

How innovation intermediaries support start-up internationalization: a relational proximity perspective

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Abstract

Purpose: This paper examines how innovation intermediary activities increase relational proximity between start-ups and foreign partners to support internationalization

Methodology: The paper applies a case study methodology to examine an international network of innovation intermediaries in the resources sector. Interviews were conducted with fifty-nine start-up, corporate and intermediary managers in four countries, supplemented by secondary data. A two-stage analysis process was performed to first identify activities relating to start-up internationalization and then apply a theoretically derived coding framework based on five proximity dimensions.

Findings: The case identifies several innovation intermediary activities, which facilitate relationship development between start-ups and partners in new markets. Findings outline how activities increase relational proximity across different dimensions, while also indicating a number of interrelations between dimensions.

Originality/value: This paper establishes interdisciplinary bridges between business network, international business and economic geography perspectives. It provides a valuable empirical foundation for relational proximity, demonstrating its application to understanding start-up internationalization and its influence by intermediary-led activities.

Keywords: Start-up Internationalization, Innovation Intermediaries, Relational Proximity, B2B Relationships

1. Introduction

Within a few years of being founded, a start-up from one of the world's most isolated cities developed and commercialized a hi-tech product in an industry their founders had no prior experience in and attracted large U.S clients with whom they had no prior relationship. The fact that this is not a unique case for many business-to-business (B2B) start-ups today is representative of the fast paced, globalized world they now participate in (Sepulveda & Gabrielsson, 2013). However, this oversimplified example ignores the numerous intermediaries providing essential contributions for start-up internationalization to occur. Many start-ups now develop relationships with partners in new markets by participating in activities facilitated by incubators and innovation hubs around the world, yet our understanding of these relational processes or intermediary roles remains limited (Blackburne & Buckley, 2019).

Business network development is recognized as a critical factor in new venture creation and performance, with numerous studies examining the processes through which start-ups form relationships with other firms (Hoang & Antoncic, 2003; Slotte-Kock & Coviello, 2010). In recognition of this, many innovation support organizations focus on network development as part of their core value proposition to start-ups (Cantù et al., 2015; Bruneel et al., 2011). To date, most research on intermediary support for start-up networks has focused at the micro level, such as within incubators (Schwartz & Hornych, 2010), or at the local ecosystem level (Oh et al., 2016). However, this does not reflect the international orientation of many early-stage start-up relationships, nor the growing cooperation between intermediaries around the world. There is a need to connect the relationship development activities of innovation intermediaries to theoretical understandings of new venture internationalization, which has long acknowledged the role of business networks in overcoming market entry challenges (Knight & Cavusgil, 1996; Sharma & Blomstermo, 2003). These intermediary-led activities are typically seen as internally orientated within innovation ecosystems, however based on international links, they potentially offer support to incoming and outgoing start-ups in overcoming challenges faced in new markets (Zahra, 2005).

This paper focuses on the multiple activities performed by innovation intermediaries which facilitate the development of international business relationships. To understand how network processes are influenced, Boschma's (2005) proximity framework is adopted, covering geographic, social, cognitive, organizational and institutional dimensions of relational proximity. Relational proximity has been shown to be a determinant of business cooperation in innovation networks, however it has yet to be applied within start-up or internationalization contexts (Nicholson et al., 2017). There also remains a lack of clarity as to how proximity dimensions are tangibly represented or change through relational activities (Balland et al., 2015; Mason & Chakrabarti, 2017). This paper establishes new interdisciplinary bridges between business networks, international business and economic geography perspectives, thereby providing novel theoretical implications for start-up internationalization and the role of innovation intermediaries. Specifically, we address the following research question: *How do innovation intermediary activities increase relational proximity between start-ups and foreign partners to support start-up internationalization?*

The paper is organized as follows. First, an examination of literature related to start-up internationalization, network processes, innovation intermediaries and proximity dimensions is presented, providing a theoretical framework for the study. The methodological approach is then outlined, followed by a findings section organized around a proximity framework. Finally, implications for theory, practice, and future research are discussed.

2. Literature

While the drivers of company internationalization have been extensively studied over the past decades, these understandings do not necessarily apply to start-ups (Cannone & Ughetto, 2014; Costa et al., 2017). This is especially true for contemporary start-ups operating in hi-tech or digital spaces whereby internationalization is often critical to access partners to develop their innovations (Yang & Gabrielsson, 2017). Many new firms operate internationally at very early stages without substantial accumulated experience, resources or knowledge (Knight & Cavusgil, 1996). However, while entrepreneurial drive is often considered a key advantage for start-ups in innovation contexts, they face multiple barriers in doing business internationally.

2.1 Start-up Internationalization

Firms' experiences with international expansion during their start-up phases stem from a mix of factors at individual, firm and network levels (Cannone & Ughetto, 2014). Much of the entrepreneurship literature highlights the importance of individual founder characteristics in exploring international opportunities (Terjesen et al., 2016), such as prior experiences or existing relationships (Zucchella et al., 2007; Debrulle & Maes, 2015). Similarly, many start-ups proactively enter foreign markets to access knowledge, resources or commercial opportunities from the limited pool of customers or collaborators (Efrat & Shoham, 2012; Yang & Gabrielsson, 2017). Start-ups, even in pre-commercial stages, are heavily reliant on establishing business relationships and leveraging the capabilities of partners to support product development and initiate revenue (Ojala, 2009; Vasilchenko & Morrish 2011). Furthermore, certain macro factors such as digital platform developments, government ecosystem investment and dispersion of venture capital have influenced start-up growth trajectories (Startup Genome 2018).

