

Building regions: a resource-based view of a policy-led knowledge exchange network

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ABSTRACT

This study looks to further understanding about how important the choice of intermediary can be in supporting policymakers in their regional development activities. Drawing on the resource based view as a framework, the paper provides new insights into resource combinations underpinning the successful creation and expansion of a regional network for knowledge exchange. Through an in-depth study of a partnership of three intermediaries involved in designing and implementing a regional ICT network, the study highlights that policymakers need to consider not only organizational resources of intermediaries, but also the resources of key individuals from those organizations.

Keywords: knowledge exchange; policy; intermediary; regional development; resources

INTRODUCTION

The importance of clusters for regional economic development has long been known (CORTRIGHT, 2006; PORTER, 1998; WENBERG and LINDQVIST, 2010). A key advantage of the clustering of sector-specific firms within a particular geographical region is that it offers greater opportunity for the sharing of knowledge (ASHEIM et al., 2013; HUGGINS, 2008b; MACKINNON et al., 2004). This in turn can lead to an increase in local productivity, innovation and the competitive advantage of regions (LAWSON and LORENZ, 1999; MOODYSSON and ZUKAUSKAITE, 2014; STOUGH et al., 1998). However, knowledge exchange is dependent upon the existence of social networks between regional firms and this is understood to be one reason why some clusters perform better than others

(LAWSON and LORENZ, 1999; SAXENIAN, 1996). Given that the creation of social networks between firms is important, policy has for over two decades looked to facilitate the creation and expansion of networking opportunities to support regional growth (LAWSON and LORENZ, 1999; MACKINNON et al., 2004; OECD, 2011, 2013).

Recently, scholars interested in regional knowledge exchange and the importance of networks between firms have turned their attention to the important role of intermediaries (HOWELLS, 2006; LOCKETT et al., 2013; ZHANG and LI, 2010). Intermediaries act as ‘middle men’ who play a role in encouraging the creation of new networking opportunities between firms for the purposes of facilitating new collaborations and knowledge exchange (see HOWELLS (2006) for an overview). Given the important role intermediaries play, the choice of intermediary to support knowledge exchange is critical (WOLPERT, 2002; WRIGHT et al., 2008; YUSUF, 2008). However, what seems especially important is that the chosen intermediary has the right network and knowledge resources to facilitate knowledge exchange between regional firms (INKINEN and SUORSA, 2010; KLERKX and LEEUWIS, 2008; NOOTEBOOM, 2003; STEWART and HYYSALO, 2008).

Despite current research pointing to the important role of intermediaries in facilitating new relationships between firms, there is a need for more empirical work on factors which contribute to the effectiveness of intermediaries’ in their creating links between firms (BATTERINK et al., 2010; SAPSED et al., 2007). This is important given policymakers are increasingly relying on intermediaries such as local universities or regional government agencies to help develop new knowledge exchange initiatives (HUGGINS and KITAGAWA, 2012; YOUTIE and SHAPIRA, 2008). There are, however, two areas of existing research which need further investigation to help policymakers choose the right intermediary to support regional initiatives. First, research so far on intermediaries has focused largely on their role in the *expansion of existing* regional networks for knowledge exchange (e.g.

ACWORTH, 2008; HOWELLS, 2006; WRIGHT et al., 2008). Policymakers, however, also rely on intermediaries such as universities (KAUFFELD-MONZ and FRITSCH, 2013; LOCKETT et al., 2013) or regional government agencies (ARANGUREN et al., 2009; BATTERINK et al., 2010; HUGGINS, 2000; KLERKX and LEEUWIS, 2008; LASCHEWSKI et al., 2002) for the *creation of new* networks. Given intermediaries' networks and knowledge resources are essential for the expansion of existing networks, there is a need to further understand how these (and other) resources underpin the successful creation of new networks for knowledge exchange. Second, a large body of work suggests the creation of regional networks is underpinned by relationships between individuals within the region (COLEMAN, 1988; HUGGINS and JOHNSTON, 2010; NAHAPIET and GHOSHAL, 1998). This is important since much of the literature on the role of intermediaries tends to focus on organizational resources, rather than the social networks and resources of key individuals (HOWELLS, 2006; WRIGHT et al., 2008; YUSUF, 2008; ZHANG and LI, 2010). The role of key individuals and the importance of individual resources in contributing to organizational goals have gained much ground in recent years (FELIN and HESTERLY, 2007; WRIGHT et al., 2001). Understanding the role of key individuals and the resources they are able to access and leverage to contribute to the success of regional networks for knowledge exchange is thus an important research endeavour.

Given the importance of networks, knowledge and social resources in underpinning the creation of networks to support knowledge exchange, this paper uses the resource-based view (RBV) as a framework to focus attention on idiosyncratic resources (RUMELT, 1997). The RBV perceives firms and organizations as bundles of heterogeneous resources and takes the view that increased levels of success depend on a firm's access to unique resource combinations (BARNEY et al., 2001; NEWBERT, 2007; PENROSE, 2009; PETERAF, 1993; RUBIN, 1973). Importantly, that uniqueness develops over time within a firm's

historical and environmental context (BARNEY, 1991; BARNEY, 2014). As such, this paper considers the uniqueness of intermediaries' resources (with a particular focus on networks, knowledge and social resources) that underpin the successful creation and expansion of a policy-led network for regional knowledge exchange. Originally used to explain the success of large profit making organisations, the RBV has more recently been used as a framework to explain unique resource combinations which underpin the success of particular Higher Education Institution (HEI) technology transfer programmes (POWERS and MCDOUGALL, 2005). Just as HEI technology transfer programmes have become increasingly popular and have created a competitive market amongst HEI providers (BERCOVITZ and FELDMAN, 2006), so too has the provision of regional knowledge exchange networks (HUGGINS et al., 2008). Institutions and organizations working together to provide such networks need to compete not only for funding, but also to get in place the right resources to support those activities and to ensure demonstrable outcomes (NOOTEBOOM, 2003). Although resources are known to be important, less is known about the idiosyncratic nature of those resources specific to the organizations and institutions involved. This paper uses the RBV as a framework to focus attention towards understanding unique resource combinations.

