

“You Can’t Make a Good Wine without a Few Beers”: Gatekeepers and Knowledge Flow in Industrial Districts

There is significant evidence that knowledge-sharing plays a key role in the performance of clustered organisations, particularly small and medium-sized enterprises (SMEs), however, it is also acknowledged that SMEs face significant knowledge-related disadvantages due to their lack of absorptive capacity and functional expertise. This paper investigates the influence of technical specialists on knowledge flow in a wine cluster in Australia. The main contribution of this paper is a finding that technical specialist’s gatekeeping role both links clustered SMEs to the global wine ‘systemworld’ by transferring knowledge of technical developments and innovation, and simultaneously develops and refines regional winemaking styles by sharing locally-specific, experience-derived knowledge. Technical specialists were found to draw on bridging and bonding social capital to identify and retrieve specialist knowledge, and were capable of assimilating complex technical knowledge into the cluster. These findings are particularly significant because recipients were typically small and micro-firms are frequently located outside cluster knowledge-network.

Keywords: Industrial Clusters; Social Capital; Knowledge Gatekeepers; Small and Medium Size Enterprise (SME); Knowledge Sharing.

“You Can’t Make a Good Wine without a Few Beers”: Gatekeepers and Knowledge Flow in the Hunter Valley Wine Cluster

1. Introduction

Industrial clusters, defined as geographically proximal agglomerations of economic actors and activity, operating in the same or connected sectors (Giuliani and Bell 2005), are viewed as critical to dynamic regional development, particularly in localities characterised by strong small and medium enterprise (SME) presence. Inspired by the performance of regions such as the ‘Third Italy’, typified by extensive local SME clustering, policy-makers continue to encourage SME clustering in pursuit of regional growth (Asheim 2001).

There is considerable evidence that knowledge plays a key role in the performance and innovation of firms in clusters (Ibrahim and Fallah 2005; Malmberg and Power 2005; Easterby-Smith et al. 2008), and clustered SMEs are argued to derive significant benefit from access to localised explicit and tacit knowledge networks (Keeble and Wilkinson 2000). However, SMEs face significant knowledge-related disadvantages due to their lack of absorptive capacity and functional expertise (Nooteboom 1994). Studies into regional knowledge networks indicate knowledge often enters clusters via technological leaders, firms characterised by strong knowledge bases (Baptista and Swann 1998; Giuliani and Bell 2005), and is likely to be shared between organisations that are cognitively proximal to these firms (Cohen and Levinthal 1990; Lane and Lubatkin 1998; Giuliani and Bell 2005). Previous research consistently indicates that SMEs often have insufficient knowledge assets to assimilate valuable technical and other business-related knowledge (Nooteboom 1994) and many localised smaller firms do not have the

absorptive capacity to share knowledge even within their cluster (Giuliani 2007; Morrison and Rabellotti 2009).

This paper harnesses two knowledge-related ideas in an effort to contribute to a better understanding of how clustered SMEs can gain access to, and take advantage of, valuable extra-cluster knowledge: technological gatekeepers, defined as actors who gather outside information and communicate it to the recipients (Tushman and Katz 1980), and social capital, defined as encompassing the sum of resources available to a firm because of its network of relationships (Nahapiet and Ghoshal 1998; McFadyen and Cannella 2004).

2. Theoretical Framework

One of the key features of clusters of related firms is that they increase potential for the sharing of tacit knowledge between firms. Both local networking and external ‘pipelines’ which connect clusters to extra-cluster knowledge sources have innovation and performance benefits (Owen-Smith and Powell 2002; Casanueva et al. 2012). While local knowledge sharing provides clustered firms with the ability to learn spontaneously and continuously, and allows the development and flow of context- and path-dependent knowledge, extra-cluster knowledge sharing minimises the risks associated with over-embeddedness and associated knowledge convergence by introducing new and diverse ideas into cluster interactions (Amburgey and Singh 2002; Martin and Sunley 2006).

However, this global/local equation provides a significant challenge for many clusters, because the organisations comprising clusters are typically SMEs. Smaller organisations face considerable knowledge-related constraints due to their limited knowledge assets and consequent lack of absorptive capacity (Nooteboom 1994). While some research has found that SMEs are capable of exchange knowledge within clusters (Sammarrà and Biggiero 2008) number of recent

studies into knowledge networks indicate that many SMEs do not assimilate valuable external knowledge and are unlikely to share knowledge with other firms inside their cluster (Giuliani 2007; Morrison and Rabellotti 2009). Beyond a core group, differentiated on the basis of the level and similarity of their extant knowledge (Giuliani 2007), are many smaller organisations that have insufficient absorptive capacity to absorb or productively utilise new knowledge (Escribano et al. 2009). The capability of these smaller firms to substantially increase knowledge assets is constrained by existing cognitive distance and limited ability to employ technically-qualified staff (Nooteboom et al. 2007). These organisations remain outside knowledge networks and therefore do not benefit from the local ‘buzz’ of continuous knowledge exchange and remain disconnected from extra-cluster knowledge imported through external pipelines, which often occurs through technological leaders with significant knowledge assets (Morrison and Rabellotti 2009). This echoes research across diverse research streams, which provides consistent support for knowledge-related constraints faced by SMEs (MacGregor 2004; Narula 2004; Lavie and Rosenkopf 2006).

In addition to these cognitive barriers, there are further social barriers which constrain the extent to which SMEs can acquire knowledge through external linkages. SMEs are generally managed by their owner and do not tend towards cooperation, particularly outside their region (Wissema and Euser 1991). Research also indicates that SMEs are reluctant to engage in knowledge sharing unless within a relationship characterised by trust and reciprocity, which limits their range of knowledge sources, as does a preference by SMEs for knowledge acquisition through informal connections, and by experience (Anderson and Boocock 2002). This prompts the investigation of factors that facilitate effective knowledge acquisition and

sharing by SMEs in clusters. One such mechanism has been identified as local knowledge brokers (Bathelt et al. 2004).