In addition to standard market entry barriers, start-ups must simultaneously overcome liabilities related to their newness, smallness and foreignness (Zahra, 2005). Relatively new and inexperienced firms have limited contacts or prior interactions with network partners from which to leverage in demonstrating credibility and trustworthiness in the market (Sharma & Blomstermo, 2003). While start-up size is lauded for agility, it also suggests a lack of internal resources, which can impose time pressures to becoming financially viable and limit their scope for relationship-building activities in new markets (Westerlund et al., 2017). Foreign firms may struggle due to unfamiliarity with local cultural norms, values, systems and business practices, which restricts their ability to recognize and access local sources of knowledge or resources (Eden & Miller, 2004). A commonality across these liabilities is a lack of available relationships from which to draw upon for local market knowledge, resources, validation and legitimacy (Vasilchenko & Morrish, 2011; Cavusgil & Knight, 2015). The process of establishing suitable relationships is therefore an essential aspect in the start-up internationalization process and is regarded as a major predictor of survival and success in the market (Oviatt & McDougall, 2005). How start-ups develop and leverage relationships with competent foreign partners remains a key research topic (Cavusgil & Knight, 2015).

2.2 Role of relationships in start-up internationalization

Business network perspectives of internationalization highlight that firms establish positions in international markets through their exchange relationships (Johanson & Mattsson, 1986). Networking activities undertaken in the internationalization process have been categorized as either active, whereby networking is initiated and undertaken directly by the internationalizing actor, or passive, whereby the process is driven by initial foreign relationships, often the first international customer (Johanson & Mattsson, 1988). However, research focusing specifically on start-ups identifies that these firms internationalize faster, often skipping traditionally assumed stages (Cannone & Ughetto, 2014). Moreover, start-up internationalization is not only initiated through buyer-seller relationships, but can come

much earlier during product development stages with suppliers, investors and intermediaries (Oviatt & McDougal, 2005). Similarly, start-ups do not only rely on formal networks but can access valuable bridging ties through informal and mediated connections (Ojala, 2009). As such, boundary-spanning ties support access to trust-based social and business networks, thereby overcoming the various issues relating to entering new markets (Ellis, 2000).

Collaborative network relationships benefit internationalizing start-ups through the acquisition of new information, resources and complementary capabilities; trusted referrals; and reducing the time required to access information or develop exchange relationships (Sharma & Blomstermo, 2003; Chetty & Stangl, 2010; Zucchella et al., 2017). Business relationships in new markets are frequently identified as important sources of organizational learning and are considered critical for knowledge-intensive, hi-tech start-ups (Ojala, 2009). Accessing relevant knowledge in foreign markets influences opportunity recognition and development of the value offering, thereby shaping the start-up's emergent business model through initial interactions (Hohenthal et al., 2014). Within product development contexts involving highly specialized and disruptive offerings, close cooperation at early stages with collaborators and customers is seen as necessary for success (Ojala, 2009; Chetty & Stangl, 2010).

While establishing collaborative relationships with actors embedded in new markets might be critically important to start-ups, such relationships are considered harder to establish and maintain over time. Perceived and realized differences between firms inhibit the development of the mutual understandings and trust required for effective relationships (Johanson & Mattsson, 1988), while also undermining the learning processes which lead to stronger partnerships (Guercini & Runfola, 2010). The internationalization liabilities specific to start-ups can further exacerbate power asymmetries with more established, local firms (Oukes et al., 2017). Start-ups seeking to engage with foreign partners must therefore identify approaches for reducing the impacts of contextual differences and improve mutual understanding over time.

2.3 The Relevance of Relational Proximity Dimensions

Most international business research conceptualizes the various relational differences between partners in terms of perceived and actual distances between firms (Johanson & Mattsson, 1988). Typically, this relates to the broader market level, as countries are described as psychologically distant based on various linguistic, political, cultural and educational factors (Johanson & Wiedersheim-Paul, 1975). This logic proceeds that the more distant the new market is for an internationalizing firm, the harder it will be to develop collaborative relationships (Oviatt & McDougall 2005). However, a shortcoming of considering market-level distances is that it only provides a limited lens through which to understand international business relationships or inform approaches to increase proximity between firms (Guercini & Runfola, 2010). An alternative approach suitable for framing dyadic and network interactions, is to consider the relative relational proximity between firms (Nicholson, et al., 2017)

This paper adopts a broad conceptualization of relational proximity encompassing various aspects characterizing the spaces between firms in business networks (Cantù, 2017). Actors that share certain similarities are more likely to establish collaborative relationships and find exchange easier due to easier communication and learning processes (Cantù et al., 2015). The likelihood of inter-organizational collaboration is not only influenced by geographic closeness but also proximity across a number of dimensions (Geldes et al., 2017). This perspective is well established in the innovation and economic geography literature, whereby innovation is considered a collective process that can be facilitated by organizational proximity (Balland et al., 2015; Nicholson et al., 2017). In contrast, research on firm internationalization or start-ups' network development has yet to embrace a dynamic perspective of organizational proximity as a way to understand how firms become embedded

in new markets. Boschma (2005) proposes five dimensions of proximity, developed from the French School of Proximity Dynamics and adapted for an innovation context. Table 1 outlines each of these dimensions and provides examples of related research from different business network perspectives.

Table 1. Proximity Dimensions

Dimension	Description	Related Business Network Perspectives
Geographic	Spatial dimension of proximity which directly refers to physical distance between organizations	Porter (1998): clusters as geographic concentrations of interconnected firms in a particular industry. Agrawal et al (2014): regional innovation dynamism and growth associated with structure of small firms and large corporate labs.
Social	Considers the relational distance between organizations based on degree of trust and shared knowledge embedded at the micro-level	Uzzi (1997): social embeddedness of economic relationships. Ellis (2000): foreign market opportunities more likely to be sourced from inter-personal ties than market research.
Cognitive	Degree to which companies have common technological and market knowledge bases and shared references to facilitate interaction	Cantù (2010): cognitive proximity needed to support spatial relations in innovation contexts. Welch & Wilkinson (2002): shared cognition shaped relationship and network development
Organizational	Interdependencies between organizations which contribute to compatible routines and systems that facilitate knowledge flows	Lind (2015): diverse nested firm goals align with broader cooperative project goals and relate to resource development. Zollo et al., (2002): inter-firm coordination and cooperation routines enhance the effectiveness of collaborative alliances.
Institutional	Considers the macro-level context of norms, rules and laws that provide stable conditions for ongoing interaction	Brito (2001): collective inter-organizational actions underpinned by institutional context. Vargo et al., (2015): institutionalization is a central process of innovation in ecosystems.