This paper is based on an in-depth study of the successful creation and expansion of a policy-led intermediary-driven regional knowledge exchange network for the information and communication technologies (ICT) sector. The study provides an important contribution to extending understanding of the choice of intermediary organization and the role intermediaries play in both creating and expanding regional knowledge exchange networks (STEWART and HYYSALO, 2008; WOLPERT, 2002; ZHANG and LI, 2010). The study also contributes more broadly to the body of research on factors underpinning the success of policy-led regional networks (ASHEIM et al., 2013; HUGGINS, 2000, 2001; HUGGINS et

al., 2008; MARTIN and SUNLEY, 2003; MORRISON et al., 2003; PICKERNELL et al., 2007).

The paper is organised in the following way. To begin, literature on regional networks and intermediaries is considered, with a particular emphasis on resources underpinning the creation and expansion of knowledge exchange networks. The RBV as a framework for focusing the study towards unique resources is then explained. This is followed by the methodology and an outline of the empirical study. Thereafter, the findings from this study are discussed. Finally, conclusions, recommendations and directions for future scholarly inquiry are provided.

REGIONAL KNOWLEDGE EXCHANGE

Knowledge creation and diffusion are critical to the competitive advantage of firms, clusters and regions (BOSCHMA, 2004; LAWSON and LORENZ, 1999). However, such valuable knowledge is often tacit and intangible, and acquired only through experience or social interaction (BOSCHMA, 2005; VALDALISO et al., 2011). Policy initiatives therefore need to be able to encourage interactions amongst firms to increase opportunities for knowledge sharing (MALMBERG and MASKELL, 2002).

The importance of geographical proximity has been criticised (BOSCHMA, 2005), with some pointing to how it could lead to 'lock-in' relationships (CLIFTON et al., 2010). However, there is a large body of work which supports the important role played by regional networks for knowledge exchange (ASHEIM et al., 2013; CHASTON, 1999; HUGGINS et al., 2008; HUGGINS and WILLIAMS, 2011; MURO and KATZ, 2011). Indeed work carried out around industrial districts (BECATTINI et al., 2009), and more recently regional innovations systems (COOKE et al., 2004), have highlighted the importance of spatial proximity. Such networks allow firms to take advantage of available regional knowledge

resources and provide a higher value-add for the region as a whole (MURO and KATZ, 2011; ROELANDT and DEN HERTOOG, 1999), as well as contributing to firm level survival and performance (WENNBERG and LINDQVIST, 2010).

High-profile cases of regional network successes continue to attract the attention of Government and policy (HUGGINS, 2000; HUGGINS and WILLIAMS, 2011; INKINEN and SUORSA, 2010; OECD, 2011, 2013). As part of their remit, policymakers have looked at different ways of facilitating the creation of networks amongst firms with a view to providing new opportunities for knowledge exchange (BODDY, 2000; HUGGINS et al., 2008; PICKERNELL et al., 2007). There are ample examples which demonstrate the active role of policy in supporting such initiatives (DE MARTINO et al., 2006; JOHANNISSON et al., 2007; YUSUF, 2008). Although regions and regionalism is often at the forefront of policy agendas (PEARCE and AYRES, 2009), there has been much criticism over the ability of policymakers to create new knowledge exchange networks for regional firms (HUGGINS and WILLIAMS, 2011; PEARCE and AYRES, 2009). While there have been some successes (ASHEIM et al., 2013; CHASTON, 1999), research has generally concluded that policymakers often lack the necessary knowledge and network resources at the regional level to facilitate the creation process (ASHEIM et al., 2013; SHUTT and PELLOW, 1997; TÖDTLING and TRIPPL, 2005).

More recently, scholars have turned their attention to understanding factors that underpin successful regional knowledge exchange. A particularly fruitful area of work has focused on the role of intermediary organizations (HOWELLS, 2006; INKINEN and SUORSA, 2010; YUSUF, 2008; ZHANG and LI, 2010). Intermediaries act as ‘bridgers’, ‘brokers’ or other ‘third parties’ to facilitate interactions between firms (HOWELLS, 2006; SNOW et al., 2000; YUSUF, 2008). HOWELLS (2006) suggests a working definition of intermediaries as “an organization or body that acts as an agent or broker in any aspect of the innovation process

between two or more parties” (p. 720). In his review of the role of intermediaries, HOWELLS (2006) highlights the broad range of services intermediaries offer, from facilitating new links between firms for knowledge sharing, through to adapting new solutions to the individual needs of firms. YUSUF (2008) usefully identifies four types of intermediaries: general purpose intermediaries, specialist intermediaries, financial intermediaries, and institutional intermediaries who “offer incentives to encourage knowledge transfer” (p. 1170). This article focuses on institutional intermediaries who are often called upon by policymakers to support, encourage and facilitate knowledge sharing and the creation of new links between regional firms (YUSUF, 2008).

