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Abstract

A survey analysis of innovation information and input sourcing of New South Wales regional exporting firms indicates that the majority of regional exporters were small to medium sized enterprises (SMEs). The analysis shows that these SMEs have been able to establish their own extensive information linkages into the international economy. Consequently, the need to assess and develop the benefits of linkages between small and large firms is not highly significant within the New South Wales regions.

The analysis indicates that international networking by SMEs brings knowledge to the regions, which facilitates intra-firm learning. However, it suggests that SME's local or regional linkages are relatively underdeveloped, as a source of new knowledge for innovation activity. This is in contrast to the main body of economic literature, which argues that small regional exporters utilize local networks as a major input into their success. This research identifies intensification in the usage of regional networks as one means of improving SME performance in more remote regions.

The analysis also indicates that a two-way effect results by the diversity of regional SME export sector base. Firstly, it restricts the client-supplier relationships preventing closer industry specific collaborations but secondly, it can be advantageous in that it restricts competition between regional exporters. This creates conditions allowing some information sharing regarding the opportunities and ways of entering overseas markets, which do not affect the competitive position of the mentoring firm.

In concluding, the paper argues that the basic requirements for regional learning development are in place but requires an increase in the interaction intensity between local SMEs in order to achieve a higher level of collaboration and knowledge sharing.

Key words / phrases:
Innovation, regional development, international networking.

JEL Codes
O180, O310, O330, R110, R120, R320

SME Information Sourcing for Innovation and Export Market Development
From Local or External Networks?

1. Introduction

During the last two decades the process of globalisation within developed economies has led to unexpected increases in regional firms becoming more horizontally integrated within their regions in contrast to the expected dominance of vertically integrated hierarchical firms (Acs and Audretsch, 1993; Loveman and Sengenberger, 1991; Sylos-labini, 1986). This process has coincided with empirical studies which have identified regional SMEs (small to medium sized enterprises) and local information networks as the main sources of information for innovation and technological developments for their developing export industries (Audretsch and Vivarelli, 1994; Pavitt et al.; 1987; Rothwell, 1989). This observation contrasts with the previous expectations of larger firms being the source of regional development, considering their higher concentrations of R&D expenditure, that innovation output depends strongly on R&D input (Scherer, 1991) and that the larger firms are expected to drive the technological process as they source their information from external networks (other regions or global networks).

This paper presents a preliminary analysis of data from a recent survey of regional New South Wales exporters. The analysis investigates the level and type of innovation undertaken by firms in different employment size categories, the extent to which they source new technologies through self-development or via collaborations with other institutions, and their pattern of sourcing new market information using local regional and external networks. Some preliminary analysis of innovative milieu and spatial effects is also provided. A more thorough study which will include a range of additional variables influencing innovation and knowledge networks is underway.

2. Theoretical background

The argument that innovation information is mainly sourced from SMEs is one originally advocated by the Schumpeter I model (Schumpeter, 1939). The Schumpeterian model of the creative entrepreneur was as the risk-taker who converted inventions into commercial innovations. As such, these firms did not necessarily conduct their own research and development but were often viewed as sourcing their new products from an exogenous bank of independent inventions associated with third parties such as other firms or local research Universities (Simmie 2001). Alternatively, the Schumpeter II model (1942) emphasizes the role of the large oligopolistic firms for the development of endogenous research, and is used as the basic model to demonstrate the contributions of large firms or MNCs within a global economy. It argues that continuing investment and the development of new ideas produces a stream of innovations, the commercial success of which stimulates further research and development investments. As such, it includes a strong positive feedback loop linking successful innovation to increased research and development

activities via a self-reinforcing circle, which in turn leads to further increased innovation concentrations (Freeman et al., 1982).