2.4 Approaches to Increasing Relational Proximity

In taking a dynamic perspective of internationalization, we assume that proximity between international actors can be increased through certain activities. Increasing proximity across different dimensions facilitates relationship development and inter-organizational cooperation which then supports start-ups' entry into new foreign markets. Adopting Boschma's (2005) multi-dimensional proximity framework enables us to take a broader view of relationships that for example, considers how the bases for knowledge and resource exchange form. Within business innovation contexts, in which many start-ups operate, proximity is used as an informative predictor of a firms' ability to collaborate and their innovation performance (Crescenza et al., 2016). Business partners must share some degree of understanding

across different dimensions in order to communicate effectively and trust the other party will act in their mutual interest (Cantù, 2017).

The geographic dimension of proximity has clear implications for internationalization, as it permits direct contact between parties and can promote learning through the experiences of observing and interacting between a new entrant and local firms (Geldes et al., 2017). Spatial proximity between actors can facilitate increases in other forms of proximity, however, this may be difficult in the start-up context given resource constraints, while also being considered a neither necessary nor sufficient condition for relationship development (Boschma 2005). As Cantù (2010) explains, the geographic proximity of firms may help to initiate relationships but ultimately ongoing engagement is supported by the closeness of their technologies, cognition and vision. Other forms of proximity are also seen to be interrelated, for example, relatively higher trust through social or institutional proximity can support information exchange to increase cognitive and organizational proximity (Crescenzia et al., 2016; Cantù, 2017).

Certain activities aiming to increase proximity can be firm led, however within the context of start-ups' lack of resources and network embeddedness, they are more likely to participate in activities initiated by others (Harris & Wheeler 2005). Start-ups may therefore turn to activities initiated by larger incumbent firms or alternatively third parties that are seeking to support innovation or trade outcomes. Innovation partnerships between start-ups and larger firms are only recently becoming more prevalent, as large firms identify new approaches to overcoming engagement issues relating to their size and bureaucratic style (Wouters et al., 2018). If start-ups are unable to directly engage in suitable bridging relationships to access new markets, non-economic intermediaries, either in the home or target market, may serve as a conduit to establishing new relationships (Ojala, 2009; Ellis, 2000).

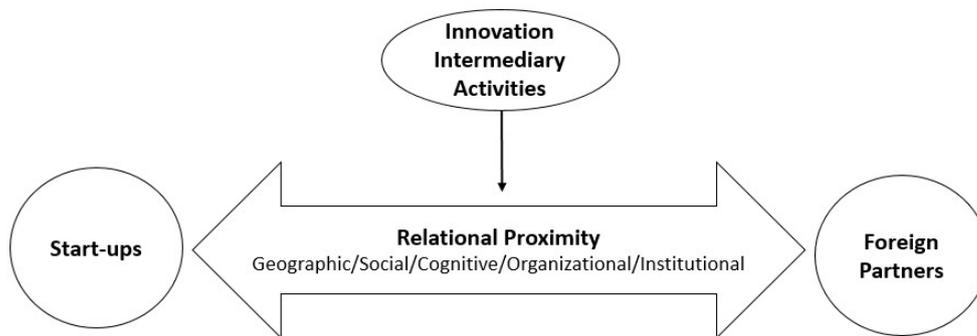
This study focuses specifically on the role of intermediaries in increasing firm proximity given their perceived importance for brokering relationships in innovation and international business contexts (Howells, 2006). Close support from intermediaries in the destination market itself has been shown to be effective in overcoming internationalization challenges in distant markets (Blackburn & Buckley, 2019). Specifically within the start-up context, we focus on innovation intermediaries, which include various types of incubators and innovation hubs aimed at supporting innovation through facilitating knowledge and technology sharing between diverse actors (Bruneel et al., 2012). More tangibly, innovation intermediaries add value by drawing actors together (Spigel, 2017); establishing and mediating collaborative relationships (De Silva et al., 2018); and fostering shared values, trust and risk taking which support exchange (Bergek & Norman, 2008; Scillitoe & Chakrabarti, 2010).

Many intermediaries seek to provide a space for inter-firm networking and learning through their activities, recognizing the value of direct interaction between participants without the constant need for mediation (Mele & Russo-Spena 2015). Through their portfolio of activities, intermediaries can connect start-ups to collaborative actors with relevant experience, competencies and resources to help them enter new markets (Klerkx & Aarts, 2013). While their direct influence on internationalization is underexplored, Blackburne and Buckley (2019) found that networks built and maintained by startups would have been slower without the availability of incubation services within the foreign market.

2.5 Conceptual Framework

This study applies a relational proximity framework to investigating the role of innovation intermediaries in start-up internationalization. In doing so, specific intermediary-led activities will be identified from the managerial perspectives of start-ups, partner firms and innovation intermediary organizations and analyzed within the proximity framework. This will provide insights as to how such activities influence relationship development between start-ups and

foreign partners by increasing relational proximity. This conceptual framework is presented in Figure 1.



3. Methodology

To develop a detailed understanding of complex international business networks, a qualitative case study approach was adopted. This follows on from similar research investigating the role of intermediaries in (Cantù et al., 2015; Bruneel et al., 2012) and allows for simultaneous consideration of multiple actor perceptions of the internationalization process (Dubois & Gadde, 2002; Halinen & Törnroos, 2005). Based on the dynamic focus of this research, the case method provides a way to structure changing processes, events and activities, in order to explore different theoretical perspectives (Halinen & Törnroos, 2005). This also provides new insight to complement recent research applying similar analytical frameworks from theoretical (Balland et al., 2015), quantitative (Geldes et al., 2017) and historical case (Mason & Chakrabarti, 2017) approaches.