In order to be effective, intermediaries need to be embedded within the regional context and have on hand necessary resources to support the creation of new links between regional firms (INKINEN and SUORSA, 2010; STEWART and HYYSALO, 2008; YUSUF, 2008; ZHANG and LI, 2010). There are three key functions of intermediaries: (1) understand the needs of network participants; (2) create new links between firms; and (3) provide mechanisms to enable knowledge sharing (BATTERINK et al., 2010). To do this effectively intermediaries need to understand the environment and have access to the right network and knowledge resources (e.g. BRAMWELL and WOLFE, 2008; WRIGHT et al., 2008).

An intermediary’s network and knowledge resources emerge through their experience and embeddedness within a particular region and sector. An intermediary’s ability to accumulate such knowledge is dependent upon the extent of available networks (HUGGINS and JOHNSTON, 2009; HUGGINS and JOHNSTON, 2010). In turn, the accumulation of knowledge provides a useful resource for broadening existing networks and creating new network ties; thus perpetuating the value of that intermediary to the region (HUGGINS et al., 2008; YUSUF, 2008; ZHANG and LI, 2010). The success of networks such as Silicon Valley have been supported through the work of ‘knowledge intermediaries’ (YUSUF, 2008), who

pool and leverage a stock of regional, firm, product and technology related knowledge (SAXENIAN, 1990). Universities are also often embedded within such networks and so can play an important role as intermediaries and ‘knowledge-creating institutions’ (HUGGINS, 2008: 2). Indeed, universities are often involved in regional knowledge exchange initiatives (HUGGINS and WILLIAMS, 2011).

There are, however, two limitations of existing research which impact on policymakers’ ability to choose the right intermediary to support regional knowledge exchange networks. First, research on the role of intermediaries has largely focused on the expansion of existing networks of knowledge exchange, rather than their role in the creation of new networks (HOWELLS, 2006; INKINEN and SUORSA, 2010). This is problematic since many policy-led initiatives for the creation of new networks involve the support of intermediaries (ARANGUREN et al., 2009; BATTERINK et al., 2010; KAUFFELD-MONZ and FRITSCH, 2013; LASCHEWSKI et al., 2002). In addition, central Governments continue to actively support the development of regional knowledge exchange networks, usually through significant financial investment (e.g. COOKE, 2001; OECD, 2011, 2013). Understanding resources which underpin the successful creation of new networks for knowledge exchange is thus also important.

Second, there is a tendency in many studies on intermediaries to focus on organizational level resources, rather than the importance of key individuals within those firms (e.g. HOWELLS, 2006; WRIGHT et al., 2008; YUSUF, 2008; ZHANG and LI, 2010). The importance of key individuals, and their network and knowledge resources, has been recognised as particularly important as often individuals play a more important role than at first thought (FELIN and HESTERLY, 2007; WRIGHT et al., 2001). Moreover, regional networks are often built through the social networks that exist between individuals, rather than organizations, within a region (COLEMAN, 1988; HUGGINS and JOHNSTON, 2010;

HUGGINS et al., 2012; NAHAPIET and GHOSHAL, 1998). Indeed, research indicates that regional firms, particularly smaller businesses, rely more on personal and informal relationships (ASHEIM, 2003; JACK et al., 2010). There is therefore a need to pay more attention to the resources of key individuals.

In addition to these limitations of existing research, there is increasing pressure on policymakers to demonstrate clear outcomes from the creation and expansion of regional networks for knowledge exchange. Given the important role that intermediaries play, it is essential that policymakers understand resource combinations that underpin the success of networks for regional knowledge exchange. This would enable policymakers to make more informed decisions over the choice of intermediary they bring on board to help facilitate the process of network creation and expansion (ARANGUREN et al., 2009; BATTERINK et al., 2010; KAUFFELD-MONZ and FRITSCH, 2013; LASCHEWSKI et al., 2002).

This paper focuses on a particular example of a policy-led and intermediary driven regional network. In this example a Regional Development Agency (RDA), University and City Council played key roles as institutional intermediaries tasked with using their knowledge and networks to facilitate the creation and expansion of a regional network for knowledge exchange. The RBV is used as a framework to focus attention on the unique resource combinations that underpinned the successful network creation and expansion.

METHODOLOGY

In order to generate new insights, it was important to adopt an approach that would provide insight into informal social interactions and relationships which underpin the creation of new regional networks (COLLINSON, 2000; JACK et al., 2010). A qualitative study was therefore deemed most appropriate; this allowed an exploration of the relationships intermediaries were engaged in, what resource combinations came about through those

relationships and how they contributed to the successful creation and expansion of a regional network for knowledge exchange.

The context

The ICT sector is an industry which has been shown to benefit considerably from regional networks for knowledge exchange (BRAMWELL et al., 2008; BRAMWELL and WOLFE, 2008; MAURSETH and FRANK, 2009; VALDALISO et al., 2011; VICENTE and SUIRE, 2007). At the time of the study, the Government was pushing development agencies towards regional economic growth and development. The ICT sector had been recognised as a fruitful area for the development of regional knowledge exchange networks to support regional economic development.

