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Knowledge Acquisition for the Internationalization of the Smaller Firm: Content and Sources

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Abstract

Knowledge Acquisition for the Internationalization of the Smaller Firm: Content and Sources

Internationalization process research emphasizes accumulated experience and networks as sources of knowledge for internationalization. Our understanding, however, as to what this knowledge is in practice for smaller firms, the challenges they face in acquiring it, and how they address those challenges is limited. Integrating organizational learning concepts with our theoretical understanding of the small firm internationalization process, we develop a new framework for understanding knowledge acquisition processes, which are examined with a case study of ten Scottish internationalizing firms. We find smaller firms may not have relevant experience or useful networks, and rely on sources rarely recognised before. Firms used recruitment, government advisors and consultants to acquire indirect experience. Recruitment is a source of market and technological knowledge and government advisors and consultants a source of internationalization knowledge. Accessing internal information is important for firms that have internationalized. Our integrated theoretical framework identifies knowledge content and sources that are critical for internationalization, but that may be absent.

Keywords: Smaller internationalizing firms, Knowledge Acquisition, Learning, International Entrepreneurship

1. Introduction

The role of knowledge and learning in the internationalization of firms has been well recognized (Forsgren, 2002; Johanson & Vahlne, 2003, 2006, 2009; Petersen et al., 2003). Internationalization process (IP) theory (Johanson & Vahlne, 1977, 1990, 2003, 2006, 2009) and international new venture (INV) research (Oviatt & McDougall, 1994) both identify knowledge accumulation and learning as a key influence on small firms' internationalization. Internationalization models that focus on the acquisition of overseas market knowledge do not explain, however, how firms actually learn (Forsgren, 2002). We still have little understanding for smaller firms, what this knowledge is, the challenges that their managers face in resourcing it, and how they address those challenges (Eriksson et al., 2000; Sapienza et al., 2005; Zahra, 2005).

The resource-based view of the firm suggests organizational knowledge is a key source of competitive advantage (Barney, 1991). This leads Grant (1996) to identify the primary role of the firm to be the integration of specialist knowledge which resides in individuals. The creation and internal transfer of knowledge is fundamental to the evolution of multinational firms, and opportunities to expand into new markets arise from the combination of different kinds and sources of knowledge (Hedlund, 1994; Kogut & Zander, 1992, 1993; Spender & Grant, 1996). Interest has grown in the processes by which knowledge is acquired (Cohen & Levinthal, 1990; Salter & Naver, 1995; Zahra & George, 2002), but this has not been investigated in depth in the internationalization of smaller firms.

In this study we ask what new knowledge smaller firms need as they learn to internationalize, and which specific sources they acquire it from. Previous international business, IP and INV research has identified three types of knowledge to be most relevant for the internationalization of small and new firms. These are technological knowledge, market knowledge, and internationalization knowledge (the latter is firm specific knowledge concerning how manage internationally); we examine these in detail. To identify where and how that knowledge is sourced we, like Bengtsson (2004), draw on

and integrate Huber's (1991) organizational theory of learning within larger firms to construct a new theoretical framework for understanding how the different types of knowledge are sourced. This comprises three sources of experiential knowledge (direct, vicarious and grafted experience), and two sources of objective knowledge (externally and internally searched). A qualitative case analysis of ten actively internationalising firms over three years leads us to five propositions.

First, we find that internationalization knowledge is critical for a sustainable process of internationalization. It is not only important for lateral expansion into new markets, as suggested in IP research, but also for the successful growth of the businesses in overseas markets in which they are already operating, and the effective management of these businesses as emerging multinational enterprises. Second, unlike technological and market knowledge, sustained interaction is required between the providers and the recipients of internationalization knowledge, the senior managers. Network relationships are important sources of technological and market information, but we suggest other network firms have neither sufficient knowledge of the firm's capabilities and resources, nor the time for interaction with the firm to provide internationalization knowledge. We find that government bodies, and specialist consultants can do this. Thus our third proposition is that internationalization knowledge is more likely to be acquired vicariously from government advisors and consultants, who will work closely with the firm, than from network relationships.

We find that grafted experience through recruitment is an important source of indirect experiential knowledge that has been overlooked in previous research. Our fourth proposition is that grafted experience is more likely to be a source of technological and market knowledge than of internationalization knowledge. Smaller firms can recruit staff with technological and market knowledge, but people with useful internationalization experience, though valuable, are rare. Finally, and surprisingly in these firms, we find internal information held within the firm to be an important source of knowledge, and accessing it is especially important for firms which have achieved international growth.

2. Content of knowledge

The distinctions made in IP and INV research between technological, market, and internationalization knowledge are now considered in turn, and the extent to which each is market or firm specific is noted.

2.1 Technological knowledge

The importance of a firm's technological knowledge in providing firm specific advantages that are transferable across borders is well established both in the theory of the internationalization of the firm (Buckley & Casson, 1976; Caves, 1971; Hymer, 1976; Kogut & Zander, 1993) and in research into early and rapid internationalization (Oviatt & McDougall, 1994; Yli-Renko et al., 2002). Knowledge intensive firms can use new technological knowledge to develop and adapt products for new markets and to avoid stagnation in existing markets (Autio et al., 2000). Developing unique products or services helps INVs to overcome disadvantages of newness (lack of experience) and size (Oviatt & McDougall, 1995). Knowledge intensification within activities, products and services allows new (including international) opportunities to be recognised and exploited (Autio et al., 2000; Dhanaraj & Beamish, 2003; Oviatt & McDougall, 1994, 2005; Zahra et al., 2000). New technological knowledge is specific to each firm, but it is not country specific (Zahra et al., 2000).

2.2 Market knowledge

Since its foundation, IP research has emphasized market knowledge acquisition (Johanson & Vahlne, 1977, 1990, 2009). A lack of market knowledge results in uncertainty and risk in internationalization. Market knowledge accumulates with increased commitment in specific markets (Johanson & Vahlne, 1977, 2003, 2009). It concerns 'institutional knowledge' of government, institutional frameworks, rules and norms (Eriksson et al., 1997), knowledge of local conditions and opportunities (Chetty & Blankenburgh Holm, 2000; Schweizer et al., 2010), and 'business knowledge' of the resources, capabilities and market behaviours of suppliers, competitors, and local clients and their customers (Blomstermo et al., 2004a; Coviello & Munro, 1995; Johanson & Mattsson, 1988 Johanson & Vahlne, 2003, 2009). Market knowledge is country and market specific, but it is not firm specific.

2.3 Internationalization knowledge

As firms accumulate international experience they can also systemise and abstract ‘internationalization knowledge’ concerning how to develop and execute an internationalization strategy and internationalize in different countries (Blomstermo et al., 2004a). Internationalization knowledge embraces abilities to search for information, to identify and evaluate opportunities, screen country markets, evaluate strategic partners, and manage customs operations and foreign exchange (Prashantham & Young, 2011; Welch et al., 2007). Internationalization knowledge helps lateral internationalization into new geographic markets by aiding their strategic market entry decisions (Fletcher, 2009; Forsgren, 2002; Johanson & Vahlne, 1977).