Social network theorists have identified knowledge brokerage as a process which facilitates transactions between individuals lacking access to one another (Marsden 1982). Knowledge gatekeepers are brokers who expose themselves to external sources of knowledge and act as knowledge 'funnels' into organisations (Macdonald and Williams 1993; 1994) through the process of knowledge translation (Tushman and Katz 1980). Recent studies have linked gatekeeper roles to regional innovation infrastructure (Graf 2011).

The majority of research conceptualises knowledge gatekeepers as having two core roles, knowledge search and knowledge transfer. Knowledge gatekeepers are required to search for, and identify, external sources of knowledge (Tushman and Katz 1980). This implies both a high level of cognitive proximity with, and a strong network of connections to, external information sources (Gittelman and Kogut 2003), which requires gatekeepers to be highly skilled and knowledgeable specialists, with extensive experience and well-developed knowledge network (Allen and Cohen 1969; Allen 1977). Knowledge gatekeepers are also required to translate the meaning of knowledge so that it corresponds to the world-view of the recipient, and to transfer and transform knowledge so that it is disseminated and utilised (Morrison 2008; Morrison and Rabellotti 2009).

Previous explorations into the value of knowledge gatekeepers in clusters reinforce that the assimilation of external knowledge and its diffusion throughout the cluster tends to be limited to organisations in close cognitive proximity to the technological frontier, and flows between cognitive proximal organisations (Giuliani and Bell, 2005). This research indicates that SMEs, typified by limited knowledge assets and absorptive capacity (Nooteboom 1994), are frequently

excluded from the knowledge network, which does not act as a knowledge conduit to smaller firms (Morrison and Rabelotti 2009). We therefore explore the knowledge gatekeeping role of local, contract technical specialists, defined here on the basis of knowledge-related authority, as actors with high-level task and industry specific expertise who work locally and provide contract service to more than one SME. Contract technical specialists live, and are embedded in, the local Hunter Valley wine cluster and are contracted to provide services as either viticulturists or oenologists.

We further explore the role of social capital as a mechanism through which local technical specialists are able to undertake their gatekeeping role. Research supports the importance of social capital as a key factor in effective knowledge sharing (Nahapiet and Ghoshal 1998; Cudney et al. 2004; Wu 2008) and as a foundation for success in industrial clusters (Fromhold-Eisebith 2004). As organisations import knowledge into their firm through their social capital, specifically through the knowledge assets embedded within their network of social ties (Lane and Lubatkin 1998), social capital enhances both knowledge availability and the knowledge sharing process (McFadyen and Cannella 2004). Access to knowledge sources is associated with the characteristics of the relationship networks within which each firm is embedded and the interactions that occur within these networks, and is therefore regulated by the amount and type of social capital possessed (Yli-Renko et al. 2001).

In order to explore the connection between social capital and knowledge flow in clusters we use a conceptualisation of social capital that focuses on relationship intensity and proximity and differentiates between bonding and bridging social capital. The concepts of bonding and bridging capital differentiate between the resources accrued through intense and proximate connections with those accrued through distant, disparate connections (Callois and Aubert 2007).

Bonding capital can be conceptualised as strengthening of homogeneous groups while bridging capital defines the connecting bonds that are formed between diverse groups (Newell et al. 2004). Bonding social capital focuses on the level of connectivity and density of social network connections (Putnam 1993). Bridging social capital focuses on the interlinkages and interactions between different networks and communities, and consists of the assets that are available to organisations through their interactions with external organisations.

3. Method

3.1 Wine Industry and Wine Clusters in Australia

The Australian wine industry is the 6th largest producer globally (Winetitles 2003). There are over 1900 wine operators in Australia who produced over one billion litres of wine in 2002 (Winetitles 2003; 2005). Of these, over 90% are small firms, which in Australia are defined as firms employing less than 20 people (Australian Bureau of Statistics 2001). The wine industry is a natural resource driven industry and has developed in clusters largely due to location-specific characteristics. There is evidence that clusters provide wine industry SMEs with significant performance advantages. Research in the Australian wine industry finds that 78% of SMEs export wine compared to 20% of non-cluster firms (Aylward and Zanko 2006).

3.2 The Hunter Valley Wine Cluster

Wine is produced in all of the Australian states. One of the regions where wine is produced is the Hunter Valley in New South Wales (NSW). The Hunter Valley was identified as an appropriate location for this study due to the dominance of SMEs and absence of a large technological leader. The region is situated around 120 kilometres north of Sydney and close to the coastal city of Newcastle. In the Hunter, the first wineries were established in the 1840s and today about 4,000 hectares of land are used for growing wine (McDonald 2005). Thirty-five

thousand tonnes of Hunter Valley grapes are crushed each year, coming from about 150 wineries (www.winetitles.com.au 2005, 2006). The economic value of the grape and wine industry in the Hunter exceeds \$A350 million and it employs 1240 people full time directly, another 480 in associated activities on grape and wine producing properties (McDonald 2005). The Hunter Valley wine cluster is comprised of small and medium sized firms and the majority of firms within the cluster are small enterprises, producing 500 tonnes of wine or less (Winetitles 2005).