The network was initiated by the RDA, which brought on board a local University (HEI) and a City council who had both worked previously on projects within the ICT sector. These three intermediaries form the focus of this study and their role was to act as institutional intermediaries who would leverage their knowledge and networks to facilitate new opportunities for regional knowledge exchange and collaboration. Driven by a recent Government policy to encourage regional development, the RDA had developed an economic development strategy to support the ICT sector. The ICT sector within the region was estimated to be worth £16 billion, with 31,000 companies employing 320,000 staff. It generated 16% of the region's Gross Value Added (GVA), employed 10.6% of its workforce and formed the second largest regional cluster of ICT firms in Europe (NWDA, 2010). The local HEI was already heavily involved in supporting the ICT sector through a range of initiatives to promote knowledge exchange and innovation. The aim of the ICT knowledge network was to create new links between firms that would enable the sharing of new knowledge, new technologies and 'best practice' management knowledge, as well as

promoting new collaborations. At the time of the study, the network had been formed for over four years and had successfully achieved its goals of creating new opportunities for knowledge exchange and new collaborations. It had also expanded the network to include over 100 regional businesses. The RDA's quarterly activity and output reports for regional, national and European funding bodies indicated the extent of their knowledge transfer activities, as well as regional increases in sales and jobs. The network in this study was already meeting targets and generating a positive outcome for the region. The research was thus conducted at a timely stage in its development.

Data collection

The focus of the study was on the resources that the RDA, City Council and local University combined to facilitate the creation and expansion of a new regional ICT network. All three intermediaries were embedded in the region and had strong networks with regional firms (LOCKETT et al., 2013). The study followed key people from the three intermediaries who each played an important role in the creation and expansion of the ICT network. Five participants from three intermediaries were purposefully selected (HILL et al., 1999; MILES and HUBERMAN, 1984; PRATT, 2009) as they had been actively involved in the creation process and the network's activities. Interviews were also carried out with five entrepreneurs brought on board by the intermediaries who played key roles in the creation process. These interviews helped triangulate the findings and also offered further insight into the value of the resource combinations for regional firms. Interviewees were therefore chosen for what they added to theoretical insights into the creation process (ALVESSON, 2009) and from whom the desired information could be obtained (EISENHARDT, 1989). The tool for data collection was interviews, a popular tool for studies in network creation (see HUGGINS,

2000 for an overview). Table 1 below provides an overview of the participants and their affiliation.

INSERT TABLE 1 AROUND HERE

The value of an in-depth research design, such as this one, is that it is able to provide rich detail and thick description about the relationships that were critical to the network's creation (GEERTZ, 1973). An independent interviewer carried out all the interviews. This interviewer was known to the participants and had been involved with the HEI and the network's creation and expansion. The interviewer was also an experienced researcher having conducted similar studies previously. This approach, combined with the interviewer's familiarity with research participants, led to the collection of in-depth and insightful material for analysis (DENZIN and LINCOLN, 2005). All interviews were digitally recorded and transcribed.

Data analysis

An inductive approach was used to identify emerging themes from the data (DENZIN and LINCOLN, 2005; SILVERMAN, 2013). Data analysis was based on EISENHARDT (1989) who suggests starting by first sifting through the data, discarding elements that are irrelevant and then bringing together the elements that seem most important. Inductive qualitative analysis and the constant comparative method were used to analyse the data (ALVESSON, 2009; GLASER, 1967; SILVERMAN, 2013). This involved an iterative reviewing of the data with emerging categories and concepts.

The first stage was to read through the interview transcripts and identify emerging themes specific to the resource combinations for both the creation and expansion of the network. Attention was directed to network, knowledge and social resources as these have already been identified as crucial to supporting regional knowledge exchange. The RBV was used as a framework to focus attention on the idiosyncratic nature of those resources; as well as how those resources combined to underpin the creation and expansion of the network. This stage was carried out independently by the three authors. To increase reliability the authors discussed, compared and agreed on the themes that would be used to analyse and compare the data. It was evident from the data that resource combinations underpinning the knowledge exchange network were idiosyncratic to the institutions, the partnership between those institutions, and to key individuals from those institutions. In addition, the data suggested that resource combinations important to the creation of the network were different to those underpinning network expansion. It was therefore important to draw out these distinctions in the presentation of findings. The next stage involved refining the themes, whilst also identifying and comparing examples. This has become an accepted approach and one reported in previous work (HILL et al., 1999; HUMAN and PROVAN, 1996; JACK, 2010; LEITCH et al., 2010). In order to preserve their anonymity the names of participants have been changed.

RESOURCE COMBINATIONS FOR REGIONAL KNOWLEDGE EXCHANGE

Presented below is an insight into the organizational and individual resource combinations that underpinned the network's success. The findings demonstrate how these resources were idiosyncratic to the institutions and individuals involved in this particular knowledge exchange network, in particular their knowledge of the region and regional firms.

At the same time, the data also provides an insight into the challenges of limited network and social resources for network expansion.

Resource combinations underpinning the creation of a knowledge exchange network

The intermediaries had worked together on previous projects and so were familiar with each other's background, experience and goals. They also all had extensive experience working with regional firms, see Table 2 below for a summary of their experience.

INSERT TABLE 2 AROUND HERE

As a consequence of their experience, each of the intermediaries was knowledgeable about the region and had built extensive networks with regional firms. The intermediaries interviewed were all aware from the start that there needed to be clear advantages to each of their institutions in creating a new ICT network as the resource commitment needed to make the network a success was significant.