Internationalization knowledge is not country specific, because it is concerned with principles for operating in international markets in general (Eriksson et al., 1997, 2000; Li et al., 2004; Prashantham & Young, 2011). It is firm specific knowledge that has to be integrated internally and coordinated with the firm’s other resources to be useful (Blomstermo et al., 2004b; Eriksson et al., 1997; Johanson & Vahlne, 2009; Welch & Luostarinen, 1988).

3. Knowledge sources in IP and INV research

Both IP and INV approaches see internationalization as a learning intensive process in which knowledge has a central role (Johanson & Vahlne, 2009). IP emphasizes experiential knowledge to be critical to a firm’s selection of foreign markets, how it enters markets, and the speed of its launch in those markets (Casillas et al., 2009; Johanson & Wiedersheim-Paul, 1975; Nordstrom & Vahlne, 1992). Firms internationalize with a series of incremental decisions, increasingly investing in greater involvement in markets more physically or psychologically dissimilar to their home market as they experientially acquire the necessary knowledge (Eriksson et al., 1997; Johanson & Wiedersheim-Paul, 1975; Nordstrom & Vahlne, 1992). Learning for internationalization is therefore regarded as a cumulative and path dependent process (Eriksson et al., 2000; Johanson & Vahlne, 1977, 2006) which suggests a gradual and incremental approach to internationalization (Eriksson et al., 1997).

The INV approach suggests that founding entrepreneurs and top management teams support a new firm's early internationalization with their particular prior knowledge, abilities and experience (Oviatt & McDougall, 1995). This is augmented with new knowledge acquired during the start up process, an experiential learning process which Huber (1991) calls 'congenital learning'. Inherited and accumulated knowledge can become outdated or irrelevant and sufficiently impair performance (Anand et al., 2002; Fernhaber & Li, 2010; Reuber & Fisher, 1997).

Internationalizing firms therefore need additional new knowledge to pursue internationalization successfully (Fernhaber et al., 2009). For entrepreneurs, foreign market knowledge comes from innovatively and proactively pursuing entrepreneurial opportunities overseas rather than by passively accumulating foreign market experience (Zhou, 2007). Firms benefit from using formal methods of gathering foreign market information (Chaudhry & Crick, 1998; Leonidou & Adams-Florou, 1998) and by actively integrating knowledge held by individuals, firms and inter-organizational networks (Casillas et al., 2009). If internationalization is to be rapid, the speedy international business decisions that have to be made requires that this knowledge is acquired and integrated quickly (Autio et al., 2000; Oviatt & McDougall, 1994; Sapienza et al., 2006). The speed of learning and knowledge accumulation depends on how individuals, firms and others in networks share their knowledge with one another (Jones & Coviello, 2005; Prashantham & Young, 2009).

Both IP and INV approaches have emphasized the role of networks. The network model recognises the influence of external organizations such as customers, suppliers, other business partners, institutions and competitors on the internationalization of the firm (Johanson & Mattsson, 1988), in both business (formal) and social (informal) relationships (Coviello and McAuley, 1999). By regarding the business environment as a network of relationships, Johanson & Vahlne's (2009) revised IP model sees relationships leading over time to knowledge exchange and the development of new knowledge. INVs use network relationships because of resource-scarcity, and achieve control through trust and moral obligation rather than through ownership and formal contracts (Oviatt & McDougall, 1994). Local market knowledge from individuals within informal personal networks is especially important in the early stages of

internationalization (Chetty & Campbell-Hunt, 2004; Harris & Wheeler, 2005; Welch, 1996).

Learning sourced from networks can be central to the internationalization process by influencing foreign market selection and mode of entry (Coviello & Munro, 1995). Learning from relationships in initial markets helps development in those markets and entry into other markets by presenting potentially useful new relationships, and improving the firm's general ability to co-ordinate activities with new relationships (Johanson & Vahlne, 2003). The experience of working in and learning from relationships in different markets helps firms to build network development routines (Blomstermo et al., 2004a); they learn how to build new networks (Loane & Bell, 2006).

Our interest is the new knowledge that smaller firms need for internationalization and how they source it. Network relationships are likely to be important sources, but we have good grounds for thinking that they might not be the complete solution in all circumstances. First, many born-global firms start-up without having previous networks (Rasmussen et al., 2001). Second, networks are not always beneficial, since they can increase rigidity (Sullivan Mort & Weereardena, 2006) and constrain the scope and nature of market opportunities that are presented (Coviello & Munro, 1995). Third, the extent and level of information exchange between firms in networks can be quite limited (Kenny & Fahy, 2011). It is possible that there might be other important sources of knowledge for firms seeking internationalization, other than direct experience and network relationships emphasized in previous research.

4. An organizational learning framework for internationalization knowledge

To help understand in greater depth than before the knowledge acquisition processes of internationalising firms, we examine the relationship between objective and experiential knowledge and internal and external sources. Seminal organizational learning research by Huber (1991) has presented a range of sources of experiential and objective knowledge for organizations. A distinction between internal and external knowledge sources has been made in recent research on knowledge sources and their implications for internationalization (Casillas et al., 2009; Fernhaber et al., 2009; Prahsantham & Young,

2011). External sources have been identified to be especially important for innovation and explorative learning (Cohen & Levinthal, 1990; Huber, 1991; March, 1991).

Objective (explicit or codified) knowledge and experiential (tacit or implicit) knowledge have long been distinguished (Johanson & Vahlne, 1977; Leonidou & Katsikeas, 1996; Nelson & Winter, 1982; Seringhaus, 1987). Objective knowledge, for example in the form of published documents, is easily obtained through training or can be acquired from data sources such as market research, government statistics, bank bulletins or company reports (Nonaka, 1994; Polanyi, 1966). Experiential knowledge cannot easily be acquired, taught, or transferred (Eriksson et al., 1997), international experiential knowledge is acquired from the experience of operating in overseas markets (Leonidou & Katsikeas, 1996). The IP model sees objective knowledge to be of relatively minor importance; it is foreign market experience that generates business opportunity and is the driving force behind internationalization (Johanson & Vahlne, 1977).

Overlaying these distinctions generates the framework illustrated in Figure 1 below. We incorporate Huber's (1991) conceptualization of forms of knowledge acquisition into cells i, ii and iii of our framework. In cell iv we identify new knowledge that may be developed by bringing together objective information from sub-units and sources within the firm, we call it internal information. We consider each of these four segments in turn.

FIGURE 1 HERE

4.1 Direct experience: Internal experiential knowledge

Firms acquire some of their knowledge through their own first hand, direct experience (Huber, 1991). This can be a result of intentional systematic efforts, but it is more frequently acquired unintentionally or unsystematically by operating in the marketplace, whereby people learn from the outcomes of past decisions and apply that knowledge to present decisions. IP research affirms current business activity to be the main source of knowledge for internationalization, because it provides the opportunity to acquire, integrate and use knowledge about foreign markets and operations (Aharoni, 1966; Cyert & March, 1963; Johanson & Vahlne, 1977, 1990). Experience provides knowledge about networks in foreign markets (Blomstermo et al., 2004a; Coviello & Munro, 1995) and

informs firms how they can acquire, adapt and integrate knowledge from networks (Petersen et al., 2008).