The case study was framed around a single industry setting and developed based on a broad sample of interconnected organizations across four different countries. The decision to adopt a single network-level analysis rather than multiple organizational-level case studies was due to the interrelatedness of firms in the study and the desire to explore international inflows and outflows of start-ups (Halinen & Törnroos 2005). A partnership agreement between four innovation intermediaries was initially identified as the starting frame for data collection, from which a purposeful snowball sampling approach was taken to incorporate relevant perspectives of network relations (Klerkx & Aarts 2013). Data was primarily collected through in-depth semi-structured interviews with managers from start-ups, multinational mining, oil & gas operators, large service firms, government and innovation intermediaries. A total of 59 individuals were interviewed from 46 different organizations across locations in Australia (11), Chile (9), U.S.A (19) and Canada (20). Separate individual protocols were developed for start-up, corporate and intermediary managers to account for contextual differences, however all interviews covered topics related to understanding organizational activities, strategic goals, relationships with other actors and experiences with start-up internationalization. Based on participant preferences and availability, interviews were either conducted individually (38), in pairs (5) or small groups (2), between June and October, 2018. Triangulation occurred through secondary data analysis of reports, internal documents, websites and news publications.

The analysis process was undertaken through a two-stage approach, supported by NVivo 12 software. First, inductive open coding was performed to identify managerial perspectives of internationalization challenges specific to the start-up and industry context; interactions and relationships between organizations and interpretations of innovation intermediary roles and activities in home and host countries (Yin, 2018). Given the interconnected relations between organizations in the sample, different perspectives were able to be compared in order to develop a more thorough understanding of relationships and activities (Halinen & Törnroos, 2005). After generating initial codes, pattern matching across interviews through the constant comparison method enabled the refinement of codes (Eisenhardt, 1989). This produced a set of codes which referred to various aspects of relationships between start-ups and international partners (specific and general), and intermediary activities.

After a set of inductive codes was developed, a second analysis stage was undertaken utilizing proximity dimensions as an analytical framework. Boschma (2005) was used as the theoretical basis for defining each of the five proximity dimensions, as outlined in Table 1. This aligns with similar analyses of spatial-temporal proximity such as Mason & Chakrabarti (2017), whereby this analytical framework can be applied to scrutinize the data from a relational proximity perspective. Each of the initial coded excerpts were categorized into one or more proximity dimensions based on how each related to perceived changes in relational proximity between specific actors or local markets more generally. The outcomes of this analysis was reproduced into a data display, including a refined set of intermediary activities and the five proximity dimensions to highlight the intersections between the conceptual lens and link back to the corresponding data for further interrogation. A second coder was included to check for coding reliability, using the same definitions to organize codes into different categories and refine codes through further discussion in instances of disagreement (Saldaña, 2015).

4. Case Study Context

This study focuses upon the global mining, oil & gas sector, known henceforth as the resources sector. The sector produces essential inputs into most product supply chains, is valued at trillions of dollars annually and a significant contributor to many national economies and international trade. Given the nature of natural resource assets, operations are heavily concentrated in clusters around the world in close proximity to naturally occurring deposits. The sector is therefore geographically dispersed in pockets around the world, with large firms simultaneously operating in multiple markets where there are also high densities of smaller operators and service providers with relevant capabilities (Martinus & Sigler 2018).

Mining, oil and gas firms have been relatively slow to embrace open innovation approaches that have proven fruitful in other sectors, however technological change and market instability are now predicted to disrupt the sector over the next decade (VCI, 2017). Notwithstanding firm-specific operational and geographic differences, the resources sector as a whole share similar innovation challenges associated with their long-term investment profiles, high operational risks and conservative managerial cultures. These factors have contributed to comparatively low engagement with start-ups as a source of innovation (Bartos, 2007). With relatively little resources or established networks, many start-ups may therefore consider the low accessibility and scalability of this market as significant barriers to entry.

4.1 Innovation Intermediary Network

This study explores an international network of innovation intermediaries active in supporting start-ups in locations with prominent resource sectors (Table 2). These intermediaries vary in format, some with physical spaces for co-working, training and product development, while others deliver innovation services remotely or in temporary spaces to support activities.

Beyond start-ups, all but one intermediary had client or membership relationships with other established firms, while two also provided services to research partners. In addition, intermediaries had differing degrees of sectoral specializations, as a number exclusively supported resources sector firms while others were sector-agnostic, however all had some degree of involvement in the resource sector, often due to its prominence in their location.

While these intermediaries had various international connections, through reciprocal partnerships with other intermediaries or servicing MNCs, none had explicit objectives to promote start-up internationalization or exporting. This distinguished these actors from traditional export intermediaries such as government trade agencies, as activities were mostly directed at start-up business support and innovation diffusion. Furthermore, given the early stage of many start-ups, the business relationships being supported by intermediaries were not solely sales-focused but directed towards ideation, product development and seed funding.