However, it is argued that within the globalized economy, the sources of innovation information for endogenous regional economic development, differ widely between SMEs and large firms due to their resource and networking differences. In much of this analysis, the terms large firms and MNCs are used interchangeably in that large firms whether domestically or foreign owned are considered to have a significant present in overseas markets. Vernon (1979) argued that SMEs networks are less global and more locally based and therefore their information sources are limited to the personal exchanges, collective learning, trust, cooperation and a trickling of information from the local MNCs. It has also been suggested that SMEs receive long distance knowledge spillovers from regional MNCs, particularly in the case of some user-supplier relationship, and that these can weaken as the distance from the relevant MNC increases (Amin and Robins, 1990; Amin, 1991; Pratt, 1991). Alternatively, MNCs are believed to have sufficient resources to search the globe for information and new inventions and therefore produce innovations anywhere they regard as suitable. Consequently, Vernon (1979) argued that they locate their head offices, research sections and financing centres within the metropolitan CBDs, thereby increasing innovation and firm cluster growth. Vernon (1979) further argued as these international cities attract the latest innovation ideas they become the first localities to exploit and benefit from them.

Relevant to this issue are two theoretical concepts: firstly, the significance of networks within a regional economy and secondly, proximity to a network being critical for accessing the guidance and information when developing innovations and export markets. However, as networks may include other firms, universities and support services, increasing support has been given to the significance of locally sourced information (from within the region) through the role of the SME, over that of externally sourced information via multinational corporations or other corporate entities. This emphasis on local networks occurs despite an increasing tendency for some firms to also develop external linkages in line with the increased globalization of their activities.

The significance of networks has long been acknowledged for regional economies. For example, the OECD (1992) argues that they provide a higher degree of flexibility for innovation and production opportunities and Porter and Fuller (1986) have emphasized their relevance for the speed of communication "as being one of the major advantages that networks have over acquisition or internal development through arm's length relationships" (Fischer, 1991). This advantage has become more important as product life cycles shorten and competition intensifies (Fischer, 1991). Also, high R&D costs have been noted to force SMEs to pool resources with other firms and in some cases even with competitors (OECD, 1992). Lundvall (1988) argues that SMEs and other firms that lack the necessary in-house R&D facilities, may develop information networks to enhance their absorption capacities. This occurs by learning from customers and suppliers, interacting with other firms and taking advantage of knowledge spillovers from other firms and industries, particularly those within close proximity.

This proximity argument presupposes that distance reduces the ability to receive knowledge and consequently a firm's innovations are more dependent upon local, rather than external linkages and networks. It is assumed that the concentration of skilled labour in one location can increase communication flows that lead to new products and processes. Saxenian (1994, 1996) has emphasized this process within large agglomerations of specialized, related and diversified industries in her study of Silicon Valley clusters. As such clusters and the networks within them were found to speed up the movement of ideas and facilitate high levels of inter-firm worker mobility among engineers as well as the informal communication among skilled workers.

Williamson (1975, 1985) drawing upon Coase (1937), developed the institutional analysis theory which argues that economic relations are controlled either within the hierarchies of large companies or by market relations between them and that these relationships were being replaced by collaborative networked forms of production as firms maneuvered to reduce their transaction costs. The resultant vertical disintegration of large companies is similar to that predicted by Piore and Sabel (1984) and may influence the regional distribution of innovations as an innovator's network or capacity to network changes.

Furthermore, global theorists have argued that international networks have a two-way influence. The first function involves collaboration with distant customers, suppliers and competitors and is paramount to accessing required information as it offers new opportunities for regions that fit into world markets (Saxenian, 1994). For example, multinational manufacturing, service or consultancy companies are known to often exchange new international information and knowledge. The second is that they influence MNCs to locate their knowledge-rich head offices and research sections within the core metropolitan regions of their respective national urban hierarchies. As a result, international knowledge is also exchanged between firms of different sizes and the time proximity of these core regions facilitates long-distance knowledge spillovers between them. However, Freeman (1994), citing Stiglitz (1987) argued that the entry of new global competitors can also constrain information access for innovation development.