3.3 Sample, data collection and analysis

This research is an initial investigation into the role of local technical specialists as gatekeepers in knowledge flows in the Hunter Valley wine cluster. The research question outlined above is directed to the processes of interaction and knowledge sharing set in a particular context (i.e. a cluster) and thus require the collection of rich empirical data around that cluster (Yin 2003) and, therefore, a qualitative methodology was chosen. According to Wolfe and Gertler (2004), the most successful case studies are able to overcome the limitations of quantitative methods and illuminate the underlying social and institutional dynamics that underpin patterns of interaction.

The method utilised to develop our interview structure was based on theoretical perspectives to enhance content validity. The criteria of ‘theoretical saturation’ was adopted to guide sampling decisions, which directs researchers to extend their sample until they are confident that no additional data can be found to contribute to category development (Glaser and Strauss 1967; Adams et al. 2006). Additional interviews were undertaken until the supplementary information generated was perceived by the researchers to be minimal.

Data was collected through one-to-one, semi-structured in-depth interviews comprising both structured and non-structured components (Cavana et al. 2001). A total of nineteen in-depth

interviews were undertaken during a twelve-month period over 2008 and 2010. A list of vineyard owners, contract oenologists and viticulturists was compiled based on local and public industry documents. In total, 73 technical specialists were identified, providing services to approximately 208 wineries. Within these three categories, potential participants were chosen randomly from this list and asked to participate in the interview process.

In order to minimise respondent bias, we triangulated our interviews across nineteen informants, incorporating both individuals who worked as technical specialists contracted to multiple organisations (gatekeepers), and vineyard holders who utilised contract technical specialists (recipients). This sample was constructed to encompass perspective differences regarding the role of technical specialists consequent to different industry functions (Eisenhardt 1989; Yin 1994). The interviewees had a combined total in excess of two-hundred years experience working in the wine industry and in the Hunter Wine Cluster. Interviews lasted for approximately one hour and were, in some cases, supplemented by written comments.

Interviewees were provided with an explanation of the purpose of the interview and were informed that their participation was confidential and voluntary. A summary of interviewee characteristics is provided in Table 1. The data sources are argued as reliable due to both the composition, which covers the spectrum of wine-related technical and business roles, and also because the interviewees all had long-term relevant, practical experience. Interview content was based on theoretical considerations, and all interviewees were asked about their role in the Hunter Valley wine cluster, and their perception of knowledge flow and exchange between actors within the region.

The majority of technical specialists in the Hunter Valley provide services to more than one organisation. The oenologists and viticulturists interviewed in this study hold contract

position within the Hunter Valley. Contract positions are common forms of engagement for technical specialists working in SMEs, and have previously being linked to knowledge acquisition (Macpherson and Holt 2007). Contract specialists typify the Hunter Valley as suggested by a local vineyard owner who notes “Ah, perhaps I should clarify, we use contractors for just about everything, um ...like for viticulture and winemaking, I use contractors.” Vineyard Owner

Each specialist is contracted to provide their technical service to two or more small firms. The sample was constructed to reflect local specialists who work within firms for extended periods, providing a comprehensive winemaking or viticulture service. While we later argue that these oenologists and viticulturists operate as knowledge gatekeepers, the purpose of their contract is the wine and grape production, not technological upgrading or knowledge acquisition.

Data analysis followed a cumulative process from basic pattern analysis, descriptive coding to interpretive coding, which focused on abstract concerns like the regional and professional collaborative patterns of viticulturists and oenologists in cluster knowledge flows and their consequent impact on knowledge flow in the cluster. During the analytical process, we found a high level of consistency among interviewees in their description of roles, patterns of activity and network relationships.

4. Main Empirical Findings

Assessment of the gatekeeper role is based on evidence that technical specialists gather information from a range of relevant source and communicate it to recipients (Tushman and Katz 1980). Excerpts from interviews with knowledge recipients, in this case vineyard owners, confirmed that contract oenologist and viticulturists were a key source of local and extra-cluster knowledge as noted by a local vineyard owner:

I talk to ‘Kevin’ (local contract viticulturist) on viticulture. Ahh, I also talk to ‘Gavin’ (local contract viticulturist) on viticulture. On winemaking I talk to ‘John’ who is my winemaker who was at Winery A. Prior to that I talked to Steven (local contract winemaker) who was at Winery X. Both of them are professionals at what they do and have got a lot of experience in either making wine or growing grapes or both, a lot more than I do. There are a lot of people around here you can ask for advice. *Vineyard Owner*

In support of their role as knowledge gatekeepers, our data suggest that technical specialists identify, retrieve and share knowledge sourced from outside the cluster, indicating significant bridging capital. In addition to technical associations, conferences and journals (noted in the following quote), extra-cluster knowledge was largely retrieved by technical specialists through professional connection, through participation in external research collaborations, as noted in the latter excerpt:

“There’s a multiplicity (of information sources). I get stuff from wine news from all over the world, I get publications and information from Hunter Regional Business Group, I get information from the NSW Wine Industry Association..., from the Orange Regional Vineyard Association, the Australian Wine and Brandy Corporation, and the Wine Industry Association of Australia...There’s a plethora of stuff” *Oenologist*

“We spent a month in France in Bordeaux two months ago, during vintage time...and got into the inner sanctum. It’s a matter of going and talking to the people.” *Oenologist*

Information is also sourced through direct searches consequent to the identification of a knowledge gap as described in the following excerpt:

“I sent some of my wines away for particular analysis a couple of weeks ago and the results came back that I asked for, but also there was an analysis of a different organism that I wasn’t particularly looking at and I had absolutely no idea of the implications of this organism...So I had

to call a technician at a company in South Australia and just ask them what are the implications of this extra analysis – do I need to worry about it? And we talked about it for about half an hour of so and he explained as best as he could what it was all about and, as it turns out, I didn't have any dramas, but it's one of those things – if I've got something and it's sort of rare and it's something that I'm not 100% sure about, I have absolutely no hesitation about getting on the 'phone and asking someone who probably would have a better idea" *Oenologist*

