effective application of resources, as well as the capacity to accumulate resources considered to be of strategic importance. From the perspective of intangible resources and intellectual assets, a more refined theory of the role of knowledge has developed in recent years. The knowledge-based view of the firm focuses on knowledge as the key competitive asset of firms, emphasising the capacity to integrate tacit knowledge, or “knowing how”, as distinct from explicit knowledge, or “knowing about” (Grant, 1996; Mowery *et al.*, 1996; Huggins, 2000). The knowledge-based view of firm is firmly focused on the role of the individual (within a firm) as knowledge carriers and recipients, with the competitiveness of firms dependent on the capacity to aggregate this knowledge (Grant, 1996). This view is consistent with our notion of intellectual assets as the

providers of strength and cohesion between individuals and processes (Brooking, 1996). As Grant (1996) highlights, aggregation capacity is dependent on the ability of recipients to absorb transferred knowledge. Cohen and Levinthal (1990) define this ability as absorptive capacity, referring to the capacity to identify, assimilate, and exploit knowledge from the environment. A recent adaptation of the absorptive capacity concept by Lane *et al.* (2006) identifies three forms: exploratory learning – recognition and understanding of knowledge; transformative learning – assimilation of knowledge; and exploitative learning – application of assimilated knowledge. As part of our framework, we seek to operationalise these three forms as well as incorporating Zahra and George’s (2002) concept of “absorptive capacity efficiency”, defined as the ratio of realised to potential absorptive capacity. Figure 1 summarises the overall conceptual framework underlying our study.

Methodology

This study focuses on the role of intellectual assets among a group of small KIBs firms in Scotland based on data collected via an online benchmarking tool designed to provide firms with an analysis of their intellectual asset and knowledge management in comparison with other firms. The benchmarking tool was launched in 2006 by Scotland’s Intellectual Asset Centre (a public sector agency funded to research and apply leading knowledge management techniques across the Scottish Economy) and takes the form of an electronic questionnaire. As well as collecting background information on responding firms, it collects scale data responses to a series of questions regarding intellectual assets. In total, 19 different forms of intellectual asset are identified, which are categorised according to the conceptual framework as follows.

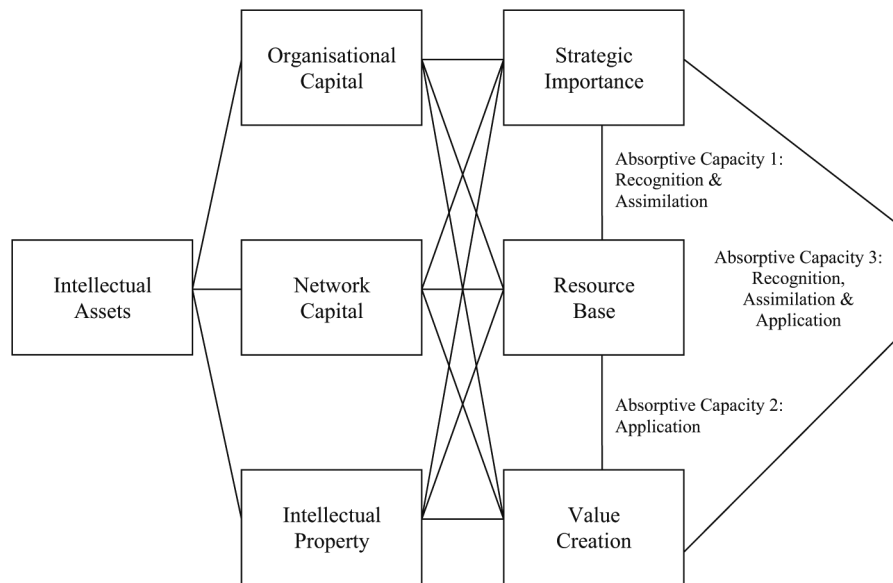


Figure 1.
The strategic management
of intellectual assets

Organisational capital

- (1) Documented procedures and technical information.
- (2) Management systems.
- (3) Brand.
- (4) Sales systems.
- (5) Distribution systems.
- (6) Administrative systems.
- (7) New product development systems.
- (8) Web site facilities.
- (9) Intranet and shared drive systems.
- (10) Training systems.
- (11) IT systems.
- (12) Marketing and communication.
- (12) Quality standards, awards and accreditation.