Important role of organizational resources: foundations of the network. The key to the creation of the network was twofold: first, that each intermediary would benefit from the resources of the other two intermediaries; second, that the combination of organizational resources could create something greater than the individual intermediary's resources would allow. Prior to creating the network, the HEI was already working across a number of different government initiatives with the aim of creating closer ties between the HEI and regional businesses. The HEI had recognised that working with the City Council and the Regional Development Agency would help broaden their access and visibility to a greater

number of regional firms and would provide resources which would feed into other initiatives they were working on. As Allan from the HEI stated, *'[the partnership] is a good way for us to be able to communicate with businesses that we wouldn't normally reach [...] it is a useful conduit for us to meet companies, potential investors, or people looking at broader engagement with the university'*. In addition to supporting existing initiatives, such a partnership also provided an opportunity for the university to promote its research to a wider audience and create new links with regional firms: *'it is also a good opportunity to show-case new developments and get academics involved with local businesses'* (Allan, HEI). Similarly, the City council was able to engage with more regional businesses and to promote its new city centre office space: *'from our point of view [it's] getting businesses through the door of [City Space] because we want to promote that building and increase tenancies and ashamedly that is one of the advantages for us [working in partnership]'* (Martin, City Council).

In addition, the three intermediaries also recognised the advantages of combining their resources. As Chris from the RDA stated, *'We would always recognise in economic development work these days that the amount that any individual organisation or any individual can do might be quite limited but by combining effort with other partners we feel that we have a particular strength'*. This recognition of combined value and the creation of something that had never been done before was acknowledged by Frank (HEI) who commented on how *'the commitment of [all three intermediaries] has brought credibility, it has brought commitment, it has brought support, it has brought access and technology [...] it gives people a bit of a buzz if they think they are part of something that is new and evolutionary'*. There was thus a clear recognition that the formation of a partnership and the combining of organizational resources benefited each of the intermediaries, as well as the region as a whole. This allowed the intermediaries to *'work in such a way that it adds value*

to the support we collectively provide to the sector as a whole’ (Martin, City Council). It also enabled regional firms to have *‘increased exposure’* to a greater range of *‘opportunities’* and the partnership enabled them to *‘raise the profile of these opportunities locally as much as possible’* (Allan, HEI). However, although these organizational resources provided an important foundation to the network, the creation of the network itself relied heavily on the leveraging of the resources of key individuals.

Important role of individual resources: creation of the network. Frank (HEI), Allan (HEI), Martin (City Council) and Chris (RDA) all had extensive experience in the ICT sector which had been acquired through previous projects and their own interests in the sector and in regional growth (see Table 3 below for a summary of their experience).

 INSERT TABLE 3 AROUND HERE

Through these individuals’ experience in the sector and the region, and their work on previous projects with ICT sector organizations, they understood the need to *“have [business owners] locally who were prepared to take the lead from the private sector point of view”* (Martin, City Council) and to *“get the private sector to take [...] ownership”* (Frank, HEI) of the creation process. Given the importance of finding the right local business owners to lead this process, the intermediaries relied on the social networks of key individuals. Martin from the City Council, for example, highlighted the importance of Frank’s (HEI) networks within the ICT sector, *‘a big advantage [the University] had in enabling the network to get off the ground was because we had [Frank] [...] who could engage local business owners’*. Both

Frank and Allan, from the HEI, played key roles in bringing on board a number of business owners who would themselves be *'good networkers'*, *'like-minded souls'* (Frank), and would be *'keen to take an active role'* in engaging other businesses in regional knowledge exchange. Frank had contacted Ed, a local business owner that he had known for a number of years through one of the HEI's incubator programmes. Frank indicated how Ed was a good person to lead the creation process as Ed was already *'connected to a number of regional firms'*, and *'Ed is a lovely guy and very much a strong networker'*. Allan also encouraged Ian, a local business owner who he knew personally, to take charge of running key events to get the network off the ground. Ian stated how the creation process was about *'helping other people in my situation to network [...and] also to look at new strategic relationships and partnerships with other regional firms'*. Business owners such as Ian and Ed, along with three other entrepreneurs interviewed, played important roles in steering and guiding the initial network of ICT organizations. These entrepreneurs were all brought on board by Frank (HEI), Allan (HEI), Martin (City Council) and Chris (RDA) and formed a steering committee that became the driving force behind the network's creation and expansion.

Resource combinations for expanding the network

The expansion of the network came about in two different ways. On one hand, the knowledge resources of the HEI, RDA and City Council played a key role in drawing in new participants. These resources helped underpin knowledge exchange by promoting the sharing of new knowledge between regional firms. On the other hand, the individual networks and knowledge of Frank, Allan and Chris were central to facilitating new collaborations amongst regional firms. These are discussed in more detail below.

Organizational resources underpinning knowledge sharing. The HEI's knowledge resources were a particular draw for participants. Peter, a local business owner, pointed to the

value of being able to tap into the University's research, *'the network provides me with more interaction with [the] University and their other research programmes'*. Ian also stated how the University's reputation for leading research in the ICT sector attracted many new members *'because the University were holding quite a few events [...] we started getting requests from companies in [local town, 30 miles away] and [local town, 50 miles away] to join our network because [they could see] the benefit [of the University] to their business'*.

In addition, the partnership of intermediaries and what it could offer local businesses was important, *'it has given us some kudos [which allows us to] pull in some quite useful players [...] we had an MP at one event'* (Chris, RDA); *'When we launched the network the turnout was particularly big because the local authority were presenting'* (Frank, HEI). These *'useful players'* helped to raise the profile of the network and meant it was able to be expanded to a broader range of participants who were looking for new knowledge to help their businesses. However, although the organizational network and knowledge resources of the intermediaries played a key role in attracting firms to participate, this was only one avenue for creating value for regional businesses.