Table 2. Description of Intermediaries

Code	Region	Intermediary Description	Members/Clients	Sector Focus
A	Western Australia	Innovation hub supporting member firms through variety of service offerings	Start-up, Corporate	Exclusively mining, oil & gas
B	Australia/ Global	Remote start-up accelerator and innovation service provider to corporate clients	Start-up, Corporate	Exclusively mining, oil & gas
C	Eastern Canada	Large innovation hub with diversified industry portfolio, closely tied to University research	Start-up, Corporate, Research	Diverse
D	Western Canada	Provincial government body supporting innovation through events and projects	Start-up, Corporate	Prominent mining focus
E	Northern Canada	Innovation hub supporting start-ups and large firms through variety of service offerings	Start-up, Corporate	Prominent mining focus
F	Northern Canada	Regional mining industry research institute assisting firms in development and commercialization of new technology	Start-up, Corporate, Research	Exclusively mining
G	Chile	National start-up incubator supporting local and international cohorts of firms with finance and services for a fixed term	Start-ups	Diverse
H	Chile	Innovation hub supporting start-ups, co-owned by Government and mining MNCs	Start-up, Corporate	Prominent mining focus
I	Chile/ Global	Innovation hub run by global management consultancy firm, connecting start-up led solutions to corporate client needs	Start-up, Corporate	Diverse
J	Western U.S.A	Venture capital division of MNC mining equipment supplier investing and advising start-ups around the world	Start-up, Corporate	Exclusively mining and construction
K	Southern U.S.A	Innovation hub supporting member firms through variety of service offerings	Start-up, Corporate	Prominent oil & gas focus

The innovation intermediaries included in this study operate independently of each other, however a number of formal and informal relationships exist between them, enabling varying degrees of cooperation. For example, an Australian intermediary has reciprocal partnership

agreements that allow start-up members to use international partners' facilities for a period while in that city. This form of relationship was characterized as 'soft landing' support, which eased the transition of foreign start-ups into new markets where they had no prior experience or relationships. In contrast, another Australian intermediary hosted hackathons in various locations around the world, typically in collaboration with local intermediaries, thereby establishing temporary relationships around specific events that occasionally continued through ongoing start-up referrals.

International interactions between innovation intermediaries were also driven by their MNC members and participation in government or industry sponsored programs. MNCs often sought to use local intermediaries as conduits for supporting innovation projects, particularly in identifying relevant start-ups and providing them facilities close to international operations. Similarly, government agencies and industry bodies sponsored international start-up competitions, trade missions and technology development projects that engaged with foreign intermediaries. There were also examples of start-ups independently seeking out international intermediaries to provide in-market support, sometimes offered at no cost for brief visits.

5. Exploring Intermediary Activities through a Proximity Framework

Intermediary activities were interpreted as influencing start-up internationalization by increasing proximity with potential partners in new markets. The following sections explore how activities increase relational proximity on different dimensions, first presented independently and then examining their interrelations.

5.1 Geographic

The physical presences of innovation intermediaries in different cities around the world enabled start-ups to directly interact with a variety of other firms. Certain cities were recognized as important locations for research, capital raising, product testing or accessing large customers. Given the geographically clustered nature of the resources sector, a limited number of cities provided access to critical start-up growth opportunities. Start-ups therefore sought to spend their limited available time in strategically important locations and many intermediaries were branded as offering temporary or ongoing assistance to incoming firms. As one intermediary manager described, their vicinity to numerous oil and gas operations was attractive to start-ups seeking to gain initial market traction through product testing and customer validation:

"We're a muddy boot company, I've heard that a lot recently, and its people that are actually on the ground implementing [new technologies]. This is the place to actually implement, and so I think if you're an early stage company and you want to be a part of that, you have to be in [City]" - Innovation Intermediary Industry Liaison (Southern U.S.A)

From the perspectives of start-ups, engaging with international innovation intermediaries represented a cost efficient avenue for entering new markets. Reciprocal partnership agreements with home intermediaries or free temporary co-location programs helped start-ups overcome the financial limitations of their small scale. In addition, given a key priority for entering new markets was establishing relationships, start-ups could leverage existing linkages between intermediaries, allowing for more efficient use of time. Many intermediary events brought together large numbers of participating resource sector firms, creating a high-density cluster of relevant partners for start-ups to interact. This provided start-ups market exposure in an efficient manner, as demonstrated in the following example:

"We have open pitch practice so people can come and get feedback on their pitch from their peers, all the way up to demo day where people are actually pitching in front of an audience

of 150 people, with investors and a lot of exposure” - Innovation Intermediary Community Manager (Southern U.S.A)

Physical proximity was perceived as important in undertaking many of intermediary activities designed to support start-ups, such as educational workshops or prototype development, which were typically delivered face-to-face. Many intermediary-facilitated activities were actually delivered by other firms in the industry with relevant expertise, thereby providing an additional networking opportunity for participating start-ups. Participants often described distance as a barrier to many start-ups establishing and maintaining relationships with partners in this sector, with some considering physical market presence to be essential:

“I think the practical reality is helping start-ups is a contact sport, it's hard to do from a distance. With bigger companies we might be able to but if you're a sub 2 million dollar company and we're trying to help you, you can do some stuff over the phone, you can do some stuff remotely but you kind of need to meet.” - Innovation Intermediary Director (Eastern Canada)

5.2 Social

Many intermediary activities emphasized network development and saw social relations between start-ups and larger firms as key outcomes. This was considered particularly important in this sector, given the common perception that many firms are ‘closed’ and ‘non-collaborative’, with a preference for maintaining the status quo in terms of innovation through existing contracting relationships. Such an environment was considered a barrier for start-ups, as many found it difficult to identify and engage with relevant managers within MNCs that could provide the necessary advice or advocacy for product development and commercialization. Certain intermediary-run networking events sought to specifically address this issue, such as curated, invitation-only sessions at large conferences where start-ups could be introduced to key decision makers from international resources companies and investment firms:

“We brought some of those tech companies in, trying to get those folks to talk to each other and organically find a way [...] to create that space with the investment community so that those little guys can show up and just talk to the 18 people that they couldn't [otherwise]. There's no way for them to go on their own and fund a trip like that and get in front of the people, they don't even know who they are” – Intermediary Director (Western Canada)

Lack of industry connections was a particularly large challenge for foreign start-ups that had no prior work experience or personal relationships in a new market. This was exacerbated by what respondents referred to as ‘industry fragmentation’, suggesting that start-ups were unable to leverage established relationships with the same MNC clients at different locations due to the relative autonomy of local managers. Respondents considered this a major barrier to start-up scalability and innovation diffusion, highlighting the need for initiatives to broker relationships across different markets:

“What [U.S Intermediary Manager] did is introduce us to a lot of different people in the US and in Australia, [...] and now we're still talking to these guys, we have business proposals in place. We haven't started any work yet, but it's just from knowing [Australian Intermediary Manager], being a [Australian Intermediary] member, going to San Francisco, now we've got access, we know who the guys are, we've been talking. We went there a couple of times already, they know what we are doing, if we find an opportunity to package a pilot or proof-of-concept we'll actually do it” - Start-up Founder (Australia)

Many intermediaries included informal networking components into their activities as a way to increase socialization between diverse companies, given the notoriously closed industry culture. A common theme across different locations was the need to develop local

'innovation communities' whereby companies had a place to openly exchange knowledge and advice for the collective benefit of the sector. Many respondents recognized the value of intermediary efforts in this regard, providing them access to communities with common interests and expertise around the world.

5.3 Cognitive

Many intermediary initiatives promoted the commercial opportunities available in the resources sector as a way to attract hi-tech start-ups with potential solutions but lacking industry experience. The diversity in technical backgrounds between corporate managers and start-up founders also presented a challenge, often leading to misunderstandings of partner requirements or commercial applications of new technologies. Intermediaries played a central role in educating both start-up and corporate managers, particularly focused on developing mutual understanding of each other's strengths and limitations, as a way to support more effective engagement. Some activities also specifically supported foreign start-ups before entering the market, as online communications or workshops offered insights into local partner needs:

"Our corporate events, where we're collaborating with corporate partners, maybe at a lunch where they're doing a fire side chat and their CIO [Chief Innovation Officer] is talking about something that they're working on and it brings people in just to learn about what this company is doing and providing thought leadership. What I know we're aiming to do is hopefully some challenges with different corporate innovation companies, maybe a hackathon" - Innovation Intermediary Community Manager (Southern U.S.A)

A number of activities were directed at educating corporate managers of the benefits of working with start-ups and exposing them to the range of potential technological solutions being developed. Many MNC managers had little experience collaborating in technology development or procuring from start-ups and therefore found it difficult to establish mutually beneficial arrangements. Intermediary-established activities such as contracting support programs, mentoring and educational workshops, were offered to inform companies of appropriate engagement approaches. Similarly, demonstrations or living labs were used by some intermediaries to showcase novel technological applications:

"The buyers of innovation being the customers, the big mining companies, the last two consecutive fiscal years we've hosted almost one global mining company a week that send their executive team to our underground center to tour it with only one question, what's next in the future of mining? The way it's set up, like pictures in an art gallery, they're just walking up and down these drifts, looking at different installed technology with a little bit of gallery signage that says here's the company, here's the technology" - Intermediary Director (Northern Canada)

5.4 Organizational

Innovation intermediaries played a central role in reducing organizational distances between start-ups and potential partners around the world. One of the main ways this was achieved was through various partnership agreements with other intermediaries, government agencies or MNCs. Start-up members could leverage these partnerships when entering new markets, accelerating learning of local market contexts and providing valuable endorsement for forming new business relationships. Corporate partnerships with intermediaries in particular, facilitated the flow of information to start-ups, with many MNCs using this channel to release sensitive operational information as a way to open-source innovative solutions. Many respondents suggested such knowledge was not publicly available and difficult to access for start-ups external to the intermediary:

“[MNC Mining] comes forward with innovation challenges, they're looking for solutions, and [Intermediary] starts connecting them with entrepreneurs, engineers who have solutions or with universities who might be interested in doing that. They have a small mining operation where they test out new technologies, it's run by [MNC Mining] and they then go and field test it and decide if they're going to start deploying it more widely around the world [...] the operators can actually come in and use machines that they couldn't otherwise afford on their own to start building things” - Innovation Intermediary Manager (Western Canada)

Similarly, intermediary managers often had open communication with managers at partner intermediaries, sharing insights related to start-up members, technologies in development and market opportunities. This enabled associated start-ups to access foreign market knowledge, which they could incorporate into product development and inform market entry strategies. These intermediary partnerships were leveraged by other actors such as government trade offices and MNCs to distribute information and support their own activities in international markets:

“they focus on FDI, bringing companies into Ontario, they work on exporting and also focus on innovation partnerships. So if an institution like [innovation intermediary] would go to them and say ‘I need some connection into an accelerator’, they would facilitate and try to make sure there is a soft landing site either way or there is some kind of relationship” - Provincial Government Official (Eastern Canada)

Other more direct forms of increasing organizational proximity arose through corporate investment in start-ups or contracting activities supported by the intermediary. A number of examples were identified whereby intermediaries facilitated equity-based accelerators and incubators or played some role in brokering venture capital investments on behalf of MNCs. By holding equity stakes in startups, a structured relationship was established with the larger partner that facilitated long-term knowledge exchange and support. Contracting was another avenue to increasing organizational proximity, which many intermediaries support by negotiating favorable terms with MNCs on behalf of start-ups. This was necessary as many start-ups in the industry struggled to meet the contracting requirements of large clients and lacked resources for compliance:

“the [MNC] innovation contracts are not made thinking about startups [...] we are trying to develop some type of more friendly contracts that allow small startups to work better with those mining companies, and also contracts that are bankable, so that you can find funds in terms of financing your pilot stage” Innovation Hub Manager (Chile)

5.5 Institutional

Within the context of internationalization, participants referred to a number of challenges faced by foreign firms in adjusting to new markets. In many cases, intermediaries provided mentoring programs and local market informational resources to guide the adaptation of business practices. In addition, many intermediaries used socialization with other local firms through networking events as a way to increase start-up manager's understandings of common relational norms and values in that market. The value of these activities was expressed by one intermediary manager who acknowledged start-ups' need for deeper understanding of new markets, which they were able to support through alliances with relevant foreign partners:

“You need a lot more when you are going to another country than [just] to have a co-working space with other people. You need to understand the business culture, to have connections, and so we are exploring an alliance with a mining leaders group that is also working with [start-up] that we are doing a pilot with, to see if we could work the two organizations and the start-up together” - Innovation Intermediary Manager (Chile)

Many participants considered the globally-integrated nature of the resources sector to minimize institutional differences between major markets. As the majority of innovation buyers were MNCs with operations around the world, participants suggested customer needs and relationship development practices were relatively similar across different markets. In contrast, differences between start-ups and larger firms were often framed by participants as problematic, leading to trust and value issues that impeded interactions:

“In Germany start-ups have the image of being innovative, a bit of a disruptor and bringing new solutions, whereas here (Chile), it's more like they're really young or they don't have any experience, so it's not like they are looking forward to meet with you. I think you start with a lot of mistrust before you even enter the room. I'm not sure that's Chilean or whether that's the mining industry, but that's what we realized” - Start-up Founder (Australia)

Educational activities facilitated by intermediaries helped to reduce misunderstanding between these sets of firms, while networking events involving diverse participants also supported this aim. Other intermediary activities such as accelerators or facilitating venture capital investment, enabled greater exchange of sensitive operational information and frameworks to overcome intellectual property tensions, thereby increasing trust between participating firms from different countries. In addition, intermediaries frequently engaged with government agencies and used their communication channels to promote international innovation programs that could reduce issues related to institutional distance.

5.6 Interrelations between Proximity Dimensions

The analysis has thus far discussed each proximity dimension separately, however, multiple links were also identified between the dimensions. The relational outcomes of activities identified in the case are therefore interpreted as aligning with different dimensions of relational proximity, supporting the view that proximity dimensions are interrelated rather than mutually exclusive (Table 3).

Table 3. Alignment between Intermediary Activities and Proximity Dimensions

Innovation Intermediary Activity	Proximity Dimension				
	Geographic	Social	Cognitive	Organizational	Institutional
Reciprocal Co-location Agreements	•	•			•
Networking Events	•	•			
Personalized Introductions		•		•	•
Living Labs/Prototype Testing	•		•	•	
Pitching Contests	•		•		
Product Demonstrations	•		•		
Hackathons/Innovation Challenges			•	•	
Engaging Government Trade Agencies			•	•	•
Communicating Market Opportunities			•		•
Mentorship Programs			•		•
Educational Workshops			•		•
Accelerators		•	•	•	•
Facilitating Venture Capital Investment				•	•
Contracting Support Programs			•	•	•

The data display presented in Table 3 provides a concise summary of the results, while serving to highlight the interrelations between concepts. This reflects the realities of innovation intermediary practices discussed in the case, whereby activities had various relational outcomes depending on member needs and market context.

6. Discussion

This section further explores how a relational proximity perspective enables us to consider the effects of these interactions, as well as how they support start-up internationalization. The outcomes of activities identified in the case can be interpreted as aligning with different dimensions of relational proximity, supporting the view that proximity dimensions are interrelated rather than mutually exclusive (Crescenzia et al., 2016; Cantù, 2017). The alignment between innovation intermediary activities and relational proximity, offers a way to understand how network development can facilitate start-ups entry into new markets.

Activities enhancing geographic proximity include those requiring face-to-face contact with potential collaborators, either to support social interaction or develop and demonstrate physical products in the market (Geldes et al., 2017). Allowing start-ups to spend valuable time in new markets on a temporary or ongoing basis was often necessary to support other proximity dimensions (Cantù, 2017). Geographic proximity was interpreted as directly addressing the lack of available financial and human resources that prevent start-ups from participating in activities in new markets (Westerlund et al., 2017). Innovation intermediaries reduce resource burdens, enabling start-ups to pursue opportunities in a more agile manner, with lower costs and more efficient use of time (Sharma & Blomstermo, 2003; Chetty & Stangl, 2010; Zucchella et al., 2017).

In line with previous studies (Spigel, 2017; De Silva et al., 2018), a number of innovation intermediary activities were orientated towards increasing social proximity by providing networking opportunities between start-ups and other firms in the local market. Social proximity therefore supports new relationship development opportunities, either through intentional activities such as networking events or as a byproduct of co-location in hubs or accelerators. Importantly, most of these activities were not direct relationship brokering processes but instead provided start-ups with a context through which to engage other parties, leveraging the trust generated from their affiliation with the intermediary (Vasilchenko & Morrish, 2011). These activities can be interpreted as allowing start-ups to overcome liabilities caused by a lack of local network embeddedness and endorsement (Eden & Miller, 2004; Boschma 2005).

Multiple activities align with increasing cognitive proximity, through focusing on developing mutual understanding between potential partners. Through education workshops or mentorship, start-ups were able to learn about local markets and understand specific customer needs to better identify opportunities. In addition, start-ups used activities such as pitching contests and product demonstrations to communicate and shape their value offerings to unfamiliar potential collaborators (Hohenthal et al., 2014). These activities were highly relevant given the innovation context and served to develop shared cognitive frames of reference and enhanced start-ups' ability to effectively communicate with new partners (Zucchella et al., 2007; Debrulle & Maes, 2015; Ojala, 2009). Cognitive proximity helped start-ups to overcome knowledge gaps with often larger, foreign partners that for different reasons restrict them from accessing opportunities for shared learning (Johanson & Mattsson, 1988; Guercini & Runfola, 2010; Oukes et al., 2017).