Network capital

- (14) Contact lists.
- (15) High profile customers.
- (16) Customer loyalty and retention.
- (17) Alliances and collaboration.
- (18) Competitive intelligence.

Intellectual property

- (19) Patents, trademarks, industrial designs and copyrights.

For each asset an initial definition is provided. For example, in the case of brand: "A name or symbol used to identify the source of goods or services, and to differentiate them from competitors. Branding protects a seller's products against those marketed by competitors and imitators and helps consumers identify the quality, consistency, and imagery of a preferred source". Three questions are then asked for each asset relating, respectively to:

- (1) Resource base.
- (2) Value creation.
- (3) Strategic importance.

In the case of resource base, the respondents choose from five options (for which we allocate a five point scoring system). For example, in the case of brand:

- To what extent has the organisation developed a brand image or reputation?
- 0 = no, we have not yet developed a brand, reputation or well-known image.
- 5 = we are beginning to develop a brand, reputation and image through increased advertising, marketing, web site development, etc.
- 10 = we have developed a brand, reputation and image that is known within our industry sector, but we do not set aside a formal budget for ongoing investment and do not conduct systematic reviews of our branding activity.
- 15 = we have developed a brand, reputation and image that is known within our industry, and invest in brand development on an occasional basis.
- 20 = we have developed a brand, reputation and image that is known within our industry, and we continue to invest in and support this brand through formal budgets and systematic brand evaluations.

For value creation, a further question with responses sought on a five-point scale is asked. Again, in the case of brand this is as follows: “does the organisation’s brand name, image and reputation communicate a consistent and positive message to attract suitable customers, staff and suppliers to the organisation? Please provide a score of 0, 5, 10, 15 or 20, with 20 being the most effective, and 0 being the least effective”. In relation to strategic importance, a similar five-point scale scoring system is adopted. In the case of brand: “how important is the organisation’s brand name and reputation to the organisation’s competitive position, and future growth and development? Please provide a score of 0, 5, 10, 15 or 20, with 20 indicating that this item is very important to your organisation, and 0 indicating that this item is not important to your organisation”. This questioning technique has the advantage of not assuming a priori the relative importance of any asset compared to another, and also allows for clarity in terms of what a particular asset constitutes and its relative resource base strengths and weaknesses. Furthermore, by looking at differences in scores across the three parameters we are able to assess the relative absorptive capacity for particular assets. Before its launch both the questionnaire and the online system were piloted across a range of firms.

The online benchmarking tool stores the responses for all completions and provides a report to all respondents. However, as well as being of use to respondents it also provides a useful database for research. In this case we extracted and analysed the responses for 48 KIBS firms operating in Scotland. These firms were requested to complete the benchmarking exercise as part of initiatives operated by the Intellectual Assets Centre. The firms are small in size with the largest having 60 employees, with 73 per cent having less than ten employees. The average number of employees per firm is 8.5. In terms of sub-sector, 52 per cent operate in the traditional KIBS sectors relating to traditional professional services, such as professional services, advertising, marketing and architectural services; while 48 per cent operate in the newer technology-based KIBS areas of software design, engineering services and computer-related activities. There is no significant difference in the mean average size of firms across the traditional and “new” sectors. In the majority of cases, those individuals completing the benchmarking tool were the chief executive or managing director of their company, although in a few of the larger companies the task was

undertaken by those with responsibility for personnel/human resource issues. The following sections present an analysis of the key data collected from these firms.