The close proximity to networks is also noted to facilitate the relationships between regional suppliers and purchases, face-to-face contact, and employee mobility which in turn facilitates an environment of cooperative learning. Innovative milieu theorists argue that these networks may contain varying combinations of SMEs and MNCs so that the resultant intense inter-industry linkages incorporate R&D and the demand for new products or processes. Consequently, these milieus often develop in large cities and act as incubators of cooperative learning for the generation of new ideas (Maillat 1997).

3. Previous analytical typologies

Several typologies have been developed to analyse the impact of the interaction of regional context with the global process. These consist of those developed by Porter

(1993), the innovative milieu theorists (GREMI, 1984)[1] and more recently, Tiberi-Vipraio and Hodgkinson (2000). Each considers regional context as a geographical area of common community, culture and values. These values including such aspects as: the region's historical background, local business practices, attitudes towards risk, cooperation, trust and the degree of openness in social and economic relationships within the region and with outsiders. As such, these typologies also assume that changes in regional culture will allow for the adoption of new ideas (i.e. best practice solutions to economic problems) from outside the regions, which when embedded within their local contexts, enhance the competitive export advantage of regional exporters.

Porter's (1993) typology is based upon the assumption that firms distribute and integrate their various production stages (i.e. design, manufacture, sales) and consequently the employment of their factors of production across a region in order to reduce their transaction and production costs. He surveyed firms to measure the intensity of firm trade within the regions and between the regions as well as their regionally integrated value-added production activity, be it kept in-house or outsourced to subcontractors. From this data he determined levels of horizontal or complementary inter-relations (or integration) and derived four main types of sometimes overlapping integration levels, or territorial production systems. These range from the first type which displays what is termed functional logic to the fourth which displays territorial logic (Maillat and Perrin 1992; Maillat et al 1994; Camagni 1991, 1998) (Porter, 1993).

According to Porter (1993), firms displaying functional logic have a vertical hierarchical or central management that makes most of the decisions thereby restricting integration into and across the region, whereas firms displaying territorial logic are the opposite. The four main types are described in the paragraphs below (Maillat, 1998) and those more likely to contain SMEs are the first, third and fourth territorial production systems whereas MNCs are more likely to be located within the second territorial production system.

The first identified territorial production system usually consists of small isolated firms, or branches of larger firms that locate their head offices outside of the region. The external head office undertakes all the innovation related decisions and locates all activities, including that of branches according to traditional functional fordist localisation criteria (labour cost, access to infrastructure, raw material and transport facilities etc.) hence it is referred to as functional logic. Consequently the branches act independently of other regional firms thereby demonstrating no integration or territorialisation whatsoever. Crevoisier (1996) argues that the isolation and resultant non-communication of these firms, causes this system to lack the necessary exchange relations required to generate the interactive learning for regional specific endogenous resources development and therefore provides only passive support for the location of branch activities. This system is referred to as *horizontal organisation of production and absence of exchange relations (functional logic).*

1. Groupe de Recherche Europeen sur les Milieux Innovateurs (European Innovative Milieu Research Group). A body of European academics researching the concept of the Innovative Milieu and developing an ongoing theory regarding its function within the territorial production system (regional economy).

The second identified territorial production system consists of firms that show some integration and no territorialization and therefore demonstrate mainly functional logic. These firms are usually large firms located within a region, who internalize all their value-adding functions such as the conception of ideas, production, distribution, distribution and marketing. As these firms internalise all their decision-making, there is no externalisation of knowledge, or development of new knowledge other than that needed by the large firm. Hence, they fail to develop any complementary and substantial relationships with the other regional players. Consequently, this type of firm can impose itself on a region and mould it to its own design, resulting in the exclusion of their competitors. Maillat and Grosjean (1999) have argued that the self-sufficiency inherent in this type of firm fails to support a region's endogenous development. This system is referred to as *vertical organisation and absence of exchange relations in the region.*

The third identified territorial production system consists of firms that display simultaneous integration and territorialization and therefore demonstrate a combination of functional and territorial logic. This occurs when a large dominant (and more or less integrated) regional firm controls the whole value-added production chain but outsources some of these activities to other local firms and hence maintains relationships with local suppliers, sub-contractors, research and training centres. These firms and their partners are capable of cooperation and therefore generate complementarities in the exchange of knowledge, know-how and technologies that are governed by the milieu rules or codes. This results in the formation of entrenched interdependencies within the territory and a possible milieu effect that further facilitates endogenous development. The effects of this type of organisation in terms of learning depend largely on the nature of the relations that are established between the firm and its partners (the milieu effect).

