

A network diagram with orange nodes and black lines on a grey background. The nodes are arranged in a roughly circular pattern, with lines connecting them to form a network. The nodes are slightly blurred, and the lines are thin and black.

Role of knowledge network ties in internationalization

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The focus of this presentation is on




- Delineating
 - the characteristics, development pattern and functions of the key network ties facilitating the internationalisation of ERISFs.
- Modelling
 - the key network tie characteristics
 - interactions underpinning ERISF internationalisation

Interorganisational network ties

A complex network graph with numerous nodes and edges, representing interorganisational relationships. The nodes are small circles in various colors (red, blue, green) and are interconnected by a dense web of thin black lines. The background is a dark, textured grey.

- Networks as interconnected relationships
- Exchange relationships between firms
- Firms as part of an unbounded business network
- Internationalisation as a cumulative process



“Late starter” and “international amongst others firms”

- Operate in internationalised business networks
- They are more likely to be pulled into internationalisation by their business network counterparts.
- They are more likely to be specialised

Time required to build industrial network ties

- Johanson and Vahlne (2009)
 - business network relationships are built gradually as firms learn about each other's needs, resources, strategies and business contexts.
- ERISF studies present relationship building as an accelerated process (Coviello and Munro 1997; Coviello and Cox 2006; Han 2006).
- The importance of time in ERISFs is emphasised by Han (2006) when modelling the development of social capital in ERISF internationalisation.
- Weak ties are valued over strong ties because they are less resource intensive and can be formed and renewed at an accelerated pace (Han).

Entrepreneurship network theories in ERISF internationalisation

- ERISF network analysis should start at the point of conception of the firm (Coviello and Cox 2006).
- The entrepreneur/entrepreneurial team is given a central role through
 - the recognition of the importance of the entrepreneur's egocentric personal network ties (Larson and Starr 1993; O'Donnell et al. 2001) and
 - the totality of the firm's network relationships in the founding process of the firm (Larson and Starr 1993; Hite and Hesterly 2001)

Empirical evidence is contradictory

- Interpersonal ties (O'Donnell et al. 2001; Sharma and Blomstermo 2003; Harris and Wheeler 2005), are seen as important for the early stages of ERISF network evolution.
- Han (2006) proposes that the network tie set enabling ERISF internationalisation is dominated by weak interpersonal ties .
- Weak ties function as a source of information and finance, which contradicts Harris and Wheeler who argue that strong interpersonal ties are valued
- The identification of the characteristics of the most effective ties for early internationalisation of young firms (Han 2006; Ellis 2012) represents a contested area in the IE network literature.

Knowledge-based network theories in ERISF internationalisation - NTBFs

- NTBFs are embedded in technological innovation systems where they develop as part of a technological articulation processes (Autio 1997).
- ERISFs are defined as bundles of technological resources
- Knowledge is considered to be important for the NTBF, which is defined by the firm's dependence on the knowledge inherent in its activities and outputs as a source of competitive advantage (Autio et al. 2000).
- Knowledge-based relationships are linked to knowledge-related outcomes
- Knowledge pools are made up of clusters of individuals who share the same knowledge expertise, in which strong interpersonal ties are superior to weak interpersonal ties because they can transfer complex tacit knowledge.

Method

- The study uses a multiple case study approach
- Case studies are suitable for exploratory, descriptive and explanatory research (Ghauri 2004).
- Eisenhardt (1989) advocates the use of case study approaches in research areas which are aligned towards theory building.
- Case studies are selected on the basis of their ability to address areas in which research is yet to crystallise and distil the key concepts delineating the processes of the studied phenomenon from a myriad of different perspectives.

Case selection

- Following Yin (2003), case selection has been guided by the replication logic.
- Cases have been deliberately selected in accordance with their potential to provide consistent results across the cases (literal replication).
- Ten cases have been selected with the aim to focus on high technology sectors in which a critical mass of firms appear to be coalescing
- The firms were categorised as young on the basis of the firm's foundation date (Jones, 1999).
- The maximum age of the firm was set at 10 years. The firms are new (5 years and less) and young (6 to 10 years) using the categorisations employed by Jones (1999).

Data collection

- The interview protocol was divided into prior experience, product and service development, the internationalisation process, and the role of the domestic market.
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- This method enables network relationships and networking activities to emerge from the interviewing process, without the entrepreneur necessarily making the effort to identify specific relationships.
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- Following Sobh and Perry (2006), each section of the interview protocol begins with open questions, followed by closed probe questions, and where necessary recognised measurement scales.
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- Each interview was conducted face to face and lasted between 90 and 150 minutes.

Data analysis

- Whilst this research moves away from employing conventional guidelines (Tesch 1990), structured steps suggested by Miles and Huberman (1994), Perry and Coote (1994) and Ghauri (2004) are used to analyse the data.
 - The first stage of analysis involved the development of case descriptions (Yin 1981; Ghauri 2004).
 - The second stage involved categorisation and coding of data. Coding was done using Nvivo, where both upfront coding and coding based on the codes that emerged from the research, have been used.
 - In the third stage, pattern matching and rival explanation approach was used to develop the themes and sub-themes emerging from the data.

Functions of interorganisational relationships: Knowledge Creation

- Knowledge creation takes the form of joint collaborative activities with the case firm's
 - Clients [S1, S2, S3, B2, B3 and B4];
 - Competitors [B4];
 - Co distributors [S1].
- These are evidenced in the publication of research papers [B3] and new ideas, [S1, S2, S3, S4, S5]; and the creation of new versions of the original product [B4].
- The software firms' knowledge creation increases the interoperability of the software/system across a range of proprietary and non proprietary technology platforms.
- The knowledge creating activities of biotechnology firms and their network partners validate the firm's technology.