Resource base, value creation, and strategic importance

Initially we provide a comparison of the relative development and accumulation (resource base), effective utilisation (value creation), and value (strategic importance) for each form of intellectual asset. Table I presents the average scores for these assets based on the scale system highlighted in the previous section (converted to a percentage), along with the average score across the three areas. The assets which firms have been most effectively able to accumulate and develop as part of their resource base are IT systems, web site systems, contact lists, and administrative systems. The focus on information and communication technologies is perhaps unsurprising given the focus of many KIBS on areas such as software and technology service provision. It is also resonates with other findings which suggest that new and small firms engaged in high growth activities tend to significantly invest in and integrate such technology as part their growth plans (Gray and Gonsalves, 2002; Lucchetti and Sterlacchini, 2004). Those assets least effectively integrated into the resource base are customer loyalty and retention systems, accreditation, standards and awards for quality, as well as distribution and sales systems. In general, developing these activities and systems requires a high investment ratio for small firms in terms of both financial capital and time.

	Resource base	Value creation	Strategic importance	Mean average
Documented procedures and technical information	58.2	61.3	68.6	62.7
Management systems	57.4	57.1	66.7	60.4
Brand	56.9	62.4	81.4	66.9
Sales systems	40.3	53.3	73.9	55.8
Distribution systems	39.3	53.6	64.3	52.4
Administrative systems	67.3	69.0	75.0	70.4
New product development systems	48.2	45.1	74.4	55.9
Web site facilities	78.8	58.4	75.3	70.8
Intranet and shared drive systems	48.8	51.9	56.3	52.3
Training systems	47.6	46.3	65.2	53.0
IT Systems	80.0	78.8	80.0	79.6
Marketing and communication	46.3	45.6	61.3	51.0
Quality standards, awards and accreditation	30.6	48.1	57.5	45.4
Organisational capital	53.8	56.2	69.2	59.8
Contact lists	67.7	72.0	74.4	71.3
High profile customers	65.2	65.2	73.4	68.0
Customer loyalty and retention	30.5	30.5	42.1	34.3
Alliances and collaboration	60.4	59.8	66.5	62.2
Competitive intelligence	45.0	46.6	63.8	51.8
Network capital	53.8	54.8	64.0	57.5
Intellectual property	49.4	39.9	55.5	48.3

Table I.
The resource base, value creation and strategic importance of differing forms of intellectual asset (per cent of maximum score)

The lack of investment in customer retention efforts is interesting as it reflects the way KIBS firms engage with their customers. Evidence from other studies of knowledge-based small firms indicates that an arms-length relationship is often kept with many key customers – with the exception of high profile and dominant customers – in order to avoid the unintentional spillover of knowledge, resulting in a mix of both strong and weak ties (Yli-Renko *et al.*, 2001; Lechner and Dowling, 2003). The underdevelopment and take-up of quality accreditation schemes may reflect the fact that small firms in general are less likely to prioritise such initiatives, as well as many existing initiatives (with exceptions such as Investors in People in the UK) targeting manufacturing rather than service sector firms (Huggins, 2000; Sun and Cheng, 2002). The lack of focus on sales and distribution systems among small KIBS firms reflects the operational structure of the sector as they move from one customer to another on a project-by-project basis (Miles *et al.*, 1995), although this is less likely to be the case with more traditional professional service firms. One might anticipate that firms of this nature would invest in e-commerce sales systems (Daniel *et al.*, 2002; Feindt *et al.*, 2002; Windrum, 2002; Santarelli and D’Altri, 2003). In this instance, however, the very smallness of the firms may mitigate against such investment. More generally, it appears that small KIBs firms do not consider formal quality accreditation, distribution systems and the like to appropriate to type of work they undertake compared with, for instance, brand and high profile customers. This indicates the unique nature of KIBS-related activity whereby success may often depend on success with a small number of dominant high profile customers for which they are reliant on repeat business or referrals to similar clients.