Organizational proximity increased through intermediary activities that provided indirect pathways for start-ups to engage with other, typically larger, collaborative partners. Particularly within the resources industry, these interactions were often difficult for start-ups

to initiate given an incompatibility of collaborative routines due to their size and inexperience (Johanson & Mattsson, 1988; Guercini & Runfola, 2010; Oukes et al., 2017). Intermediary activities such as hackathons, provided start-ups with otherwise unavailable insights into local customer needs, while contracting support programs provided affiliated startups an established organizational link to initiate commercial relationships (Harris & Wheeler, 2005; Wouters et al., 2018). Organizational proximity was relevant in overcoming various liabilities faced by internationalizing start-ups related to the lack of trust, network experience or existing relationships in that market (Eden & Miller, 2004).

Institutional proximity increased through activities such as mentorship that allowed start-ups to develop a better understanding of the local market context; or accelerators and investments, which demonstrated some level of legitimacy to potential partners (Vasilchenko & Morrish, 2011; Cavusgil & Knight, 2015). Increasing institutional proximity supported relationship development by enabling mutual understanding, values and trust which could then lead to shared risk taking and resource exchange (Bergek & Norman, 2008; Scillitoe & Chakrabarti, 2010). Not unsurprisingly, the majority of these activities can be interpreted as helping start-ups overcome liabilities of foreignness, which limits their understanding of local norms and laws, while increasing their perceived trustworthiness to potential business partners (Eden & Miller, 2004; Boschma, 2005).

7. Theoretical & Managerial Implications

By outlining the relational proximity-enhancing role of innovation intermediaries in start-up internationalization, this paper establishes new interdisciplinary bridges between business network, international business and economic geography perspectives. While the importance of collaborative ties in the internationalization process are acknowledged, these relationships have historically been viewed dyadically, overlooking the more complex intermediary networks identified in this study (Sharma & Blomstermo, 2003; Chetty & Stangl, 2010; Zucchella et al., 2017). Given the lack of existing networks to draw upon and low relational proximity with suitable partners, the involvement of innovation intermediaries is often required to provide a foundation for interaction (Blackburne & Buckley, 2019; Spigel, 2017). Such support goes well beyond the basic brokering of ties, instead demonstrating value to start-ups and larger firms in fostering shared understanding, values, trust and risk taking to support exchange in relationships (Bergek & Norman, 2008; Scillitoe & Chakrabarti, 2010). By linking start-up internationalization challenges to a lack of available partner support in new networks, this study highlights the importance of relationship development to access market-specific knowledge, resources, validation and legitimacy (Vasilchenko & Morrish, 2011; Cavusgil & Knight, 2015).

We also extend our understanding of the role of innovation intermediaries as influential 'third' actors in start-up internationalization (Scillitoe & Chakrabarti, 2010). Intermediaries offer tangible value to both incoming and outgoing start-ups, providing critical bridging ties between otherwise unconnected networks (Guercini & Runfola, 2010). Through their various activities, innovation intermediaries create physical or digital meeting places for potential international partners to interact and exchange resources or ideas (Klerkx & Aarts, 2013). Importantly, while some activities identified in the case are targeted at reducing general market-level distance (e.g. generic educational workshops), the majority focus on B2B interactions (e.g. product demonstrations) and therefore seek to reduce relational distances between participating firms. This finding supports the view that B2B relationships offer a valuable lens to understand start-up internationalization processes (Guercini & Runfola, 2010; Nicholson, et al., 2017).

In exploring the nexus between three theoretical perspectives, this research demonstrates the operationalization of relational proximity dimensions, thereby adding important empirical

grounding to this framework (Mason & Chakrabarti, 2017). Specific intermediary activities are identified as influencing different dimensions of relational proximity, establishing an understanding that existing and potential B2B relationships can be strategically enhanced (Klerkx & Aarts, 2013; Costa et al., 2017). This extends the theoretical focus of relational proximity from a static understanding of why organizations may collaborate successfully, to a dynamic perspective that articulates the processes through which various proximity dimensions are increased (Balland et al., 2015; Geldes et al., 2017).

The case study identifies a number of practical examples of how innovation intermediaries support start-up internationalization through relationship-enhancing activities with potential foreign partners. Embedding these common activities into a relational proximity framework offers a more nuanced understanding of how start-ups benefit. This perspective recognizes intermediaries' contributions to enhancing proximity, through activities that are both directly (e.g. networking events) or indirectly (e.g. hackathons) relationship-orientated. A relational proximity perspective can be used by managers to better articulate the value of intermediary service offerings to existing and prospective members, as well as large firms seeking to effectively engage with foreign start-ups.

Broader managerial implications can be drawn from the interactions between innovation intermediaries in the case. Recent trends towards closer partnerships or formal agreements between international intermediaries offer relational benefits on start-up internationalization. A number of start-ups in the case took advantage of reciprocal partnership agreements to access so called 'soft-landing' support, perceived as particularly critical for engaging in activities requiring physical presence in new markets. The case also demonstrates how start-ups benefit from other, even remotely accessed activities, which increase relational proximity to potential partners. Given the intermediary collaboration practices identified in the case were largely uncoordinated, the findings suggest there is clear scope to increase integration of services and develop deeper strategic partnerships that leverage greater value to start-up members. Furthermore, government trade agencies and MNC innovation managers should also consider establishing linkages between international innovation intermediaries in order to achieve their respective objectives.

8. Conclusions and Directions for Future Research

This paper has brought together different theoretical perspectives to provide a novel insight into the role of innovation intermediaries in start-up internationalization. Relational proximity offers a valuable multi-dimensional lens through which to consider how business networks support internationalization. Furthermore, this study adds a dynamic perspective of how relational proximity can increase between business partners, while also clarifying the role of third-party innovation intermediaries and their international links.

As the study takes an exploratory approach to applying proximity within a cross-sectional case study, broad generalizability is limited. Future research can build upon the case by linking intermediary activities to quantitative measurement of proximity changes over time and/or related variables of internationalization success (Geldes et al., 2017). Furthermore, future research should build upon this initial empirical foundation to disentangle the interrelations between proximity dimensions, thereby clarifying the direct and indirect patterns that exist.

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