4.2 Indirect experience: External experiential knowledge

Indirect experience, referred to as second-hand experience by Huber (1991), is knowledge that is needed but which has not been learned directly. Huber identifies two ways of acquiring it: vicariously and grafting.

In vicarious knowledge acquisition, firms learn from the experience of others, for example by observing them in networks, or through licensing, strategic alliances or corporate intelligence (Chandler & Lyon, 2009; Huber, 1991; Welch & Welch, 1996;). This is the type of external source that IP and INV research has emphasized (Chetty & Blankenburg Holm, 2000; Coviello & Martin, 1999; Johanson & Vahlne, 2009). Knowledge from network partners can help overcome liabilities of foreignness (Schwens & Kabst, 2009), and the tacit knowledge learned in business relationships can stimulate rapid and early internationalization (Fernhaber & Li, 2010; Forsgren, 2002; Schwens & Kabst, 2009). Firms can also acquire knowledge externally from specialist organizations such as export intermediaries (Peng & Ilinich, 1998) or other commercial and government sources (Leonidou & Adams Florou, 1998). One form of vicarious learning is mimicking other firms for example, by looking to similar firms when making foreign entry mode decisions (Lu, 2002). Firms without international presence can reduce the uncertainty perceived by others in their foreign market entries by imitating firms that have some legitimacy in having achieved successful market entries (Forsgren, 2002). Internet firms seeking fast internationalization, for example, do this by imitating the lead firm or by 'following the herd' (Forsgren & Hagstrom, 2007:301).

Grafting involves hiring people or acquiring business units (Huber, 1991). Recruiting an overseas marketing manager, for example, can bring that individual's experiential knowledge. Forsgren (2002:263) notes how 'by acquiring local units (or people) that possess the necessary market knowledge, the slow process of learning from one's own experience can, at least partly, be avoided', especially if firms focus on integrating personnel and the knowledge involved (Barkema & Vermeulen, 1998). There is a possibility that this knowledge might not be available or exist (Johanson & Vahlne,

1977), but it has become increasingly possible to recruit internationally experienced managers (Oviatt & McDougall, 1995).

4.3 External Search: External objective knowledge

Firms can acquire knowledge from published and other objective sources by searching, which involves scanning its external environment and conducting focused search for new information (Chetty & Blankenburg Holm, 2000; Forsgren, 2002; Huber, 1991; McDougall et al., 1994; Welch & Welch, 1996). This is usually a response to a specific problem or an attempt to enhance strategic effectiveness (Chandler & Lyon, 2009; Simonin, 1999). Many sources of published marketing information have been reported in export marketing studies, though their usefulness has been questioned (Jones & Crick, 2004; Leonidou & Adams-Florou, 1998). These include chambers of commerce, banks, trade associations, consultancy/research agencies, trade publications, and government outlets, as well as technology-based services and sources of information. Firms may also conduct their own market research, and they can undertake education and training to learn from others (Leonidou & Katsikeas, 1996; Slater & Narver, 1995).

4.4 Internal information: Internal objective knowledge

Internal knowledge has been overlooked in much previous research, perhaps because it might be assumed that knowledge already resident within the firm does not have to be acquired. Much of this knowledge is experiential, discussed earlier, but some can be objective, thus both internal staff and systems can be important sources of objective information. Firms often ‘do not know what they know’ (Huber, 1991:100) and lose organizational memory.

Slater and Narver (1995) suggest that effective managers use many internal sources to acquire new knowledge about their enterprise and its environment. Firms can develop knowledge by piecing together items of information that they obtain from other internal units (Huber, 1991). For example, new market knowledge can lead to new technology knowledge that can help firms to tailor their sales efforts to local conditions (Prashantham & Young, 2011; Shane, 2000). Firms need to codify information and record it in information systems if they are to distribute and be able to retrieve

information sufficiently to improve learning (Huber, 1991; Prashantham & Young, 2011). Effective formal and informal communication lines are needed within intra-firm networks with interpersonal linkages, otherwise information loss will hinder internationalization (Karlsen et al., 2003).

Organizational learning research has given us a more comprehensive and theoretically grounded framework for types and sources of internationalization related knowledge, some of which have been overlooked in IP and INV research. We examine these elements in firms that are actively internationalizing.

5. Methods

We were interested in smaller firms that undertake internationalization as a strategy for growth (Autio et al., 2000; Cumming et al., 2009; Sapienza et al., 2006), so we needed to study firms with internationalization intentions and the individuals (CEOs and other directors) who were driving them. We wanted to find out what new knowledge they sought, why they needed it, what sources they used, and how and why they used those sources. We had begun with a body of theory, but because we needed to explore the relevance of and possible relationships between concepts that had not previously been combined and applied in this area, we needed to access fine-grained data from relevant firms and individuals without being driven by a priori expectations framed in one conceptual standpoint or another. As our focus was on knowledge for the evolving process of internationalization, we needed to track their internationalization over time.

This suggested a qualitative approach, and a multiple case study with enough cases, studied for long enough to achieve sufficient data saturation to draw theoretical generalisations (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2009). Following Lincoln and Guba (1985) and Sinkovics et al. (2008), the research design sought trustworthiness in the findings by establishing; credibility through triangulation and prolonged engagement, transferability by using thick descriptions, dependability with an audit trail of all documentation and the use of Nvivo data analysis, confirmability through having independent and neutral researchers and using an interview schedule agreed by researchers and programme managers to be unbiased. This addressed issues of validity and averted the danger of confirmatory evidence bias, as organizational learning and

knowledge acquisition have been the subject of considerable theoretical development in the past (Sharpe, 2004). The interview schedule was designed to explore and unravel the issues and the thinking of the interviewees themselves in as non-directive a way as possible (Harris, 2000; Yin, 2009). Triangulation was achieved through multiple cases, multiple sources of information, and multiple interviews over time for each. Figure 2 shows five stages within the research protocol, detailed below.

FIGURE 2 HERE

5.1. Case selection and validity checking (Stage I)

The selection of cases was purposeful, to provide a relevant sample of SMEs to meet the study's research aims (Davidsson, 2008; Patton, 2002). Fifteen firms were drawn from Scottish firms participating in a high growth, internationalization programme run by Scottish Enterprise, the government regional support agency (2003). The firms were well suited for the study because they were internationally engaged and focused but faced challenges and constraints to their internationalization. As we were study organisational learning processes, the individual firm was the unit of analysis. The firms had to be SMEs (employing fewer than 250 employees when they embarked on the programme), strategically controlled from Scotland, and actively internationalizing. Programme managers were interviewed and archival records examined to select firms implementing an internationalization strategy. Of the fifteen firms initially selected, two were deselected under these criteria when they subsequently abandoned their internationalization strategy, and three further firms became unavailable for the study when they withdrew from the programme. This left ten case study firms suitable for the study and available, labelled A to J to preserve anonymity (Table 1). Three-year access to the firms was secured to allow a process based research design using a combination of real-time and retrospective data collection (Leonard-Barton, 1990). Data was collected on the firms' internationalization strategies, plans and activities, and on the resulting issues, problems, learning needs and knowledge acquisition processes.