In terms of overall differences in resource base across organisational and network capital, there is no significant variation in the average score for each, reflecting a relative balance in external and internal asset investment and development. Intellectual property scores slightly lower, highlighting a lower propensity to engage in formal intellectual property right registration. In general, service firms are less likely to register patents due to difficulties in protecting service-based innovations (Acs *et al.*, 2002; Miles, 2005), which is accentuated in the case of small firms (Acs and Auderetsch, 1988; Acs *et al.*, 1997).

The effective utilisation of intellectual assets for value creation correlates strongly with resource base allocations, indicating that KIBS firms are generally utilising their assets in line with their relative accumulation and development. Those assets firms are most effectively utilising are IT systems, contact lists, and administrative systems. IT systems and administrative systems (in this case defined as relating mainly to financial processes – invoicing, budget tracking, etc.) refer to the basic internal organisational architecture of a firm, while contact lists refer to its network capital and the formalised management of information on external actors with which it is linked. In small KIBS firms the effective management of network contacts is likely to be paramount from a range of supply-chain and horizontal network perspectives, especially knowledge of associates and partners. These actors may be important external knowledge sources, and there is a wealth of complementary evidence highlighting the role of external knowledge acquisition in establishing competitive advantages for small firms (Keeble *et al.*, 1998; Romijn and Albu, 2002; Lechner and Dowling, 2003; Kingsley and Malecki, 2004; Pittaway *et al.*, 2004). Those assets least effectively utilised are customer loyalty/retention, assets followed by new product

development systems. The inability to effectively utilise new product development systems (which also has a relatively low resource base score) suggests that small KIBS firms may possess constraints on their innovation capabilities.

While the innovation constraints on small firms – especially those in the manufacturing sector – such as a lack of financial capital (Oakey, 2003; Mason and Harrison, 2004), human capital (Davidsson and Honig, 2003; Rogers, 2004) alongside knowledge networks (Freel, 2000; Huggins, 2000, Pittaway *et al.*, 2004) are well documented, less is known about innovation processes within KIBS. As in other service sector firms it is likely that the research and development process is enacted on an informal and “needs must” basis, i.e. reacting to the needs of customers for new services or the development of new products to satisfy market change. In this sense, innovation is driven by external users, which presents a potential tension for KIBS firms, as they are required to engage in knowledge exchange with current, and prospective customers, while at the same time seeking to protect their knowledge base. The inability to create value through existing systems is understandable to the extent that such firms are unable to effectively establish the routines (Nelson and Winter, 1982) related to the allocation and management of R&D related personnel, finance to fund R&D, or the external acquisition of knowledge (Miles *et al.*, 1995). The inability to acquire external knowledge is confirmed by the low resource base and value creation score recorded for competitive intelligence, consisting of the gathering and benchmarking of relevant information concerning the activities of competitors. It should be stressed while these factors do not necessarily imply that KIBS firms are not innovating, they do suggest that the means by which the innovation process is undertaken may lack effective investment and management.

The final perspective from which we measure the intellectual assets of KIBS firms is the strategic importance placed on particular assets as a means of creating value. All assets score more highly for strategic importance than for value creation or resource base, reflecting possible gaps in absorptive capacity, which we analyse in more detail later. The assets rated of highest strategic importance are brand, IT systems, web site facilities, administrative systems, new product development systems, and contact lists. The ranking of brand at the head of the list is an indication of the perceived importance of reputation within the KIBS sector, with a high density of small firms competing for clients and procurement contracts. Technological advances means that small firms are increasingly able to leverage their brand and reputational resources through web site and other electronic media, which also reflects the high strategic importance given to these assets (Feindt *et al.*, 2002; Prashantham and Young, 2004). This finding is compatible with other studies, which list reputation as one the most critical success factors for business service firms (Wood *et al.*, 1993; Bryson *et al.*, 1997, 2004). Those assets perceived to be of least strategic importance are customer loyalty and retention, intranet systems, and intellectual property. The low strategic importance given to intranet systems reflects the knowledge network and sharing environment within small KIBS firms. Much of this activity is likely to occur through the mobilisation of social capital and informal communication networks (Nahapiet and Ghoshal, 1998; Thorpe *et al.*, 2005). While such networks and modes of communication are vital to effective knowledge – especially tacit – exchange, the lack of more technology-based networks does heighten the propensity for knowledge to remain embodied within

particular individuals in the form of human capital rather than more accessible organisational capital.