Knowledge transfer activities

- Software firms engage in knowledge transfer activities which are aligned to the physical [S1, S5] or web based deployment [S2, S3, S6] of their software.
- Knowledge transfer activities include the licensing of components of the firm's technology to their network partners [S1, S2, S3 and B3] and the provision of product knowledge-related support offered through distributor/sales representatives [B1] or conference attendance [B4).

Knowledge adoption activities

- Take the form of technology acquisition of software source codes or physical hardware components [S4 and S6], which are then integrated into the case firm's technology.
- Based on the range and type of knowledge-related activities carried out within their interorganisational relationships, the case firms internationalise through a combination of inward, outward and cooperative cross border links.
- These cross border links range from international research and development collaborations [S1, B2, B3, B4] to the deployment of the firm's software in MNE subsidiary and foreign client network [S1, S2, S3, S6], and international technology licensing agreements [S1, S2, S3, S6, B3]

Tracing the origins of the case firms' internationalisation relationships

- The founder's and top management team member's pre-firm establishment experiences are in specialist technical [B1; B2; B3; B4; S2; S3; S4; S6] and/or sector specific internationalised industrial market knowledge pools [S6; S5; S6; B1; B3] that overlap with the business sector of the case firm.
- The 'depth' of knowledge is linked to prior organisational positions held by the founders, the founder's educational background, and cumulative time in specific technical sectors.
- Prior interpersonal contacts are embedded in specialist technical and industrial market knowledge communities [S1; S3; S4; S5; S6; B3].
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- By operating within the same knowledge pools these interpersonal contacts share similar educational and work-related experiences with the firms' founders (Reagans and McEvily 2003) and are thus characterised as knowledge-based interpersonal ties.

Pattern of network tie development

- Collectively, the findings show that the case firms establish hierarchical knowledge-based interpersonal ties by
 - activating their prior contacts [S1, S4, S5, B1] or
 - establishing new contacts [B1, B2, B3, B4, S1, S6] with influential employees who work for the organisations where they are seeking to establish a formal relationship.
- In comparison to the biotechnology firms, as software firms progress with their internationalisation activities the knowledge pools from which the software firm establishes their initial network ties increases [S1, S2, S3, S4, S6].
- Those firms, which have established relationships with MNEs and dominant foreign-based firms, seek to penetrate the network partner's intraorganisational network [S1, S2, S3].

The founder's pre-firm knowledge pools

- Important in establishing the source of the initial interpersonal network ties, which form the basis for the establishment of the interorganisational ties that lead to the case firms' cross border activities.
- As the software ERISFs internationalise, the range of knowledge pools for sourcing interpersonal contacts extends beyond the initial pre-firm internationalisation knowledge pool.
- In line with Reagan and McEvily (2003, p.240) the founders' ability to convey 'complex ideas to heterogeneous audiences' increases.
- This is shown by an expansion into different industrial and technology markets and the search for "influential contacts" outside the firms' initial knowledge pools.



Noting that

- ERISF notion of “international markets” is not related to the geographical or spatial differences between markets.
- Rather, they are seen as availability and accessibility of “influential” or “champion” network relationships that can enable new international entrepreneurial opportunity development (Masango and Marinova 2012) for knowledge transfer and knowledge creation.
- The interview data do not show liability of foreignness (Zaheer 1995; Johanson and Vahlne 2009) as being important in ERISFs internationalisation.

Concluding remarks

- The activation of initial interpersonal network ties is facilitated by the common technical knowledge bases and sector specific industrial market knowledge of ERISF founders situated in knowledge pools.
- The founders have occupied high level positions within their prior work experiences and are more likely to have been privy to forming prior pre-firm establishment contacts with employees who have also worked in similar high level positions.
- Thus ERISFs seek to activate or establish knowledge-based interpersonal ties with influential contacts/champions.
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- This contradicts Han (2006) who views hierarchical networks tie formation as resource intensive and therefore unsuitable for ERISF internationalisation.
- In contrast to Sharma and Blomstermo (2003) and Han (2006), this study proposes an initial and prior interpersonal network tie set, which is composed of predominantly strong knowledge-based contacts.

Concluding remarks

- Network tie development shows the importance of knowledge as the foundation of ERISF network ties, which reminds of the importance of ownership advantages in MNE's internationalisation (Dunning 2006).
- However, the interview data draw attention to the mechanism through which network ties develop. The network ties development reminds to some extent of the Linkages, Leveraging and Learning (LLL) paradigm (Mathews 2006), but offers new perspectives.
- ERISFs have a technological advantage, but their global orientation is also a source of advantage as the opportunities for expansion are likely to be found in the global market rather than in their domestic environment. They develop their network ties initially in existing knowledge pools and extend their network ties into new knowledge pools so that limited resources can be leveraged.

Finally

- The firms we have studied are growth oriented.
- They have developed their core technology constantly enhancing it by embracing continuous international entrepreneurial opportunity development straddling a range of industrial markets.
- The range of industrial clients and technology partners, to which the firm seeks to provide its software technology platform, is unbounded.
- Biotech firms have globally concentrated markets and their technology may not be extendable to a wide range of technological and industrial markets.
- Hence, ERISFs develop as part of a technology articulation system rather than in the linear growth models, which have been adopted within the ERISFs literature to explain network dynamics