Individual resources. The data points to how the more long-term value of the network emerged through the unique resources of key individuals from the intermediaries which they had developed over a number of years. Frank, Chris and Allan in particular played important roles in facilitating new collaborations between regional firms. Their knowledge of the region and of regional firms was of particular value to participating firms and the regional business community as a whole: *'Frank has a real interest in what is happening in the business community'* (Peter); *'[Chris] for example is a star when it comes to pointing people in the right direction. I think he has provided a very valuable service in the ICT community'* (George); *'[Allan] is very useful... he knows what is going on [...] he can help make the links [...] it saves us from having to do all the networking'* (Ian). Within this particular example of

a policy-led network, the important role of key individuals and the resources they were able to leverage were crucial to facilitating new collaborations and, more broadly, increasing knowledge exchange between regional firms.

The challenges of engaging resources for network expansion. Expanding the network presented a key challenge for the three intermediaries. The intermediaries recognised the limitations of their network resources. Although each intermediary had ties to a number of regional firms, given the extent of the ICT industry within the region, their networks did not extend to all ICT firms. In an attempt to expand the network, intermediaries relied heavily on the network resources of key entrepreneurs as well as other core members. The intermediaries realised quite early on the ‘difficulties’ of relying on ‘*participants of the network group to bring in new members, friends or colleagues*’ (Martin, City Council). Since most members of the network were small regional firms, their networks were also quite small. Another challenge was expanding participation to larger organizations, as Chris stated, ‘*the thing that hasn’t happened that I would have hoped would have happened is that some of the larger businesses in the sector would take a more active involvement*’. Since all three intermediaries had historically focused on the development of smaller regional businesses, they had only limited network ties to larger organizations. As Martin from the City Council stated, ‘*one of the areas where [the intermediary partnership] has fallen down a little bit is engaging with the larger businesses and it may be that its main strengths lie in the small business sector*’. Despite the extensive networks to regional businesses of both the intermediary organizations as well as individuals such as Frank, Allen, Martin and Chris, they struggled to engage businesses outside of those networks. It is perhaps no surprise that the network resources of intermediaries constrain growth and in the particular example reported here this limits the ability of intermediaries to expand the network to larger organizations. This points to important limitations in the resources of these three intermediaries. Even though network

resources were strong at a local level, their ability to use those resources to expand the network to broaden regional participation was a recognised weakness.

DISCUSSION AND INTERPRETATION

Using the RBV as a framework has helped focus this study towards an exploration of unique resource combinations that underpin the creation and expansion of a regional network for knowledge exchange. The findings point to different resource combinations for a) the creation of a knowledge exchange network and b) the expansion of that network to attract a broader base of participants. The analysis of data uncovered the importance of both organizational and individual resources which underpinned the successful creation and expansion processes. In addition, the findings highlight the idiosyncratic nature of those resources specific to the three institutions involved, the partnership between those institutions, and to key individuals. The findings also indicate that although organizational resources were necessary and important, they were in themselves not sufficient to support the creation and expansion of a regional network. The data suggests that the unique resources of key individuals played an essential, and perhaps central, role in supporting the creation and expansion processes. Figure 1 provides a summary of findings.

INSERT FIGURE 1 AROUND HERE

The creation of a successful knowledge exchange network (illustrated in the bottom half of Figure 1) is underpinned by the network and knowledge resources of intermediary organizations. However, the network resources and social capital unique to key individuals plays an important role in engaging the help of regional firms and individuals. Expansion of the network occurs in two ways (illustrated in the top half of Figure 1). On one hand

organizational resources play a key role in providing new knowledge sharing opportunities; in the example here this was supported by the University's unique and cutting-edge knowledge resources, as well as the knowledge and network resources of the RDA and city council. On the other hand, it is again the unique resources of key individuals which play a central role in underpinning the successful expansion of the network through facilitating new collaborations between regional firms.

The findings contribute to three key areas of existing research. First, they highlight the importance of the relationship between intermediary organizations and how this relationship is critical for underpinning the successful creation of a regional network for knowledge exchange. This adds to understanding of the importance of partnerships between intermediaries in policy-initiated knowledge exchange network formations (YUSUF, 2008). Recent studies using the RBV also point to the importance of resources that a firm is able to leverage by combining resources available through partnership agreements (LAVIE, 2006). Second, although extant research highlights the role of intermediaries' organizational resources, there has been little acknowledgement of the role of key individuals within those organizations. The study highlights that a focus on intermediaries as organizations can mask the importance of the resources of key individuals and the leveraging of their unique social and knowledge resources that facilitate regional knowledge exchange. This study therefore provides an important addition to furthering understanding of the role of intermediaries in supporting knowledge exchange (HOWELLS, 2006; INKINEN and SUORSA, 2010; WOLPERT, 2002; YUSUF, 2008; ZHANG and LI, 2010). Finally, the study highlights how important the choice of intermediary can be in supporting policymakers in their regional development activities (ASHEIM et al., 2013; CORTRIGHT, 2006). Each of these areas is discussed in turn below.