With this system there are two possibilities. The first, is where the exchange partnership is one of cooperation and non-dependence and there is complementarity, exchange of knowledge, know-how and of technology resulting in the growth of generated synergies and interdependencies between the various partners of the large firm. The stimulation of the small firms and hence the region, by the large firm causes a renewal of the territories and therefore a territorialisation of the large firm. In the second situation, the large firm has exchange relations with the dependent partners of a trading nature similar to those between a principal and subcontractor. There is however some transfer of knowledge or technology to the subcontractor but without any of the resulting synergies of the first case as the sub-contractors have no other partners other than the firm and merely execute its orders.

In these cases the production systems may become unhinged if the firm or any of its suppliers move away from their region. This of course depends upon the degree of dependence between the firm and its subcontractor-supplier. This is why the greater the milieu effect, the costlier it is for the firm to leave a territorial production system because it will lose the advantages supplied by the latter (trusted partners, synergies, specific resources, etc). These systems are referred to as v*ertical organisation and presence of exchange relations.*

The fourth territorial production system consists of horizontally integrated small independent and specialized firms, cultivating numerous relations across a horizontal

territorial integration and is therefore referred to as operating according to territorial logic. They may belong to a part, or the whole of the production chain and considerable interactions between the players is the rule. As such, the coordination between the various stages of production is not organised according to the dominant hierarchical model of the large firm, but result from a complex set of relations and rules which ensure a level of both competition and cooperation within the flexibility of the system (Maillat, 1998). Consequently, there is no dominant player within the various stages of the value-added chain and the mechanism that ensures the coherence of the system is the level of competition or co-operation occurring between the players, within a milieu type framework. As this system derives its strength from the complementarities between the firms, its development can be hindered by gaps in the value-added chain (i.e. lack of relations with the market, gaps in research etc.). This system possesses relative autonomy and has endogenous development capacities.

Certain industrial districts function according to the fourth territorial production system. However, because of the permanent interaction between the actors, there is no appropriation of specific resources in such systems, and the system only functions effectively if the actors are able to maintain cooperation. Compared with the previous case, this type of territorial production system is less risky for the region since the territorial production system's functioning does not depend on a single firm. In actual fact, the disappearance of a firm does not affect the existence of the others. The development potential however of such a system, resting exclusively on SMEs, is obviously weaker inasmuch as it does not possess the mobilising effects a large firm can produce. This system is referred to as *Horizontal organisation and presence of exchange relations.*

The innovative milieu typology (GREMI, 1984) further utilises and expands upon Porter's typology but stresses a cooperative learning capacity and the exchange of shared information via network linkages which assist in reducing information uncertainty. The innovative milieu is considered a subset of the territorial production system responsible for the cooperative learning element. It collects this innovation information from the global economy and distributes it to various regional players such as research institutions, universities and colleges, MNCs, SMEs, consumers, suppliers and competitors via inter-industry information linkages. Its purpose is to facilitate a level of cooperative learning in order to reduce the decision making uncertainty existing within the innovation development stage (Nelson and Winter; 1982; Dosi et al., 1988). The milieu is not characteristic of all regions and its presence is identified by a greater number of network connections to research institutions, increased knowledge flows from these research institutions, and a balance in the information distribution channels between vertical-hierarchical firms and those that are more horizontally integrated within the region. As such, the presence of a large dominant firm that could possibly relocate, or the partial vertical integration or take over of a large number of competing firms or subcontractors may upset the established information distributional channels restricting the generation of endogenous innovative activity.