Through interaction with knowledge sources external to the cluster, technical specialists established 'pipelines' between external sources of expertise including other wine regions and research institutions. This reflection of their bridging capital relied on network overlapping which enabled technical specialists to draw resources from other actors through organisational and professional linkages (Putnam 2001). Bridging capital impacted knowledge flow by providing the advantages associated with weak ties – access to novel information through the connection of previously disparate organisations (Hansen 1999). Through their embeddedness in professional networks, local oenologists and viticulturists connect to the global 'systemworld' of wine (Habermas and Outhwaite 1996), encompassing rapidly and globally disseminated technological innovations in grape cultivation as well as fermenting, processing and blending (Lagendijk 2004). In so doing, they utilised their social capital to bridge structural holes, or gaps in the knowledge flow, spanning the cluster boundary, thereby providing SMEs with access to a broad array of technical knowledge (Burt 2004).

Our data also indicate that local specialists facilitated the diffusion of local knowledge, and suggested a distinction between the extra- and intra-cluster knowledge flows. While externally-sourced knowledge was typically codified and technical, local knowledge was, in all cases, situated and largely acquired through workplace trial-and-error. External knowledge sources provided scientific, research-based knowledge generated by research institutions, cluster

knowledge sources provided with practice-based, experientially-derived knowledge generated in local contexts, as depicted in the following excerpt:

“Often we get snails in our vineyard and they climb up into the vine and they eat the flowers. We had tried different sprays, and my husband said, well snails hate vinegar...And they do – they hate vinegar. And so I said to our viticulturist, ‘John’ reckons we should give this a go. So we did and I sprayed (the vines) and it got rid of the snails. Our viticulturist is on the viticulture team for the Wine Industry Association and every time she went to a meeting or she spoke to someone who was talking about snails, she said, have you tried this? And so other people started trying it.”

Oenologist

When asked to describe their knowledge-related contacts, oenologists and viticulturists reported patterns of connections and knowledge acquisition that reflected this dichotomy, between external scientific knowledge, from the technological frontier, and experientially, locally-embedded knowledge. For example, one Hunter Valley oenologist acquires specialist technical advice on oenology and engineering from extra-cluster consultants and national research institutes, and utilises local knowledge networks, encompassing vineyard owners, and other contract viticulturists and oenologists, to acquire and share knowledge on locally-specific issues.

Our data provide support for this local gatekeeping role in both organised (Oenologist) and spontaneous (Viticulturalist) knowledge-sharing interactions within the cluster.

“One of my mates and I have instigated a bit of a get together with some of our mates...I think the first time we did this was about three years ago. There was probably about 6 or 8 of us where we brought our current vintage Semillons out of tank, prior to bottling, and line them up at the table and...taste our wines against other people’s wines and I guess it’s a bit of a benchmarking exercise and have this discussion about who’s doing what and ‘that wine was good – what have you done there’...Over the last years it’s grown to the points where...we’re getting about 40

people to it...So, that's really good. We put a few snags on the barbie, have a few beers, and generally turns into a fairly late night" *Oenologist*.

"The wine industry is a very close community where knowledge of any description is readily available from fellow viticulturists or winemakers...I am regularly "sprung" driving through vineyards uninvited whilst I inspect their vineyard management practices and levels of disease infection. Never been thrown off a property yet – rather the owner/manager is more than willing to share his problems and discuss remedies and what else is happening in the district."

Viticulturist

The latter quote illustrates how the technical specialists bonding capital not only allowed him to identify and assimilate local knowledge and expertise, but also to disseminate that knowledge to recipient organisations. Bonding capital facilitates the development of cooperative norms, trust and shared institutions so that connected organisations are able to cooperate effectively to achieve cooperative goals (Putnam 1993). Bonding capital reflects mutual trustworthiness, cooperative norms and sharing attitudes, which lower transaction costs by minimising the threat of opportunism (Dyer 1997; Gulati 1999; Andrews and Delahaye 2000; Huxham and Hibbert 2008). Organisations are also able to exchange knowledge under the premise that network benefits will accrue to individual firms (Dyer and Nobeoka 2000), which allows technical specialists to collaborate and share knowledge even in circumstances which require the discussion of potentially sensitive issues:

"As a (wineshow) judge, when you see a common fault...from a particular winemaker, I never hesitate in saying to him "Listen have you had a look at this...your wine has suffered from this problem or that problem". *Winemaker*

Being part of the local Hunter Valley community, means that viticulturists and oenologists share relationships characterised by trust, common experiences and shared meaning, which overcomes many of the social barriers to SME knowledge sharing (Anderson and Boocock 2002). The importance of socially-based local exchanges was recognised by all interviewees and reflected by one oenologist who noted “You can’t make a good wine without a few beers”. *Oenologist*.

Intra-cluster knowledge sharing was perceived as valuable because national and international differences in terroir, climate and grape varieties provided limited opportunity for “comparing apples with apples...” Oenologist. The knowledge shared through local exchanges was characterised as cluster-specific and as providing access to specialist expertise unique to the Hunter that had been developed, often through trial and error, over successive vintages, as evidenced by the following excerpt:

“What other regions are doing may not be relevant to what I’m doing...For example, the Hunter Valley Semillon is a very very unique style of wine and no-one does it better in Australia, and, in fact, the world. It’s a world class, a very unique style and for me to go and ask someone else for advice on Semillon would just be a waste of time because we do it better than anyone else in Australia” *Oenologist*

Through local interaction, oenologists and viticulturists gain access to valuable tacit knowledge relating to Hunter wine-making methods, which is shared and embedded in local context and therefore very difficult for firms outside the cluster to imitate (Maskell and Malmberg 1999; Pinch et al. 2003; Martin and Sunley 2006). This local knowledge was perceived as central to the refinement of the ‘iconic Hunter style’ of winemaking and therefore evidenced advantages of intra-cluster knowledge sharing from a path dependency perspective.