Firms D, F and G were low technology intensive manufacturing firms with understood technologies. A, C and E were medium technology intensive firms, making use of

technology to develop products and processes. B, H, I and J were high technology intensive firms, whose core competence was their knowledge base (Oviatt and McDougall, 2005). A, B and C were start-ups and the remaining seven were already established. Of the latter, F, G, and I were late internationalizers, being established in their domestic market before internationalization, D, E, H and J were early internationalizers, having done so within six years of foundation (Oviatt & McDougall, 1997).

The three start-ups were at early stages of product development. A and B began trading during the research but C still had no sales. The existing firms were at more advanced levels and had already obtained international sales. D and G increased total and international sales throughout the period. After periods of high growth, E and F's sales had faltered, E's domestically and F's internationally. H and J grew mainly through international sales, while I had experienced high international sales growth, followed by a decline and partial recovery. The appendix shows the total and international sales level and export ratio over the research period.

TABLE 1 HERE

5.2 First year of interview data (Stage II)

Following preliminary analysis of archival data that included company profiles prepared by the government programme managers, independent consultants' reports, and the firms' action plans, a series of interviews were undertaken to provide data that was used to triangulate and validate data from CEO interviews. These included face-to-face interviews (taped and transcribed) with the programme managers and telephone interviews with regional support agency managers. Notes and minutes were collected from monthly programme meetings.

Semi-structured interviews (recorded and transcribed) were conducted with the each of the CEOs of the case-study firms as they implemented the internationalization strategy. Acknowledging the emergent nature of the case study process (Piekkari et al., 2009) the role of the interviewee as the key decision maker with responsibility for the firm's internationalization was confirmed in the interview. Data were collected on the firms'

past and present internationalization activities, plans and strategy, competitive position, external and internal barriers and facilitating factors in order to set the context of the issues and problems firms were facing as they internationalized.

Data coding and analysis involved content analysis of interview notes and secondary data, identifying the issues the firms addressed, the specific new knowledge they acquired to deal with those issues, and their sources of that knowledge. Data triangulation (Figure 3) involved evidence from the CEOs' transcripts, and programme managers, and archival data from the government agency records (Huberman & Miles, 1994; Silverman, 1993; Yin, 2009). Coding categories were derived in an iterative process involving moving back and forth between data and existing theories (Yanow, 2004).

5.3 Second year of interview data (Stage III)

During the second year, interviews were again held with those involved in the internationalization process. In two firm new informants involved in the internationalization were interviewed to enhance validity. Issues and problems arising as firms implemented their internationalization strategy were identified. Notes and minutes from monthly meetings with the programme manager provided a further separate source for data triangulation. Iterative coding of data from all sources was undertaken.

FIGURE 3 HERE

5.4 Third year of interview data (Stage IV)

The third round of CEO interviews focused on organizational learning and knowledge acquisition. Referring to the analysis from stages I and II data, respondents identified and confirmed the main issues and problems they faced as they internationalized. The interviews probed into the new knowledge that had been acquired to address these, and where it was acquired from. Data were collected from the (now quarterly) programme manager meetings for triangulation, and coding of data from all sources was repeated.

5.5 Overall data analysis (Stage V)

At this stage coding was undertaken using coding categories derived from the internationalization and organizational learning literature to enable data-theory

triangulation (Figure 4). Codes were added until there was a more complete explanation and understanding of the new knowledge acquired and sources of that knowledge. Within-case analysis was undertaken for each firm, with data coded into knowledge content and source constructs, which were then presented in within-case displays using content summary matrices (Miles & Huberman, 1994; Yin, 2009). An iterative coding process similar to that in Stage II identified core themes, patterns and trends to generate findings against the research propositions. Following Miles and Huberman (1994), cross-case analysis to themes was carried out whilst remaining sensitive to the unique context of the firms, for example to their level of technological intensity and to their stage of firm development. In this way, patterns were identified that were robust to specific industries or markets served, and which could be generalised.

FIGURE 4 HERE

6. Findings: The content of knowledge

We now discuss the different content of knowledge that the firms needed, then examine the sources used to acquire that knowledge. Table 2 shows the incidence of technological, market and internationalization knowledge.

Six firms sought technological knowledge. All these firms were high or medium technology intensive firms that needed new knowledge to adapt or develop products for new markets and to add value to manufacturing output:

In each of the major geographies we learned that you have to do something different and understand and develop the different (technical) solutions that were needed in each country. This was then put into our sales message. [CEO, Firm B].

The low technology intensive manufacturing firms (D, F and G), had well understood technologies and well-defined product ranges; their focus was to develop overseas markets and they had no new technology development needs. Bell, McNaughton, Young and Crick (2003) and Oviatt and McDougall (2005) may be correct affirming that technological knowledge may be an important driver of rapid internationalization of technology intensive firms, but not necessarily for all firms. Similarly, the service firm A had already acquired the technology it needed.

As expected, firms needed to acquire new market knowledge when they entered new markets and adapt new products to overseas markets. This involved building close network relationships. For one firm (D) operating in the USA, new market knowledge was needed to enter new states.

We have worked in the USA since day one, we know the way the market is, (to expand) we are developing business relations Every state has different legislation, requirements and business controls [CEO, Firm D].

TABLE 2 HERE

Three manufacturing firms (E, F, and G) that had already established a presence overseas did not need to acquire new market knowledge so much as to acquire new internationalization-related know-how to further penetrate their markets. This internationalization knowledge was sought by all the firms. They needed knowledge of market entry methods, managing overseas partners, legal issues, licensing, overseas project management, overseas franchising, sales and marketing processes, in nearly all cases, knowledge that could then be applied to other overseas markets. D, H and G needed to develop an ability to manage overseas subsidiaries. After an unexpected decline in overseas sales, E and F sought to improve international performance by converting existing specific market and technological knowledge into internationalization knowledge. F improved overseas project management capabilities. E developed customer-focused sales models and marketing processes in the USA, which they subsequently transferred world-wide:

We weren't performing as well in sales as we should and identified that sales and marketing were our weakness in the business. We brought in an outside consultant to develop the people but also to develop processes internally to monitor and plan properly ... we needed to develop people and processes and learn how to monitor and plan properly [CEO, Firm E].

Although the initial focus was to acquire specific market knowledge when entering new markets; subsequently it was new internationalization knowledge that was needed by all firms. The three start-up firms (A, B, C) acquired new internationalization knowledge about how to build overseas relationships and networks. They had all had some prior experience of international relationships, but this knowledge was not sufficient to develop their businesses internationally. A and B both needed to learn how to build relationships that would enable overseas

market entry, for A with an identified US partner and B with multiple partners in Asia. C needed to identify and collaborate with manufacturing partners in China and Taiwan to develop new technological products. All needed to develop deep relationships:

Although over the years I have traded with China, I have never had to get into that sort of partnership. We employed a consultant to learn about the culture, which was very beneficial. The first thing we learned is not to expect the same culture as you have in the UK of doing business – the practices are totally different. [CEO, Firm C].