Two basic models of inter-firm cooperation have emerged from a synthesis of Porter's typology and the innovative milieu theories. More specifically, the functionally integrated production systems dominated by large firms and the territorial production systems made up of SMEs. In the first case, coordination and cooperation are explicit

and depend on hierarchy whereas in the second case, they are implicit and depend upon the milieu (Maillat, 1998). Furthermore, in the latter case SMEs appear to require proximity in order to establish cooperative networks whereas in the first case, large firms are also finding an increased need for some interaction at the territorial level. As such, this interaction would enhance their flexibility thereby assisting with the identification of new opportunities and may occur by upgrading in-situ and embedding branch plants within the region rather than relocating (Pratt. 1997, p. 128). Hence, large companies can also integrate horizontally by moving from vertical information flows towards horizontal information flows and Lundvall and Johnson (1994) have identified this as one aspect of the learning economy that demonstrates a long-term commitment to the formation of learning networks (Asheim, 1995).

The use and extent of local versus externally sourced information may be significant at various stages of the innovation process. For example, Crevoisier (1993) argues that during the collection of information from the global economy, innovation takes place in two stages. The first stage is where regional players develop an idea, consider the necessary resource requirements, or mobilise the resources to the required location with the developing opportunities in mind. For example, a small machine tool manufacturer may consider their know-how and equipment and perceive opportunities developing within the electronics and information technology industries. Consequently, they may devise a project that will make better use of their existing technologies, or develop new technologies or resources. The second stage is the execution stage and may involve developing the know-how necessary to transform the resources and organisation into a finished product or process. Consequently, as the firms in the second stage have already developed new forms of know-how, resources and production capacities, they open up new opportunities for other innovative projects that sometimes involve the same firms. Hence, the milieu creates autonomous sequences of innovation processes based on specific resources that they collectively mobilise, create or renew.

4. Previous empirical studies

Studies undertaken by Mensch (1979) and Massey (1984) have found SMEs importing externally produced inventions in the manner predicated by the Schumpeter I model and found that this importing activity was associated with higher levels of clustering and SME start-ups in international cities. Marshall (1987) found a multiplier effect that not only increased the number of SME innovations, but also reduced their absorption time into final inventions. Alternatively, Vernon (1979) argues that MNCs can split their production activities into many production units and relocate them in cities that demonstrate the most agreeable work and industrial cultures, thereby creating spatial divisions of labour, production and innovation.

Alternatively, Dosi et al. (1988) have argued in support of the Schumpeter II model, when stressing the importance of large oligopolies in undertaking systematic research and development while being concentrated within large international cities and metropolitan trading nodes. Since then, studies undertaken by Freeman, Soete and Clark (1982) have found little evidence to support the existence of a strong relationship between innovation clusters and economic crises. Although they recognize that the diffusion process is important in encouraging innovation imitators to invest in new technologies, they have further argued that the mutual relations

between innovations, firms, political and socio-institutional forces comprise the necessary conditions for optimal diffusion and therefore economic growth (Davelaar, 1989).

A GREMI study of the Jura Arc areas of Switzerland and France identified two diverging production systems, in terms of their ability to evolve and respond to changes in their environment, from what once were originally comparable systems (Aydalot, 1986; Maillat, Nemeti and Pfister, 1992a). The Swiss Jura Arc displayed (after considerable restructure) some recovery of its watch making industry and the emergence of microtechnology industries. The French Jura Arc was identified as having serious structural difficulties, a disappearing watch making industry and emerging micro-technology industries that relied upon sub-contracting and remaining heavily dependent on major national and international groups.