In focusing on the important value of resource combinations available through partnerships and alliances, LAVIE (2006) stated that “the inimitability of resources will depend less on the nature of resources and more on the nature of relationships between the firm and its partners” (ibid: 649). This particular study demonstrates how important the existing relationship between the three intermediary organizations was in supporting the creation and expansion of a regional network for knowledge exchange. More specifically, two key aspects of this relationship were particularly important. First, recognition that each of the intermediaries would benefit from the combining of resources. Second, that combining resources could also create *something greater than the sum of its parts* (LAVIE, 2006; TENG, 2007); a unique resource combination which would benefit the regional as a whole. This provides an important addition to existing work on understanding key factors underpinning intermediary collaborations (YUSUF, 2008). In addition, this study also highlights the value that can be created through partnerships of intermediaries working together on policy implementation. However, the study suggests that the nature of the partnership in this study was developed over a period of years through which each intermediary was able to gain an understanding of each other’s goals, resources that they had on hand, as well as a relationship that is based on mutual trust (HUGGINS, 2000; HUGGINS et al., 2008; KAUFFELD-MONZ and FRITSCH, 2013).

Second, although prior research has highlighted the importance of intermediaries’ networks and knowledge resources (INKINEN and SUORSA, 2010; STEWART and HYYSALO, 2008; WOLPERT, 2002; ZHANG and LI, 2010), such studies have tended to largely assume the relevance of organizational resources, rather than the resources of key individuals within those organizations. In this study, the findings indicate that although the combination of intermediaries’ organizational resources provide a strong foundation for the creation and expansion of the network, they alone are not sufficient to make the network a

success. The study draws attention to the role of key individuals from those organizations; their knowledge of the region, the sector and of regional firms is essential to expanding the network and underpins their role as mediators for new collaborations and new links between regional firms. This provides an important extension to understanding the role of intermediaries (HOWELLS, 2006; INKINEN and SUORSA, 2010; WOLPERT, 2002; YUSUF, 2008; ZHANG and LI, 2010) and calls for further acknowledgement of the role of key individuals within those intermediaries and the importance of their network and knowledge resources.

Finally, the study also contributes to understanding the importance of the choice of intermediary in supporting policy initiatives for the creation and expansion of regional networks for knowledge exchange. The role of intermediaries in supporting regional knowledge exchange is a particularly important area of research (YUSUF, 2008; ZHANG and LI, 2010). This is particularly relevant given that policymakers, who often rely on intermediaries such as local universities, often struggle to implement new knowledge exchange networks (SHUTT and PELLOW, 1997; TÖDTLING and TRIPPL, 2005). The findings highlight how policymakers, when choosing intermediaries to support their regional network initiatives, need to consider whether those intermediaries have access to, and are able to leverage, the right combinations of organizational and individual resources. This study has provided an insight into the idiosyncratic organizational and individual resource combinations that create value for participating firms (BARNEY, 1991; BARNEY, 2014). However, what this study shows is that the uniqueness of such resources only comes about through extended periods of immersion within the region and embeddedness within a network of regional (and maybe national) firms. The challenge for policymakers is that the embeddedness of intermediaries' within existing networks underpins their ability to be able to combine a unique set of resources for supporting knowledge exchange networks. As such it

can be difficult for intermediaries without sufficient experience to gather together the necessary resources in a shorter period of time, as such resources often take significant time to develop (BARNEY, 1991; DIERICKX and COOL, 1989). This also helps explain the weakness in the intermediaries' networks with larger firms, which they believed limited their ability to expand the network. The challenge for these intermediaries, and for the key individuals from those firms, is that they had been historically immersed in networks of local and regional firms and their experience was largely with small businesses (see Tables 2 and 3 above). This also points to how resources may change, or may need to change, over time as the network expands and the needs of the network changes. This is certainly an interesting topic for future research.

Conclusions

Increasingly, policymakers are drawing on the resources of key intermediaries, such as universities and development agencies, to facilitate the creation and expansion of regional networks for knowledge exchange. It is therefore important for policymakers to understand how the choice of intermediary organization may contribute to their success. While previous studies have explored key factors which underpin the success (or failure) of policy-initiated network formations (CORTRIGHT, 2006; HUGGINS, 2000, 2001, 2008a) as well as the important role of intermediary organizations (STEWART and HYYSAALO, 2008; WOLPERT, 2002; YUSUF, 2008; ZHANG and LI, 2010), few have focused specifically on the resources of intermediaries and how these might impact on the creation of regional networks. In this study, the RBV is used to focus attention towards unique resource combinations underpinning the successful creation and expansion of a regional network for the ICT sector.

The approach combined with the research context enabled a deeper insight into the organizations and individuals involved in the development of a regional network for knowledge exchange. This study has two important implications for policymakers. First, the findings not only highlight the relevance of intermediary organizations, but importantly point to the significance of key individuals within those organizations. A relevant question is how policymakers are able to identify who such individuals might be. Second, the importance of the value created through a combination of intermediary and individual resources cannot be developed in a short period of time. The development of such resources can be specific to a particular regional context.

However, there are limitations of this study. It is important for future research to extend the findings from this study to other cases and contexts, to avoid these findings being accused of bias towards a successful network (TÖDTLING and TRIPPL, 2005). It would also be interesting to explore the generalizability of these findings for other regional networks for knowledge exchange. Future work might also consider how the combinations of organizational and individual resources change over time and in particular how they contribute to the sustainability of such networks after the withdrawal of policy support.