Traditional and new KIBS firms

As well as viewing small KIBS firms “in the round”, it is also instructive to assess how different types of KIBS firms value, accumulate and utilise their intellectual assets. Table II breaks down the aggregate scores presented in Table I according to whether firms operate in “traditional” or “new” KIBS sub-sectors. This distinction between new and traditional has been adopted in other KIBS studies (Miles *et al.*, 1995; Muller and Zenker, 2001), with traditional KIBS firms being those providing professional services such as marketing, advertising, management consultancy, accounting, legal services, and architectural and environmental services. New KIBS firms are those whose activities are related the specialist use and application of new technology, such as software, telecommunications, technical engineering, training in new technologies, R&D consultancy and high-technology “boutique” firms. As new KIBS are necessarily operating in emerging and often fast growing and changing sectors of activities, it is considered that their management strategies, as well as constraints on growth and development, might differ from more traditional KIBS firms (Miles *et al.*, 1995; Muller and Zenker, 2001). As Table II highlights, our data offers some support for this hypothesis, with there found to be significant differences between traditional and new KIBS firms in resource base, value creation and strategic importance for a number of organisational capital elements. New KIBS firms score significantly lower than traditional firms for training systems, documented procedures and technical information, management systems, and administrative systems. They only score significantly higher in relation to the strategic importance attached to web site facilities, which given their orientation is unsurprising.

The gap in organisational capital between new and traditional KIBS firms indicates that newer technology-based firms have less formalised internal systems and workforce development activities. In traditional KIBS firms, administrative and management systems are likely to be at the heart of the professional services they offer, while in technology-based KIBS they are more likely to be perceived of less importance, as operations function on a more fluid project-by-project basis (Miles *et al.*, 1995; Miles, 2005). The wide gap in training systems between the two types of firms suggests that learning-by-doing acts as the mesh between individual-level development and firm-wide innovation. As Simmie and Strambach (2006) argue, in knowledge intensive working environments both learning-by-doing and learning-by-interacting tend to be of more importance to development and innovation processes than more formal learning routes. However, the sustainability of these non-formalised for innovation generation in such small firms is open to question.

There is no significant difference between new and traditional KIBS firms in terms of the network capital aspects of their intellectual asset base. While it might be anticipated that “client intensity” (Miles *et al.*, 1995), for example, would be higher for new KIBS firms, as they devote their energies to customising their knowledge and services for specific clients, both types of firms appear to give equal measure to external network and relationship development. The same is also the case for intellectual property aspects, indicating that intellectual property rights are perceived as being neither more or less critical across both sets of firms.