In a study of the Mittelland region in Switzerland by Maillat (1989) and Grosjean et al., (GREMI, 1997) survey data was used to analyze the degree of integration in the value-added chain the regional relationship types. The method involved analysing the industries' statistical data to identify branches with high levels of employment (by a location coefficient greater than one) and the production percent exported (70%-98%). Interviews were then conducted with twenty experts in order to determine the specific characteristics of these branches, the most important players and the territorial production chains involved. Qualitative interviews of fifty firms were used to identify networking relationships inside and outside of the region, and the nature of their partnerships (customers, suppliers, competitors, research centres, etc.). This analysis identified six different production systems related to different types of industrial specialisation with varying levels of SME, MNC or domestic large firm concentrations. Using Porter's typology, firms operating according to functional logic and territorial logic were identified as contributing to 40 per cent and 60 per cent of employment respectively. The milieu effects were identified using three measures: the level of complementary and partnership type working modes, the presence of innovation networks and significant links with research centres.

The analysis suggests that the Mittelland Area is adjusting successfully to globalization and is organised by a milieu. This gives the regional authorities more leeway to stimulate the development of specific resources such as know-how and special qualifications required by the players and to stimulate interfaces between firms and research centres or to pursue a specific technological policy. The analysis also identifies the simultaneous occurrence of a well-integrated value-added production chain, considerable international trade, exchange between local cooperative networks, and declining territorialization as processes that facilitate both a firm's local and global integration.

Studies of the Silicon Valley region undertaken by Krugman (1991) found that international trade and information networks were stronger than local networks in generating innovation clusters. This suggests that international networks are the prime drivers of cluster formations in international cities. In this example, international networks had transformed an agricultural region into the world's leading production cluster of new information technology and a group of nearby towns was transformed into the fastest growing innovation cluster in the United States in the 1970s, all within a single generation. This implies that both endogenous and

exogenous factors to the international cities are driving these cluster formations at varying levels, and that these levels may be influenced by the spatial differences in technologies, markets, capital, know-how, technical culture and representation that arise from international trade (Crevoisier and Maillat, 1989). Similarly, Veltz (1996) has recognized that with increased global competition, firms have located their research, knowledge and production capacities in localities with reduced transport and communication costs, thereby creating international poles where multiple networks intersect.

Studies by Davelaar (1991) of innovating firms in the Netherlands, find inconclusive evidence regarding the presence of a milieu phenomena. Todtling (1990) has obtained similar results, leading some to argue that the theory gives no explanation as to how and why these advantages arise. Storper (1997) argues that in an attempt to explain this, the milieu theorists have reverted to tautological explanations. Hence, questions regarding the existence and significance of the milieu and whether it actually fosters innovation and why and how innovation is located still remain. Others have argued that it does not explain which comes first - innovations or the innovative milieu and as such, it is difficult to understand the processes that would turn a non-innovative region into an innovative region.

5. Innovation Activity in Regional SMES

The method used in this analysis is derived from Tiberi-Vipraio and Hodgkinson (2000) which uses a survey-based typology that expands upon Porter (1993). It combines the concept of positioning of a firm along the value-added production chain as defined in terms of being process or product orientated, and its strategies. Strategies are defined in terms of the firm's degree of specialization or flexibility regarding the development of product and process variety and variability. This survey also combines the concepts of international and local networking to more accurately define and identify a firm's level of international versus global sourcing of innovation information and inputs. In combining these two dimensions, it specifically identifies the development of either product or process innovations (or both) in terms of either global or regional information and input sourcing for various sectors. In this way, those aspects of the regional context that provide the information and knowledge from which new internationally competitive variations of a product or process can be developed and, therefore, how local firms can become leaders in their respective international product markets are identified. This analysis therefore asserts that the individual agents or entrepreneurs are the major players in determining a firm's international competitiveness due to their capacity to relate with both regional knowledge and external best practice.