Some internationalization knowledge was connected to technological and marketing knowledge acquisition. It was concerned, for example, with how to select and build relationships with partners, to improve overseas project management, to manage worldwide sales and processes, to integrate marketing and technology information for new product development, to develop overseas franchise operations, and to improve R&D commercialization. It was needed, therefore, to transform the specific technology or market knowledge that was being acquired into a capability to internationalize.

Other internationalization knowledge needs were not connected to technological or market knowledge. For example, it was how to enable both UK and overseas managers to be effectively involved in decision-making, improved head office and international management structures, new management delegation procedures, information and reporting systems. Internationalization knowledge, therefore, was not only for helping expansion into new markets (that has been the focus of IP and INV research); it was also to help the overall management of operations in existing markets as a growing international firm.

7. Findings: Knowledge sources

Table 3 shows the knowledge sources categorized into Huber's (1991) knowledge source constructs. We find that all the sources of knowledge are employed, and there is diversity within those sources. The direct experience of the firms' CEOs, management and staff was an important source of the three kinds of knowledge, but an absence of direct experience was often compensated by knowledge accessed from the other sources shown.

TABLE 3 HERE

7.1 Sources of technological knowledge

We found that managers proactively acquired experiential and objective knowledge about technologies, and this played an important part in their internationalization. Having direct experience did not make the search for more knowledge unnecessary; the firms integrated their direct experience with experiential knowledge learned from diverse domestic and foreign sources. Firms sourced knowledge widely, and using one source did not limit use of another. These sources included industry partners, customers, suppliers, government sources, consultants and contacts. The firms also recruited individuals with experiential knowledge and searched for objective knowledge. C used the internet, government sources and universities to find out more about a technology for the firm. C used consultants and government advisers to gain knowledge of Taiwanese manufacturers' practices and culture, to select suppliers and then to build relationships to jointly develop a new technology. To acquire technology knowledge for developing new medical products, J used the experience of existing staff and recruited new staff:

We expanded the R&D group quickly to develop the products for a new customer. These used different technologies [CEO, Firm J].

It was common for direct experience to be augmented by grafting through recruitment of staff at employee, manager, senior director and chairman levels.

The acquisition of technology knowledge often required network relationships to be developed, from which experiential knowledge could be acquired vicariously. Three high technology firms (B, C and J) co-created new technological knowledge in open innovation with their customers or suppliers in order to innovate (Chesbrough, 2003; Lauren & Salter, 2006). The development of these relationships was time consuming and involved much more effort than the firms had expected. B developed their technology product first with a UK partner, and then worked with both that partner and a US customer to adapt the technology for overseas markets. J reduced its use of distributors, and entered contractual agreements with customers, which involved close co-operation to develop new biotechnology products.

7.2 Sources of market knowledge

A similar pattern of integrating different types of knowledge from diverse sources was evident with market knowledge. To acquire market knowledge, for example, J recruited and integrated new marketing staff into the management structure while at the same time engaging in a government programme and participating in conferences. Similarly, D supplemented market experience with knowledge from the experience of a government agency abroad.

Firms built close network relationships with overseas partners, customers, suppliers, manufacturers, distributors and agents to acquire new market knowledge. Again, the effort required for this knowledge co-creation with network partners was intense, time consuming and more costly than expected. While the scope and size of the international networks of the firms differed, all found their previous international networks to be deficient in extent and usefulness. Network deficiencies hampered their internationalization and restricted their growth into additional markets:

We want to be a global business and there are still markets which are unexplored... We don't have international resources to develop all markets. When we set up our US subsidiary (previously) we did not want to start a new project till we made money. We learnt a lot about the US, but each market is different [CEO, Firm G].

Vicarious sources of experience in the form of consultants and government advisors were important for helping firms to identify partners and build new networks:

The Scottish Enterprise man on the ground in China was able to help and support us and introduce us to potential design manufacturing partners in China. We developed a good working relationship with him and speak most weeks. For example, although the people we deal with people speak English, because of different cultures, misunderstandings can happen [CEO, Firm C].

In firms E and F, information held latently within the firm, but which had not been accessed, was an important source of new knowledge. This required the firms to develop new systems to access and manage it. F developed a market information system to access market knowledge held by overseas employees. E created a product management system to integrate technological and market information to help develop new technological products.

In all the firms acquiring market knowledge, the process of involved proactive management activity and in some firms the recruitment of professional and senior management talent. The people recruited to address needs for international experiential market knowledge played an important role:

We had a good understanding of the UK market, but we employed Mr X whose knowledge of the international market has been an eye opener, he is heading up the whole area for us now we had thought the US was the main market to crack, but with X's involvement we might have more engagement with the Middle and Far East, so it will be a learning process. We are currently learning what he knows that we didn't, it is all additional knowledge [CEO, Firm B].

7.3 Sources of internationalization knowledge

Internationalization knowledge was the most frequent knowledge need identified, but the process of acquiring it followed a different pattern to technological and market knowledge. This difference becomes clear when examining the acquisition of the knowledge over the whole period of the firms' internationalization, and the role of that knowledge in the internationalization process.

Internationalization knowledge involves an ability to acquire knowledge, or to develop it by converting or combining knowledge. It often developed out of the acquisition of technological and market knowledge. To increase its technological knowledge, for example, H needed to improve the way it managed its UK sub-contractors. In order to transfer manufacturing under licence to overseas contractors to reduce costs, I acquired knowledge of how to protect its intellectual property and set up a licence agreement. E created a new customer focused product development function to convert market knowledge to new product knowledge.

Internationalization knowledge evolved from the combination of knowledge from different sources. It often came from combining own experience with learning from government advisors and consultants (Table 3). These external sources helped firms to seek and acquire necessary internationalization knowledge more quickly by internalising the learning of others (vicarious experience). C and D, for example, relied mainly on their work with the government advisors. The one firm (H) that relied mainly on the CEO's experience, suffered significant problems with the establishment of its US subsidiary, and suffered delays in internationalization as a result.

Internal information was an important source of internationalization knowledge. To acquire it E, F and H developed new formal management systems, including costing, project management and planning, and control procedures. F created a new system that would help it manage new operations in overseas markets:

We have created a project management system using a spreadsheet, where the sales team report monthly and we can track proposals [CEO, Firm F].

Two other sources of knowledge do not feature. The use of recruitment to acquire internationalization knowledge is surprising by its relative absence. It was only found by one firm (F) which recruited a non executive director recommended by the investing bank. As this knowledge is firm, not market specific, people with the precise experience needed are difficult to find and they may not choose to work for SMEs. Firms D and F had previously employed government advisors who had worked with them to provide relevant internationalization knowledge. It is surprising that network relationships do not feature in the acquisition of internationalization knowledge. This was because the deep experiential knowledge concerning how to approach the process of internationalization requires a level of extensive interaction that could not be elicited from network relationships which tend to be relatively new for young or newly internationalizing firms.