	Resource base		Value creation		Strategic importance		Mean average	
	Traditional	New	Traditional	New	Traditional	New	Traditional	New
Documented procedures and technical information	67.5*	47.7*	73.3***	47.7**	76.0*	60.2*	72.3**	51.9**
Management systems	69.0**	44.3**	67.4**	45.5**	71.4	61.4	69.3**	50.4**
Brand	62.0	51.1	63.4	61.4	84.0	78.4	69.8	63.6
Sales systems	47.3	33.0	59.8	46.6	73.9	73.9	60.3	51.1
Distribution systems	45.2	33.3	50.0	57.1	65.5	63.1	53.6	51.2
Administrative systems	81.0**	53.6**	77.4*	60.7*	81.0*	69.0*	79.8*	61.1*
New product development systems	47.5	48.8	43.8	46.4	70.0	78.6	53.8	57.9
Web site facilities	77.6	79.8	52.0	64.3	66.3*	83.3*	65.3	75.8
Intranet and shared drive systems	50.0	47.6	47.4	56.0	51.3	60.7	49.6	54.8
Training systems	63.2**	34.1**	60.5**	34.1**	72.4**	59.1**	65.4**	42.4**
IT systems	76.4	83.0	77.8	79.5	75.0	84.1	76.4	82.2
Marketing and communication	48.6	44.3	51.4	40.9	62.5	60.2	54.2	48.5
Quality standards, awards and accreditation	29.2	31.8	50.0	46.6	58.3	56.8	45.8	45.1
Organisational capital	58.8*	48.6*	59.5	52.8	69.8	68.4	62.7	56.6
Contact lists	75.0	61.4	78.9	65.9	75.0	73.9	76.3	67.0
High profile customers	65.8	64.8	63.2	67.0	68.9	77.3	66.0	69.7
Customer loyalty and retention	28.9	31.8	28.9	31.8	42.1	42.0	33.3	35.2
Alliances and collaboration	65.8	55.7	60.5	59.1	72.4	61.4	66.2	58.7
Competitive intelligence	47.4	42.9	46.7	46.4	59.2	67.9	51.1	52.4
Network capital	56.6	51.3	55.7	54.1	63.5	64.5	58.6	56.6
Intellectual property	48.7	50.0	36.2	43.2	51.3	59.1	45.4	50.8

Notes: ** $p \leq 0.01$; * $p \leq 0.05$ (student's *t*-test)

Table II.
Differences between
"traditional" and "new"
KIBS firms

Firm size

Differences in the size of KIBS firms (and to some extent, by default, their maturity) may be associated with differences in their intellectual asset bases. As already highlighted, the smaller a firm is the more likely the possibility of constraints on the development of intellectual assets, restricting the growth and competitiveness of the firm. Table III indicates the relationship between the size of KIBS firms and the resource base, value creation, and strategic importance of their intellectual assets. There is a significant relationship between firm size and the resource base across the three broad types of assets, the strongest association being with organisational capital. In particular, new product development systems, quality accreditation, and sales systems are subject to more progressed development and investment in larger firms. The association with new product development systems suggests that firm size is related to innovation processes and systems, and is a constraining factor in small firms. This confirms existing evidence concerning small firms and innovation (Wiklund and Shepherd, 2003; Thorpe *et al.*, 2005), but further indicates the potential limitations on the development of innovation processes even with highly knowledge intensive environments. In terms of network capital, firm size is also positively associated with alliance and collaborative resources, as well as the means to monitor competitors, which again may restrictive innovation and competitiveness.

Larger KIBS firms are more likely to have in place systems to protect intellectual property. As Miles *et al.* (1995), argue, small KIBS are unlikely to be able to take advantage of intellectual property protection due to underlying regulatory systems

	Resource base	Value creation	Strategic importance
Documented procedures and technical information	0.26***	0.04	0.19
Management systems	0.23	0.14	0.09
Brand	0.14	0.16	-0.04
Sales systems	0.39*	0.21	0.19
Distribution systems	0.33**	0.18	0.22
Administrative systems	-0.03	-0.18	-0.11
New product development systems	0.38*	0.22	0.11
Web site facilities	0.10	0.16	0.06
Intranet and shared drive systems	0.29**	0.18	0.19
Training systems	0.22	0.22	0.17
IT systems	0.22	0.08	0.16
Marketing and communication	0.29**	0.24***	-0.06
Quality standards, awards and accreditation	0.38*	0.25***	0.08
Organisational capital	0.42*	0.27***	0.26***
Contact lists	0.00	-0.07	0.08
High profile customers	0.14	0.23	0.10
Customer loyalty and retention	0.19	0.33**	0.11
Alliances and collaboration	0.28**	0.25***	0.29***
Competitive intelligence	0.31**	0.26***	0.21
Network capital	0.32**	0.34**	0.24***
Intellectual property	0.39*	0.22	0.23

Notes: * $p \leq 0.01$; ** $p \leq 0.05$; *** $p \leq 0.1$ (correlation coefficient)

Table III.