“The first person we would rely on is ‘John’, a very senior oenologist in the valley who started making wines at (local wine firm) in the ‘50s. He created the iconic Hunter style really...so he’s someone who we’ve used informally and formally to some extent for probably 25 years.”

Oenologist

This form of local knowledge use allows the cluster to develop a cumulative path of learning, which builds on extant expertise and provides a platform for continued development along the cluster’s learning trajectory (Dosi 1988). We found evidence that technical specialists were aware of the value of building on current competencies, and particularly that their winemaking style was a source of differentiation and therefore competitive advantage. For example, Hunter Valley Young Winemakers Tasting Association involves:

“people new to winemaking...so it may be cellar hands or lab technicians or assistant winemakers or trainee winemakers...they come along and then we get three senior winemakers from around the valley (to discuss) the history of the valley, the history of the vineyards and winemaking...and we go through the wines with these people and have a big tutorial.”*Oenologist*

Through their local embeddedness, local contract oenologists and viticulturists are part of the Hunter Valley ‘lifeworld’ as well as the wine ‘systemworld’ (Habermas 1984). They connect the local lifeworld and global systemworlds and, through this, allow Hunter Valley SMEs to not only acquire and utilise globally-sourced, ‘state-of-the-art’ technology, but to adapt these to suit local conditions and maintain sources of differentiation. As depicted in Figure 1, their professional and local embeddedness allows local oenologists and viticulturists to be contrasted with ‘flying winemakers’, who, while responsible for the transfer of technological innovations, grape varieties and marketing developments throughout the globe, have been accused on

homogenising wine to the extent that “One country’s Cabernet or Merlot could easily be another’s” Editorial, WINE, November 2001).

This capability to integrate externally-derived knowledge on technical advances and local experience-based knowledge is depicted in the following excerpt:

“I get value out of their winemaking technical subcommittee, when they do things in relation to the Australian Wine Research Institute – the AWRI. Because they’re a (representative) body, they usually contact the AWRI and say we need to do a stability or faults seminar, they’ll organise that and bring the related oenologists or the scientists in the field of protein hazes, what are the causes, how do we manage it on a practical level, blah blah blah. I attend those seminars and they’re very good seminars to attend, not only for the knowledge but it’s an opportunity for all the winemakers to get together and have a bit of a yak about up and coming things, and ‘how did you find the Vintage – oh yeah, a bit grassy – what did you think about that?, or did we try this this year?, oh did that work for you?’ And then you go into the seminar and you gather information, and I think that side of their association is very very good and very practical and very informative for me.” *Oenologist*.

Being part of the wine ‘systemworld’ as well as the local Hunter Valley ‘lifeworld’ has the effect of allowing global technical advances to be adapted to reflect local preferences and conditions. It also allows technical specialists to share knowledge with non-expert recipients. This stems both from the existence of relationships characterised by trust and reciprocity, and also because of knowledge of what the recipient will understand.

In addition to being positioned to assimilate external specialist information, technical specialists increased the absorptive capacity of clustered firms by ‘translating’ knowledge so that it could be understood by non-specialist recipients...“in a way our viticulturist was not just a

connector but a translator... viticulture is a science so it's a different language, there's different terms you have to know" Vineyard Owner. This translation role was mentioned between technical specialists, with viticulturists noted to have a role in translating technical information for oenologists... "...it's a pretty neat process because I (oenologist) have to understand what's going on in the vineyard, but my area of expertise in is the winery" Oenologist. Such translation overcomes the limitations associated with cognitive distance and allows small firms to access knowledge that is typically unavailable due to a lack of absorptive capacity (Carlile 2002).

In summary, this empirical work indicates that technical specialist, operating as knowledge gatekeeper use bridging capital to identify and retrieve scientific knowledge from the technical frontier and bonding social capital to enable the acquisition of experientially-derived local knowledge, the adaptation of global innovations to reflect local preferences and conditions, and the dissemination of knowledge throughout the SME cluster.

5. Implications, Propositions and Future Research

By investigating knowledge flow and patterns within the Hunter Valley wine cluster, this paper achieves its aim to explore role of technical specialists as knowledge gatekeepers and the mechanisms through which technical specialists influence knowledge sharing to, and between, SMEs in clusters.

Three novel findings emerge that demonstrate the value of technical specialists in facilitating knowledge flow. The first finding, that knowledge gatekeeping is a key role undertaken by contract oenologists and viticulturists, is significant because it illustrates an effective knowledge brokering function in clusters that overcomes the constraints imposed by significant cognitive distance from the technological frontier. These findings can be interpreted against some of the recent research into SME intermediary roles in the Netherlands which indicates that the transfer of rich knowledge is a core contribution to innovation networks, and

that this is linked to the reduction of cognitive and technological distance between knowledge sources and recipients (Kirkels and Duysters, 2010).

The second finding relates to the ability of such specialists to facilitate the flow of two complementary types of knowledge. Oenologists and viticulturists were able to retrieve and disseminate valuable scientific knowledge sourced from external sources to recipient firms, and also assist in the diffusion of situated, experiential local knowledge throughout the cluster. In doing so, they connected clustered SMEs to the global wine 'systemworld' by acquiring knowledge on technical developments and innovation from external professional and industry connections. Through their embeddedness in the local 'lifeworld', these technical specialists are capable of integrating technical expertise and experientially-derived know-how to develop and refine locally-specific wine-making styles and grape production. This dual gatekeeping function means that oenologists and viticulturists are capable of locally integrating 'systemworld' and 'lifeworld' by adapting scientific, technical advances to suit local conditions thereby maintaining regional differentiation and avoiding the threat of 'vinous homogenisation'.