All the firms internalised experiential knowledge that had been sourced from outside by sharing experiential knowledge within the management team and staff:

We spent quite a bit of time with a consultant to advise us about Chinese culture and communication with our partnerswe spend a lot of time sharing (new knowledge) [CEO, Firm C].

The processes that developed their internationalization knowledge within their firms involved knowledge and experience sharing between management, production and marketing individuals and groups, and in F, G and J this took place in cross-functional project teams.

8. Discussion

Our integration of IB and organizational learning theories has enabled our first major contribution, a concrete framework that links the type of knowledge and its sources for internationalizing firms for the first time (Table 3). The areas where our findings most contribute are highlighted. We make five propositions about the sources of internationalization knowledge and the roles of grafted experience and internal information. The clearest contributions apparent in Table 3 can be found in the right hand column concerning internationalization knowledge and from which we develop our first three propositions. We find a wider range of sources of internationalization knowledge than has been recognized before. We then make a contribution concerning the role

grafted experience in knowledge acquisition (from the middle row of Table 3) which leads to our fourth proposition. The final proposition arises from the bottom row of Table 3, which recognizes the importance of internal information transfer processes for internationalizing SMEs.

Sustained internationalization requires internationalization knowledge which is firm specific knowledge concerning how to learn in new markets by combining, integrating and coordinating knowledge and other resources (Blomstermo et al., 2004b; Eriksson et al., 1997; Johanson & Vahlne, 2009; Welch & Luostarinen, 1988). It has been suggested in recent IP research to have an important and possibly critical role as a driver of internationalization (Eriksson et al., 1997, 2000; Forsgren, 2002). In this study internationalization knowledge is needed by all firms, and the all sources of knowledge identified in the study were involved in acquiring it.

The longitudinal nature of this study and its close involvement with the firms has enabled us to see that internationalization knowledge works in a different way from technological and market knowledge. Firms without internationalization knowledge had a poor understanding of this knowledge need for internationalization. Managers may be unable to recognize the knowledge that they need but do not have. Acquiring internationalization knowledge is critical for a sustainable process of internationalization. Without it, the internationalization process can be deeply impaired.

IP research has suggested that the main function of internationalization knowledge is in assisting firms' lateral expansion into new markets (Forgren, 2002; Johanson and Vahlne, 1977). We found this, but the knowledge involved was also important for the successful growth of the businesses in overseas markets in which they were already operating, and the effective management of these businesses as emerging multinational enterprises.

Proposition 1: *Internationalizing small firms need internationalization knowledge not only for lateral expansion into new markets, but also to support their expansion within existing overseas markets.*

As has been found elsewhere, firms without relevant experience find it difficult to absorb internationalization knowledge (Cohen & Levinthal, 1990; Zahra & George,

2002). A number of specific characteristics of internationalization knowledge have an effect on where it can be sourced from. Being predominantly experiential, it requires learning by managers themselves, directly from their experience, or indirectly by interaction with others who possess it. To be internalized, a high degree of interaction between other sources of the knowledge and the managers receiving it, needs to be sustained over a period of time. This, for example, precluded mimicking as a source. Furthermore, the interaction is likely to be with smaller firms' senior and top managers.

International business research has identified networks to be core sources of knowledge in the small firm internationalization process (e.g. Blomstermo et al., 2004a; Chetty & Campbell-Hunt, 2004; Johanson & Vahlne, 2003, 2009). Our study found network relationships were important sources of information, but for technological and market knowledge and not for internationalization knowledge. There are three explanations for this. First, the firms were newly internationalizing or embarking in new internationalization activities and had self-declared themselves to need support. The relevant international networks of many were sparse, and the start-up firms needed to learn how to build them. Much network research observes firms which have relevant networks, rather than, as in this study, those that do not.

Second, improving network embeddedness and developing strong relationships will take too long for firms who were seeking rapid internationalization; they need other sources of internationalization knowledge. Third, the level of interaction required for transferring internationalization knowledge requires a great level of relationship commitment. It would be unusual and rare to find such a great level of commitment within the network relationships of young or newly internationalizing firms. Overall, therefore, network relationships may be good sources of technological and market knowledge, but will rarely be sources of internationalization knowledge.

Proposition 2: *Network relationships are more likely to be a source of technological and market knowledge than of internationalization knowledge.*

The firms in this study acquired internationalization knowledge internally through senior managers' direct experiential learning and externally by learning from close interaction and contact with government advisors and consultants. We suggest that

government agencies and programmes such as the one in this study, can make the learning process faster by helping firms to recognize the need for internationalization knowledge and to acquire it. Further, specialist consultants, whether independent or associated with government programmes, can possess relevant internationalization knowledge and be prepared to spend sufficient time with the firms to help them acquire it. Our third proposition is therefore that internationalization knowledge is more likely to be acquired vicariously from government advisors and consultants than from network relationships.

Proposition 3: *Internationalization knowledge is more likely to be acquired vicariously from government advisors and consultants than from network relationships*

Early IP research ignored the role of grafted experience as a source of knowledge, and previous internationalization research has barely mentioned the role of recruitment. Grafting was found in the internationalization of seven of these firms and was one of the most important sources of experiential knowledge. Recruiting people with relevant experience allows smaller internationalizing firms to acquire rapidly critical experiential knowledge.

Autio et al. (2010) found venture capital backed technology ventures in the United States rapidly acquire internationalization knowledge through recruitment. In our study, six firms recruited for technological and market knowledge, and only one for internationalization knowledge. People with technological and market knowledge were available for recruitment, but those with useful smaller firm internationalization experience are rare. It is possible that potential recruits are less available for employment in some territories, or that US venture capital companies were pursuing institutional roles that were not being replicated in Scotland.

Proposition 4: *Grafted experience is more likely to be a source of technological and market knowledge than internationalization knowledge.*

Finally, and surprisingly, in firms that were not large multinational enterprises, we found learning to access internal information was critical for three firms at specific times. To do this, these firms developed new management reporting and information systems

for the internal transfer of objective information that resided within the firm. While these were the larger firms of those studied, they are not the scale of businesses where we would expect problems of internal knowledge flow, as this has not been a knowledge need recognised before in smaller firms. It is, nonetheless, potentially a source of all three types of knowledge, especially for firms that have already achieved some substantial growth internationally. As firms internationalize, they need to ensure that they have processes for the internal transfer of information.

Proposition 5: *Firms that have achieved internationalization need to access internal information.*

There are, inevitably, limitations in the study which lead to caution about its findings. First, our case firms differed in terms of industry sector and in other aspects, which is important because the internationalization processes, problems, and knowledge needs of firms are inevitably firm, industry and context specific (Fernhaber et al., 2009; Saunders et al., 2009). Between-case differences were explored, noted and analysed in relation to the contexts, for example in relation to firm size and to the technological intensity of the firms. This highlighted internal information to be most relevant in larger and more internationalized firms, and that firms with poorer networks used them less, but no other associations could be drawn. The aim of the study, however, was not to analyse the effects of these contextual differences on internationalization, but to understand the knowledge needs and sources of firms that held internationalization as a priority, and that had sufficient challenges in pursuing them that they joined a government programme.