Table 1: Key participants

Participant	Intermediaries
Frank	Director, University-based ICT research facility
Allan	Business Development Officer, University-based ICT research facility
Emma	Business Advisor, Regional Development Agency
Martin	Economic Development Officer, City Council
Chris	Strategy & Development Manager, Regional Development Agency
Participant	Entrepreneurs
Ed	Director of real-time performance solutions company. Friend of Frank
Peter	Director of avionics software firm. Friend of Chris
Ian	Director of marketing solutions provider for ICT firms. Friend of Allan and Ed
George	Director of software solutions firm. Friend of Martin
Steve	Director of e-commerce solutions provider. Friend of Emma

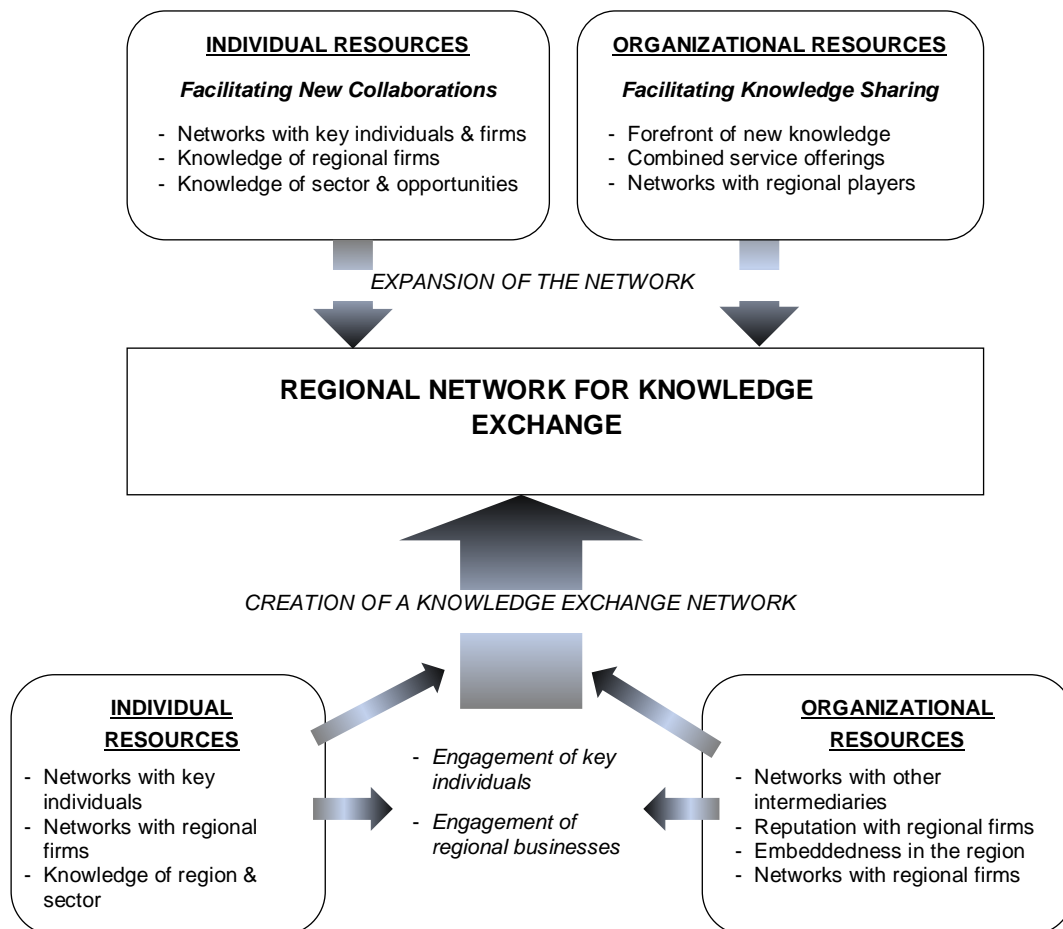
Table 2: Summary of Intermediaries' Experience

Intermediary	Experience
University	<p>Worked alongside the RDA for over 3 years on a variety of regional ICT projects</p> <p>Had worked on a series of funded projects in the ICT sector and had built relationships with regional firms</p> <p>Worked with the City council for 3 years on a variety of projects for promoting regional growth</p>
Regional development agency (RDA)	<p>Identified the ICT sector as a key sector for increasing GVA in the region</p> <p>Worked with the University on several projects over a 3-year period and built good relationships with regional firms</p> <p>Worked with other institutions in the region and had often been asked for advice on ICT sector growth projects</p>
City Council	<p>Had for some time become heavily involved in regional growth programmes for small businesses</p> <p>Had a particular interest in the ICT sector and had built a network with small ICT businesses</p>

Table 3: Summary of individual's experience and networks

Individual	Experience
Frank	<p>High profile role in the University for over 8 years focusing on regional growth and engagement with small businesses in the ICT sector</p> <p>Held a key role in the Chamber of Commerce</p> <p>Had led a series of major projects for regional ICT businesses</p> <p>Had become well-known within the sector, the region and across other HEIs</p>
Allan	<p>Worked for over 10 years in the ICT sector and over 2 years with the University</p> <p>Had developed extensive networks with regional ICT businesses</p> <p>University role focused on engaging with small regional firms as well as start-up companies</p>
Martin	<p>Worked for the City Council for over 20 years; extensive experience in regional economic development</p> <p>Focused on increasing employment and regional growth</p> <p>Respected by other institutions and intermediaries in the region, as well as having extensive knowledge of regional businesses</p>
Chris	<p>Experienced business advisor with regional responsibilities for the ICT sector</p> <p>Built up extensive network of SMEs in the region</p> <p>Well respected by other business advisors in the region and a key point of contact for regional ICT companies</p>

Figure 1: Resource combinations underpinning network creation and expansion



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