The final contribution of this paper is to identify the role of social capital accrued by these specialists which is harnessed both to search for valuable knowledge and share this knowledge within the cluster. A second significant contribution of this research is to support the role of social capital in technical specialists' gatekeeping role. Technical specialists utilise their own bridging and bonding social capital to identify and assimilate knowledge, and use their bonding capital within the cluster to disseminate knowledge to recipient organisations. All technical specialists discussed their access to knowledge through extensive national and international linkages developed and maintained by means of artefacts of their profession, such as conferences, industry associations and research collaboratives. These networks were used to

identify and access valuable, non-redundant knowledge. Interviewees also described a system of close local connection in which specialists and clustered firms were embedded. These connections, representing bonding capital, provided the opportunity to source local tacit understanding, particularly experience-based knowledge, and also facilitated knowledge transfer, even of a critical nature, to recipient firms. Intra-cluster bonding capital allowed technical specialist to effectively provide unsolicited advice that represented criticism of current practice.

These findings are significant because there are significant barriers to knowledge acquisition for clustered SMEs, both social and cognitive, and these significantly constrain smaller firm's ability to accrue knowledge-based advantage from clusters (Morrison and Rabellotti 2009). Our research indicates that technical specialists can operate as mechanisms that share knowledge between disconnected organisations, and overcome organisational and cognitive distance with considerable knowledge-related effect. As such, they provide SMEs with knowledge connections, or conduits (Inkpen 2000; Inkpen and Pien 2006). This finding is particularly interesting given the competitive relationship between many SMEs in industry clusters, and builds on findings that informal relations between professionals in competing firms are a key vehicle for the acquisition of valuable specialist knowledge (Dahl and Pedersen 2003).

This research has several limitations. As a case study, the generalisability of our findings cannot be assessed except insofar as they conform to existing published research. While the sample does not hamper our ability to determine whether technical specialists play a knowledge-gatekeeping role, it does limit our ability to determine to what extent these roles and associated functions are played out in clusters with different industry dynamics and cultures. Future research should attempt to replicate or extend our study with alternative cases and non-case methods that will allow for the collection of data across a large number of clustered firms.

Despite its limitations, we believe that our study had a number of strengths. We collected data from several different sources and we were therefore able to explore the same research issue in different contexts in the same cluster. Similar reports from each of these different perspectives give confidence in the validity of interview findings.

Despite the limitations, the reported findings have significant implications for our understanding of the circumstances affecting organisations ability to draw value from cluster membership. Research into Chilean wine regions, for example, suggests that policy developers should be cognizant of the emerging evidence that firm innovation and learning is driven primarily by the knowledge bases (absorptive capacity) of individual firms, which mandates measures promoting the knowledge base of clustered firms and limits the potential effectiveness of measures designed to foster intra-cluster communication and collaboration (Giuliani and Bell 2005; 2008). In contrast, our research indicates that technical specialists provide less knowledgeable firms with the ability to learn through their gatekeeping role, which suggests that policies promoting collaboration, particularly involving individual experts, are likely to be effective in facilitating firm learning. Our findings indicate the value, for SME's in particular, of utilizing technical specialists and reinforce the importance of mechanisms designed to strengthen specialists' knowledge and networks, for example, reinforcing professional associations as hubs facilitating the continuing development of expert's knowledge bases as a more efficient mechanism to enhance cluster absorptive capacity. Our data therefore strengthen claims that organizations, and indeed, regional innovation policy, should incorporate both a focus on human capital (utilization and training of specialists) and social capital (development of trusting relationships) (Nauwelaers 2001).

References

- Adams Richard, Bessant John, Phelps Robert. Innovation management measurement: A review. *International Journal of Management Reviews* 2006; 8 (1): 21-47.
- Allen T. *Managing the Flow of Technology*. Cambridge MA: MIT Press, 1977.
- Allen T. J., Cohen S. I. Information flow in research and development laboratories. *Administrative Science Quarterly* 1969; 14 (1): 12-19.
- Amburgey Terry L., Singh Jitendra V. Organizational Evolution. In: Joel A. C. Baum editor. *Blackwell Companion to Organizations*, 2002. pp. 327-343.
- Anderson V., Boocock G. Small firms and internationalisation: Learning to manage and managing to learn. *Human Resource Management Journal* 2002; 12 (3): 5-24.
- Andrews K.M., Delahaye B.L. Influences on knowledge processes in organizational learning: The psychosocial filter. *Journal of Management Studies* 2000; 37 (6): 797-810.
- Asheim B. Learning regions as development coalitions. Partnership as governance in European workforce states? *Concepts and Transformation* 2001; 6 (1): 73-101.
- Australian Bureau of Statistics. *Small Business in Australia*
- Aylward D., Zanko M. Emerging interorganizational structures in the Australian wine industry: Implications for SMEs
- Baptista R. , Swann G. Do firms in clusters innovate more? *Research Policy* 1998; 27: 527-542.
- Bathelt Harald, Malmberg Anders, Maskell Peter. Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography* 2004; 28 (1): 31-56.
- Burt Ronald. Structural holes and good ideas. *American Journal of Sociology* 2004; 110 (2): 349-399.
- Callois Jean-Marc, Aubert Francis. Towards Indicators of Social Capital for Regional Development Issues: The Case of French Rural Areas. *Regional Studies* 2007; 41 (6): 809-821.
- Carlile P. A pragmatic view of knowledge and boundaries: boundary objects in new product development. *Organization Science* 2002; 13 (4): 442-455.
- Casanueva C., Castro I., Galán J.L. Informational networks and innovation in mature industrial clusters. *Journal of Business Research* 2012.
- Cavana R.Y., Delahaye B.L., Sekaran U. *Applied Business Research: Qualitative and Quantitative Methods*. Sydney: John Wiley & Sons, 2001.
- Cohen Wesley M., Levinthal Daniel A. Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly* 1990; 15: 128-152.
- Cudney S., Craig C., Nichols E., Weinert C. Barriers to recruiting an adequate sample in rural nursing research. *Online Journal of Rural Nursing and Health Care* 2004; 4 (2): 78-88.
- Dahl M.S., Pedersen C. Informal networks in a regional cluster
- Dosi Giovanni. Sources, Procedures and Microeconomic Effects of Innovation. *Journal of Economic Literature* 1988; 26 (September): 1120-1171.
- Dyer J. H., Nobeoka K. Creating and managing a high-performance knowledge-sharing network: The Toyota case. *Strategic Management Journal* 2000; 21 (3): 345.
- Dyer Jeffrey H. Effective interfirm collaboration: How firms minimize transaction costs and maximize transaction value. *Strategic Management Journal* 1997; 18 (7): 535-556.
- Easterby-Smith M., Lyles M.A., Tsang E.W.K. Inter-organizational knowledge transfer: Current themes and future prospects. *Journal of Management Studies* 2008; 45 (4): 677-690.