The firms studied were therefore not representative of internationalizing small firms. They were from one small open country, firms in other countries may encounter different challenges and different sources. They were internationalizing within the supportive framework of a government programme that was working to a specific agenda. These firms were eligible for and had chosen to use government agency support that other firms may be less inclined to use. The presence of this could have displaced support which otherwise would have been supplied from elsewhere. Finally, we have benefited from going outside IB theories to organizational learning theories to develop our theoretical categorizations for analysis. Other theoretical frameworks may have indicated different

categorizations; and might present possibilities for further enquiry.

Conclusions

Research on the role of knowledge acquisition in the internationalization of firms often fails to clearly distinguish the types of knowledge involved, and pays little attention to where it comes from, other than direct experience or from networks (Autio et al., 2000; Autio, 2005 and Autio et al., 2010; Eriksson et al., 1997; Freeman et al., 2010). We propose a concrete research framework that links types of knowledge and its sources for the first time. By combining IP, INV and organizational learning theory within our research framework, we are sensitive to the potential for a much greater range of types and sources of knowledge for smaller firm internationalization than suggested by previous research. Close study of the case firms' internationalization over several years offered an analysis of the inter-relationship between the information content of the knowledge needed and its sources.

IP research focuses almost exclusively on the need to acquire knowledge experientially (Johanson & Vahlne, 2003), but this takes time and considerable effort (Forsgren, 2002). Internationalizing smaller firms' need for knowledge is great, but their ability to resource is often limited, so they need to use both external and internal sources (Autio et al., 2010; Fernhaber et al., 2009). We suggest that external knowledge sources are especially important for internationalizing firms with limited experience (Casillas et al., 2009; Cohen & Levinthal, 1990; Fernhaber et al., 2009; Prashantham & Young, 2011).

The interactivity over time required to learn from others can affect its sources (Fernhaber et al., 2009); this study has found different sources of knowledge to be valuable for different types of knowledge. Internationalization knowledge is critical for internationalizing smaller firms, and this has rarely been noted before (Eriksson et al., 1997). Being transferrable from market to market, firms can acquire it from the experience of others. But it is also highly firm specific and requires a great deal of proactive involvement to integrate. Those who provide it need to be able to work with the learning firm over a period of time, so it cannot readily be sourced from network relationships. Recruitment can be a useful source of technological and market knowledge,

but it is difficult for smaller firms to recruit experienced international managers who can offer internationalization knowledge. In the absence of other sources, government advisors and consultants can provide this knowledge.

A key lesson for management is that the internationalization knowledge they need may be beyond the understanding of the current management team, and cannot be regarded only as a by-product of the firm's current international work. Firms need to recognise what they don't know and to develop learning processes and an organisational learning culture to address the gaps. In this activity, government programmes can help firms to recognise their internationalization learning needs, acquire new knowledge, and develop the formal and informal knowledge management systems and processes that support internationalization.

Further research might investigate how internationalizing smaller firms develop international business learning into capabilities to internationalize, and the role of internationalization knowledge in that process. For example, this study identified the importance of access to internal information within internationalizing firms; future research could examine the processes used for assimilating that knowledge. The sources used by the firms in this study were inevitably affected by their particular geographical and institutional contexts; research might explore how different contexts would result in different knowledge needs, types and sources.

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Appendix: International Sales

Year	2003			2004			2005		
Firm	Sales £m	Int. sales £m	IS %	Sales £m	Int. sales £m	IS %	Sales £m	Int. sales £m	IS %
A	2.5	1.7	67	1.9	*		2.2	*	
B	1.0	na		1.5	na		2.0	na	
C	na			na			na		
D	12.0	8.0	67	18.0	11	61	34.5	22.0	64
E	42.0	7.5	18	38.0	20.0	53	32.2	12.0	37
F	25.0	14.5	58	13.0	5.9	45	14.4	5.7	40
G	37.0	19.0	51	40.0	20.5	51	40.5	25.0	62
H	3.6	3.0	83	8.9	7.8	87	16.6	15.6	94
I	9.0	1.0	11	6.2	1.0	16	7.7	*1.0	13
J	5.2	3.6	*70	7.4	5.3	72	9.8	7.7	79

IS% - Percentage of international to total sales

Na - not applicable

* Unavailable

	Internal source of knowledge	External source of knowledge
Experiential knowledge	i. Direct experience	ii. Indirect experience: vicarious learning & grafting
Objective knowledge	iv. Internal information	iii. External search