Firm size (number of employees) and the resource base, value creation and strategic importance of intellectual assets (correlation coefficients)

favouring larger players. Indeed, protection may even restrict innovation as it locks firms into redundant and lagging strategies, reducing the capacity for the type of open innovation processes considered to offer the most scope for new knowledge exchange and creation (Chesbrough, 2003). As KIBS firms grow, however, there is more likelihood they will seek to develop measures to protect their intellectual property. There is still a lack of systematic evidence on intellectual property rights within service sectors, but our findings suggest that while such rights are not perceived of high importance among small KIBS firms, they are associated with the evolution of these firms. Furthermore, if size is seen as a proxy for the evolution KIBS firms, then the accumulation of key intellectual assets appears to accelerate as these firms grow and mature.

Absorptive capacity

Following Zahra and George (2002), we seek to measure the absorptive capacity efficiency of KIBS firms. We derive three absorptive capacity measures as follows:

- (1) *Recognition and assimilation* – resource base score minus strategic importance score (expressed as a percentage of resource base score).
- (2) *Application* – value creation score minus resource base score (expressed as a percentage of value creation score).
- (3) *Recognition, assimilation and application* – value creation score minus strategic importance score (expressed as a percentage of value creation score).

The rationale behind this methodology is that negative gaps between the first and second scores are an indication of absorptive capacity inefficiencies since greater strategic importance is being allocated to an asset than its accumulation or utilisation, or utilisation lags the resource base. Such a gap analysis provides an indicative understanding of how absorptive capacity varies on an asset-by-asset basis. As highlighted by Table IV, the largest registered gaps concern recognition and assimilation, indicating that while firms may recognise a particular asset to be of strategic importance they are unable to effectively invest in and develop this asset. Lane *et al.* (2006) refer to these recognition and assimilation processes as transformative learning, whereby firms integrate and combine new forms of knowledge. Those assets which firms are least able to efficiently recognise and assimilate are sales systems, quality accreditation, and new product development systems. As indicated earlier, the resource base of each of these assets is also significantly correlated with firm size, suggesting that absorptive capacity gaps in transformative learning are most prevalent among smaller firms. The gaps in application absorptive capacity efficiency – which Lane *et al.* (2006) term exploitative learning – are less, and for a number of assets are significantly positive. This suggests there are less problems, in effectively utilising an asset, once it has been sufficiently invested in, and developed (two exceptions here are web site facilities, and intellectual property).

The final column of Table IV highlights the difference between asset value creation and strategic importance, which is perhaps the best overall measure of the relative absorptive capacity of each asset. The biggest efficiency gap is for new product development systems, followed by training systems and intellectual property. This confirms the potential under-absorption of these assets, particularly in relation to innovation processes, and reflects deficiencies in firm responsiveness, i.e. the capacity to implement actions of which there is awareness (Liao *et al.*, 2003). Other research has

Table IV.

Intellectual assets and absorptive capacity efficiency (positive scores equal perceived positive absorptive capacity efficiency, and negative scores vice versa)

	Recognition and assimilation	Application	Recognition, assimilation and application
Documented procedures and technical information	- 17.8	5.0	- 11.9
Management systems	- 16.1	- 0.6	- 16.8
Brand	- 43.0	8.9	- 30.3
Sales systems	- 83.4	24.5	- 38.5
Distribution systems	- 63.6	26.7	- 20.0
Administrative systems	- 11.5	2.6	- 8.6
New product development systems	- 54.4	- 6.8	- 64.9
Web site facilities	4.4	- 34.8	- 28.8
Intranet and shared drive systems	- 15.4	6.0	- 8.4
Training systems	- 37.2	- 2.6	- 40.8
IT systems	0.0	- 1.6	- 1.6
Marketing and communication	- 32.4	- 1.4	- 34.2
Quality standards, awards and accreditation	- 87.8	36.4	- 19.5
Organisational capital	- 28.6	4.3	- 23.1
Contact lists	- 9.9	5.9	- 3.4
High profile customers	- 12.5	0.0	- 12.5
Customer loyalty and retention	- 38.0	0.0	- 38.0
Alliances and collaboration	- 10.1	- 1.0	- 11.2
Competitive intelligence	- 41.7	3.4	- 36.9
Network capital	- 19.1	1.9	- 16.8
Intellectual property	- 12.3	- 23.7	- 38.9