- Eisenhardt Kathleen M. Building Theories from Case Study Research. *Academy of Management Review* 1989; 14 (4): 532.
- Escribano A., Fosfuri A., Tribo J.A. Managing external knowledge flows: The moderating role of absorptive capacity. *Research Policy* 2009; 38 (1): 96-105.
- Fromhold-Eisebith Martina. Innovative milieu and social capital: Complementary or redundant concepts of collaboration-based regional development. *European Planning Studies* 2004; 12 (6): 747-765.
- Gittelman M., Kogut Bruce. Does good science lead to valuable knowledge? Biotechnology firms and the evolutionary logic of citation patterns. *Management Science* 2003; 49 (4): 366-382.
- Giuliani Elisa. The selective nature of knowledge networks in clusters: evidence from the wine industry. *Journal of Economic Geography* 2007; 7 (2): 139-168.
- Giuliani Elisa, Bell Martin. The micro-determinants of meso-level learning and innovation: evidence from a Chilean wine cluster. *Research Policy* 2005; 34 (1): 47-68.
- Giuliani Elisa, Bell Martin. Industrial clusters and the evolution of their knowledge networks: Back again to Chile
- Glaser Barney G., Strauss Anselm. *The Discovery of Grounded Theory*. Chicago: Aldine, 1967.
- Graf H. Gatekeepers in regional networks of innovators. *Cambridge Journal of Economics* 2011; 35 (1): 173-198.
- Gulati Ranjay. Network location and learning : The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal* 1999; 20 (4): 397-420.
- Habermas Jürgen. *The Theory of Communicative Action*. Cambridge: Polity, 1984.
- Habermas Jürgen, Outhwaite William. *The Habermas reader*. Cambridge, UK: Polity Press, 1996.
- Hansen Morten T. The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits. *Administrative Science Quarterly* 1999; 44 (1): 82-111.
- Huxham C., Hibbert P. Manifested Attitudes: Intricacies of Inter-Partner Learning in Collaboration. *Journal of Management Studies* 2008; 45 (3): 502-529.
- Ibrahim Sherwat, Fallah M. Hosein. Drivers of Innovation and Influence of Technological Clusters. *Engineering Management Journal* 2005; 17 (3): 33-41.
- Inkpen A.C. Learning through joint ventures: a framework of knowledge acquisition. *Journal of Management Studies* 2000; 37 (7): 1019-1044.
- Inkpen A.C., Pien W. An examination of collaboration and knowledge transfer: China-Singapore Suzhou industrial park. *Journal of Management Studies* 2006; 43 (4): 779-811.
- Keeble David, Wilkinson F. High-technology SMEs, regional clustering and collective learning: An overview. In: D. Keeble, F. Wilkinson editors. *High-technology clusters, networking and collective learning in Europe*. Aldershot: Ashgate, 2000.
- Lagendijk Arnoud. Global 'Lifeworlds' versus local 'Systemworlds': how flying winemakers produce global wines in interconnected locales. *Tijdschrift voor Economische en Sociale Geografie* 2004; 95 (5): 511-526.
- Lane Peter J., Lubatkin Michael. Relative Absorptive Capacity and Interorganizational Learning. *Strategic Management Journal* 1998; 19: 461-477.
- Lavie D., Rosenkopf L. Balancing exploration and exploitation in alliance formation. *Academy of Management Journal* 2006; 49 (4): 797-818.