Figure 1: New knowledge acquisition sources

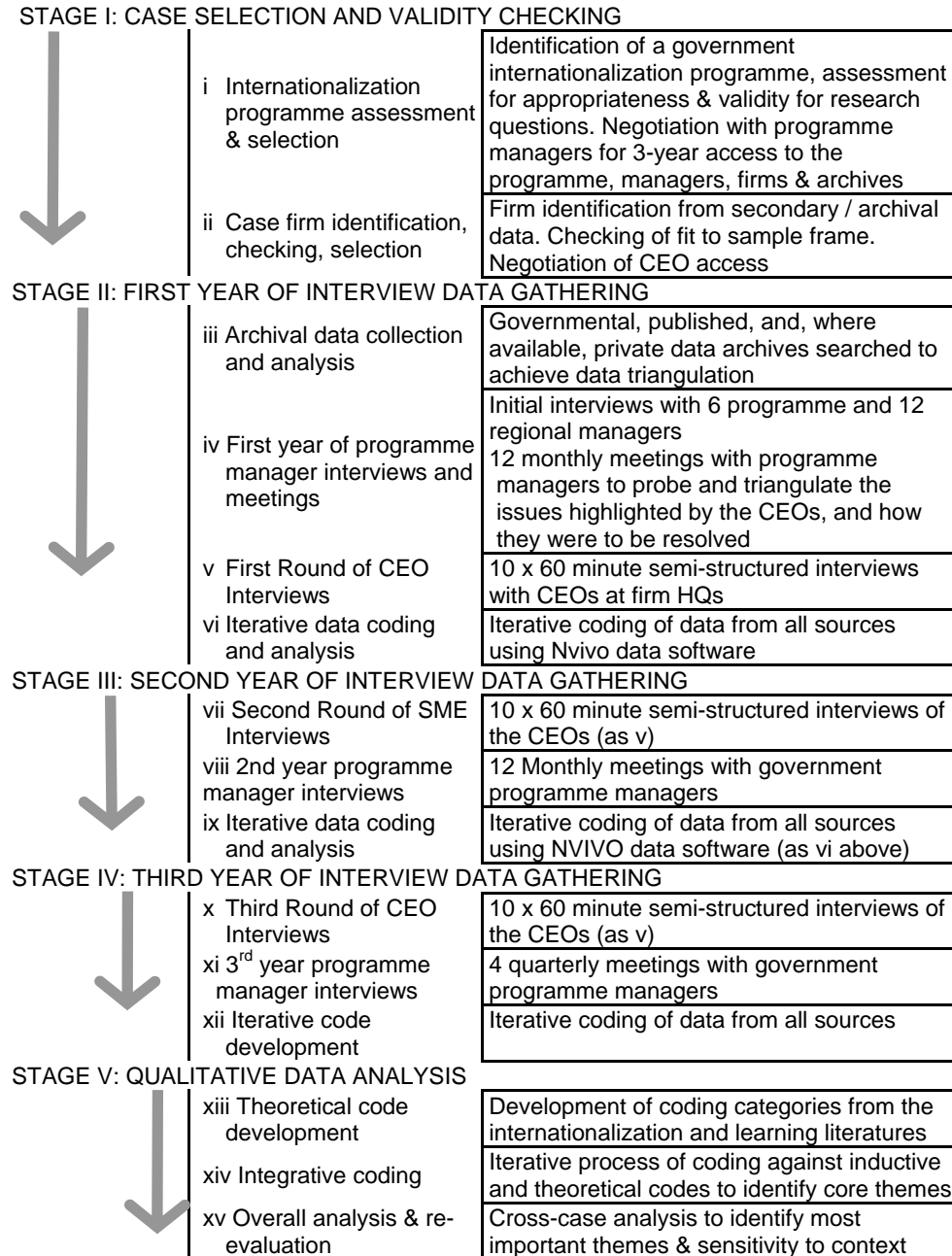


Figure 2: The research design

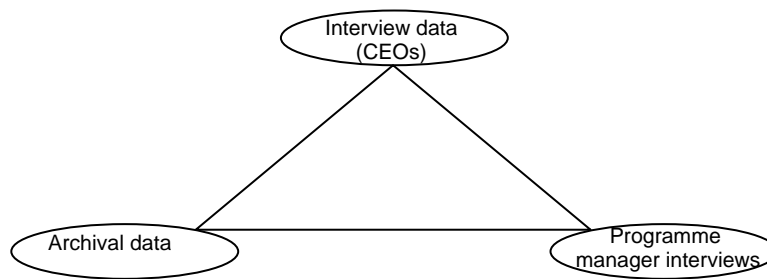


Figure 3: Data-data triangulation (Stages II and III)

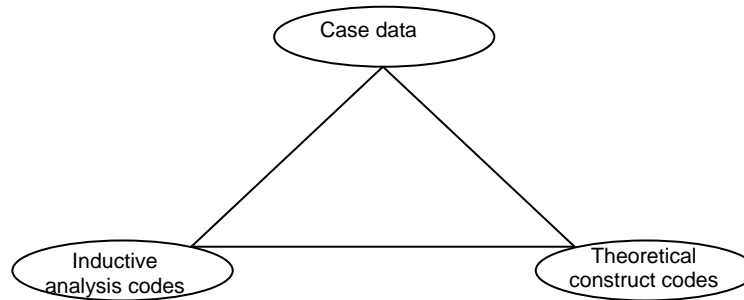


Figure 4: Data-theory triangulation (Stage V)

Table 1: The case firms – Descriptive data

<i>Firm</i>	<i>Business type</i>	<i>Start year</i>	<i>Internationalization intention</i>
A	Education provider	2002	University spinout to develop existing education provision with overseas partners. Enter new markets overseas in the Middle and Far East.
B	Aviation software development	2001	Spinout from existing firm to internationalize new idea for airport management. Initial plan to enter US market.
C	Clothing manufacturer	2005	Design innovative electronic garment. Transfer manufacturing abroad.
D	Alloy processing manufacturer	1996	Expand manufacturing and sales in the US and open sales office. Start manufacturing in Europe.
E	HiFi manufacturer	1973	Expand in existing overseas markets. Improve sales and marketing performance.
F	Oil and gas product manufacturer	1979	Growth plan to create overseas regional Hubs to service existing markets. Develop new product.
G	Clothing manufacturer	1960	Expand retail, wholesale and franchising in existing overseas markets. Establish US subsidiary.
H	Optical eye testing technology/manufacture	1993	Market penetration in the US and Canada. Launch new products worldwide. New market entry in Germany and other European countries.
I	Digital media technology	1991	Change business model to supply components rather than full system products. Research and design develop overseas manufacturing and licensing.
J	Biotechnology – diagnostic testing products	1987	Sold off auto-immune part of business to focus on new product development. Reduce use of distributors for overseas markets to focus on selling to OEMs in the US and Europe.

Table 2: The knowledge needs for the case firms

Firm	Technological knowledge	Market knowledge	Internationalization knowledge
A	NONE	Recruitment of partners & develop sales ops	Developing organizational structure at home, and business model (recruit partners), to enable internationalization
B	Collaborative development of new product for overseas market	Market entry into the US & international markets information	The process of building partnerships in the US; Legal aspects of partnerships & product liability
C	Application of technology in new product development	Consumer research; importing/exporting information	Developing relationships; Understanding cultures of partners; Product protection through patenting
D	NONE	Customer research; information on regulations	Creating new management structure to support international operations
E	Developing new technology intensive products	NONE	Creating new management structure to support international operations
F	NONE	NONE	International project management; International MIS; Creating new management structure to support international operations
G	NONE	NONE	International franchising; Web design; Improving international distribution system; Creating new management structure for international operations
H	New product development for international markets	Customer research, cultural knowledge and legal regulations	Restructuring overseas operations; Head-office administration to support international activities
I	Product design for international market	Knowledge of customers & suppliers; capabilities for US market entry	New strategy and business model for international operations; Analytical tools
J	New technologies and their application to products	General industry market knowledge and sales and marketing capabilities	Staffing, structures and HRM practices to support international operations

Table 3: Sources of knowledge within the case firms

Form	Technological knowledge	Market knowledge	Internationalization knowledge
Direct experience	Apply expertise to new international venture (B) CEO experience (C) Overseas visits (C) UK managers (E) Experienced staff (J)	CEO Experience (A, C) Partner experience (B) Overseas visits (D, I)	CEO experience (A, H) Chairman as mentor (E) Overseas visits (B, F) Employees/ managers (F, G) Existing management (I) Internal project teams (J)
Vicarious experience	UK partner (B) Suppliers, industry, (C) Customers (E, J) Government (E) GCDP consultants (I)	Government (A, B, C, E, J) Overseas Government agencies (D) Government networks (C) Consultants (E) Conferences (J)	Government (A, B, D, E, G, I) Lawyers (B) GCDP Consultants (C, E, G, I) HRM consultants (J)
Grafted experience	Recruited director (H) Recruited staff (J)	Recruited sales team (A) Recruited director (B) Recruited manager (H) New chairman (I) Recruited marketing staff (J)	New non executive director (F)
External search	Patenting, published reports (C)	Market research (C, H)	Seminars, books (C)
Internal information	Product knowledge management system (E)	Marketing information system (F)	Product knowledge management system (E) Marketing info. system (F) Management info. system (H)