found that responsiveness in small firms is associated with a “well developed internal knowledge dissemination capability” which underpins high absorptive capacity (Liao *et al.*, 2003). For small firms operating in knowledge intensive sectors, where innovation is a clear source of competitive advantage, the necessity to focus absorptive capacity externally on value and supply-chains may weaken their internal absorptive capacity capabilities (Meeus *et al.*, 2001; Thorpe *et al.*, 2005). While there is variability across each asset type, small KIBS firms do appear to face greater absorptive capacity issues for internally, rather than externally, focused intellectual assets.

Conclusion

This paper has operationalised the concept of intellectual assets as means of understanding how small KIBS firms seek to manage their knowledge base. It is argued that these assets are critical in securing competitive advantage among knowledge intensive firms. It is found that the relative development and accumulation (resource base), effective utilisation (value creation), and value (strategic importance) attached to particular types of intellectual asset, varies considerably. Many firms have prioritised development and investment in ICT infrastructure and less so assets such as customer development, quality accreditation, and competitor intelligence. Overall, the inability to create value from intellectual assets, especially those relating to new product development, is restricting the development of effective innovation processes, with innovation more likely to be undertaken via less formal and systematic channels. New technology-based KIBS firms are less likely than their traditional professional

service KIBS counterparts to have effective formalised learning systems in place, and generally operate within a more “fluid” working environment. As well as sub-sector, firm size is strongly associated with the accumulation of intellectual assets. Smaller KIBS firms generally possess less-resources related to both their organisational and network capital, as well as intellectual property such as patents, copyrights, and trademarks. Resource deficiencies in small firms further constrains their innovation capability and measures of absorptive capacity indicate that firms often perceive gaps in their ability to assimilate and apply knowledge which they recognise to be of strategic importance.

This paper adds specificity to the literature on knowledge and its management within small firms. While much of the literature on KIBS firms portrays them as efficient providers of knowledge, linking creators and utilisers to generate innovation, this study demonstrates that small KIBS firms themselves face particular challenges in managing the innovation process and establishing sustainable knowledge management practices. This raises a number of implications. As Starbuck (1992) argues, small firms – especially very small ones – compete most successfully if they take advantage of their peculiarities and the peculiarities of their environment. In the case of KIBS firms, one of their peculiarities is that knowledge forms their commodity and marketplace as well as their source of competitive advantage. Among small KIBS firms, the shortfall in intellectual asset building suggests a divide between these two knowledge forms. For example, while a small technology-based KIBS firm may develop advanced software and web-based facilities for a client, it may not be in position to undertake the same level of investment and development of such facilities for itself inhibiting the origination of process innovation, i.e. a hand-to-mouth scenario restricting long-term growth or sustainable competitive advantage.

From a policy perspective, there is a case for specialist business support to be made available to small (and particularly new technology-based) KIBS firms to facilitate the development and deployment of systems to ease some of the blockages apparent within the innovation process, or what others refer to as developing the “professionalisation” of the sector (Miles *et al.*, 1995; Miles, 2005). KIBS firms are increasingly considered to be integral components of innovation systems, particularly regional systems, acting as bridging agents connecting knowledge sources and innovators (den Hertog, 2000; Muller and Zenker, 2001; Miles, 2005). If this is the case, then there is clear justification for such support to be made available. Although a potential limitation of our study is the relatively small sample of firms, the sample does consist of firms from one particular region – Scotland in the UK – suggesting a requirement to explore regional policy intervention. In terms of more generalisable policy implications, further studies on small KIBS firms are required to ascertain the wider extent of intellectual asset and knowledge gaps among such firms.

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