- Macdonald S., Williams C. Beyond the boundary - an information perspective on the role of the gatekeeper in the organization. *Journal of Product Innovation Management* 1993; 10 (5): 417-427.
- Macdonald S., Williams C. The survival of the gatekeeper. *Research Policy* 1994; 23 (2): 123-132.
- MacGregor R.C. Factors associated with formal networking in regional small business: Some findings from a study of Swedish SMEs. *Journal of Small Business and Enterprise Development* 2004; 11 (1): 60-74.
- Macpherson Allan, Holt Robin. Knowledge, learning and small firm growth: A systematic review of the evidence. *Research Policy* 2007; 36: 172-192.
- Malmberg Anders, Power Dominic. How do firms in clusters create knowledge. *Industry and Innovation* 2005; 12 (4): 409-431.
- Marsden Peter V. Brokerage Behavior in restricted exchange networks. In: Peter V. Marsden, Nan Lin editors. *Social structure and network analysis*. Beverly Hills: Sage Publications, 1982. p. 319 p.
- Martin Ron, Sunley Peter. Path dependence and regional economic evolution. *Journal of Economic Geography* 2006; 6 (4): 395-437.
- Maskell Peter, Malmberg Anders. Localised learning and industrial competitiveness. *Cambridge Journal of Economics* 1999; 23 (2): 167.
- McDonald R. The Hunter Wine Industry
- McFadyen M. A., Cannella A. A. Social capital and knowledge creation: Diminishing returns of the number and strength of exchange relationships. *Academy of Management Journal* 2004; 47 (5): 735-746.
- Morrison Andrea. Gatekeepers of Knowledge within Industrial Districts: Who They Are, How They Interact. *Regional Studies* 2008; 42 (6): 817-835.
- Morrison Andrea, Rabellotti Roberta. Knowledge and Information Networks in an Italian Wine Cluster. *European Planning Studies* 2009; 17 (7): 983-1006.
- Nahapiet Janine, Ghoshal Sumantra. Social capital, intellectual capital and the organizational advantage. *Academy of Management Review* 1998; 23 (2): 242-266.
- Narula R. R&D collaboration by SMEs: New opportunities and limitations in the face of globalisation. *Technovation* 2004; 24 (153-161).
- Nauwelaers C. Path-dependency and the role of institutions in cluster policy generation. In: A Mariussen editor. *Cluster Policies - Cluster Development?* Stockholm: Nordregio, 2001.
- Newell S., Tansley C., Huang J. Social capital and knowledge integration in an ERP project team: The importance of bridging AND bonding. *British Journal of Management* 2004; 15: S43.
- Nooteboom Bart. Innovation and diffusion in small firms: Theory and evidence. *Small Business Economics* 1994; 6: 327-347.
- Nooteboom Bart, Van Haverbeke Wim, Duysters Geert, Gilsing Victor, van den Oord Ad. Optimal cognitive distance and absorptive capacity. *Research Policy* 2007; 36 (7): 1016-1034.
- Owen-Smith J., Powell W. W. Knowledge networks in the Boston biotechnology community
- Pinch Steven, Henry Nick, Jenkins Mark, Tallman Stephen. From 'industrial districts' to 'knowledge clusters': a model of knowledge dissemination and competitive advantage in industrial agglomerations. *Journal of Economic Geography* 2003; 3 (4): 373.

- Putnam R.D. The Prosperous Community: Social Capital and Public Life. *American Prospect* 1993; 13: 35-42.
- Putnam Robert D. *Bowling Alone: The Collapse and Revival of American Community*. Carmichael, CA: Touchstone Books, 2001.
- Sammarra A., Biggiero L. Heterogeneity and Specificity of Inter-Firm Knowledge Flows in Innovation Networks. *Journal of Management Studies* 2008; 45 (4): 800-829.
- Tushman Michael L., Katz Ralph. External communication and project performance: An investigation into the role of gatekeepers. *Management Science* 1980; 26 (11): 1071-1085.
- Winetitles. *The Australian and New Zealand Wine Industry Directory*: Winetitles, 2003.
- Winetitles. *The Australian and New Zealand Wine Industry Directory*
- Wissema J.G., Euser L. Successful innovation through inter-company networks. *Long Range Planning* 1991; 24 (6): 33-39.
- Wolfe David, Gertler Meric. Clusters from the inside and out: Local dynamics and global linkages. *Urban Studies* 2004; 41 (5-6): 1071-1093.
- Wu W. Dimensions of social capital and firm competitiveness improvement: The mediating role of information sharing. *Journal of Management Studies* 2008; 45 (1): 122-146.
- Yin Robert K. *Case Study Research: Design and Methods*. Thousand Oaks, CA: Sage, 1994.
- Yin Robert K. *Case Study Research: Design and methods*. Newbury Park: Sage, 2003.
- Yli-Renko H., Autio E., Sapienza H. J. Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal* 2001; 22 (6-7): 587.

Table 1
Interviewee Characteristics

	Current Position	Length of Time in the Wine Industry	Length of Time in the Hunter
1	Winemaker (Contract)	5-9 years	5-9 years
2	Winemaker	5-9 years	5-9 years
3	Viticulturist	5-9 years	5-9 years
4	Vineyard Owner and Winemaker (Contract)	20+ years	20+ years
5	Winemaker	20+ years	20+ years
6	Winemaker (Contract)	15-20 years	15-20 years
7	Senior Winemaker	10-14 years	10-14 years
8	Viticulturist	1-4 years	1-4 years
9	Winemaker	10-14years	10-14 years
10	Chief Winemaker (Contract)	20+ years	20+ years
11	Winemaker (Contract)	20+ years	20+ years
12	Winemaker (Contract)	10-14 years	5-9 years
13	Viticulturist	20+ years	20+ years
14	Vineyard Owner	5-9 years	5-9 years
15	Winemaker (Contract)	20+ years	20+years
16	Winemaker (Contract)	10-14 years	10-14 years

Figure 1

Systemworld and lifeworld: Local Technical Specialists vs Flying Winemakers

	Systemworld	Lifeworld
Global	Market integration and ‘vinous homogenisation’; global concepts of wine production and marketing (Lajendijk, 2004)	Flying-winemakers – global dissemination of technology and market development through connection to local winemakers.
Local	Acquisition and local adaptation of technological advances through external, professional networks of local oenologists and viticulturists.	Refinement of regional winemaking styles and grape production based on locally-specific, experience-derived knowledge.

Source: Adapted from Lajendijk (2004)