The analysis presented below is based on a survey of 106 exporters located in five rural NSW regions: Wingecarribee (Southern Highlands), Shoalhaven (South Coast), Far North Coast (Coffs Harbour, Byron Bay, Lismore), Northern Region (Armidale, Tamworth) and Murrumbidgee (Griffith, Leeton). All but six of the surveyed firms were small and medium enterprises with less than 200 employees. Thirty-two firms were very small (1 to 9 employees) while 20 were small (10 to 19 employees). Twenty-six firms were small-medium (20 to 49 employees), 10 were medium (50 to 99 employees) and 11 were large-medium (100 to 199 employees). The firms came from a wide range of sectors: predominantly manufacturing but some value-added

agriculture, wholesaling, information technology and consulting. Within manufacturing, the only single sector to have substantial representation was wine-making. Most of the analysis relates to the behaviour of the small and medium firms covered by the survey. However, data for the large firms has been included for comparative purposes.

Three basic hypotheses arise from the academic literature on the role of SMEs in regional development which can be examined using the data generated from the survey of regional exporters.

(1) That both SMEs and MNCs/ Large firms have important roles within regional territorial innovation systems.
(2) That the regional context is important as a means of enhancing ideas (best practices) accessed from outside the region in order to turn these into innovations which augment the export advantages of regional firms.
(3) That in 'learning regions' where innovation is the basis of economic growth, a creative milieu is developed which enhances the cooperative learning capacities of SMEs through the exchange of shared information in local networks thus reducing uncertainty within the innovation development stage.

(a) Small versus Large Firms as Regional Innovators

The data in Tables 1 and 2 provide a general picture of the type of innovation activities undertaken by NSW regional exporters. Product innovation activities do not vary significantly by size of firm. New product development is important for all exporters. Export market success depends, in many of these cases, in having a unique or superior product compared with competitors which allows these relatively small firms to find niche markets as the basis of exports.

A slightly smaller number of firms undertake improvements to their product range. The proportion of firms undertaking this sort of activity had some tendency to increase with size. The low proportion among very small firms reflects situations where such firms often only have one product in their range while larger firms are more likely to have a wider product range.

However, these were significant differences by firm size in terms of whether regional exports undertake major changes to their production process. This activity clearly increases with firm size as shown in Table 1. Only one-quarter of very small firms were engaged in this activity and one-half or less of firms up to 99 employees. By contrast, two-thirds of large firms made significant changes to their production processes.

Table 1

Type of Innovation Activity By Size of Firm
% of Firms

Size	New Product Development (88)	Improvements to Product Range (73)	Changes to Production Process (44)	Continuous Production Improvements (81)
1 – 9 employees	80.6	64.5	25.8	74.2
10-19 employees	75.0	70.0	40.0	75.0
20-49 employees	92.3	65.4	46.2	80.8
50-99 employees	80.0	80.0	50.0	70.0
100-199 employees	90.9	72.7	63.6	81.9
200 Plus employees	100.0	100.0	66.7	100.0

Note: Tables do not add to 100 as multiple responses were accepted.

Table 2

Source of Technologies by Size of Firm
% of Firms

Size	Self-developed within Firm (92)	Adaption of Products from the Market (48)	Developed in Partnerships with other Firms (26)	Licensed from other Firms (12)	Transferred from Parent (10)	Cooperation with Public Research Institutions (18)
1 – 9 employees	83.9	51.6	22.6	3.2	3.2	12.9
10-19 employees	95.0	45.0	30.0	10.0	20.0	25.0
20-49 employees	92.3	42.3	19.2	15.4	3.8	11.5
50-99 employees	90.0	50.0	30.0	10.0	10.0	10.0
100-199 employees	81.8	45.5	27.3	27.3	27.3	27.3
200 plus employees	83.3	33.3	33.3	16.7	0.0	33.3

Note: Tables do not add to 100 as multiple responses were accepted.

From Table 2, it can be seen that the majority of regional exporters self developed their new product and process technologies within their own firms. This did not vary with the size of firm. Less than half of the firms used products or processes observed in the market as the basis of their own innovations. Again there was no consistent variation in this pattern by size of firm. It was a little more common among very small firms (1-9

employees) and these with 50-99 employees but somewhat less common in the larger firms.

Consistent with the high levels of product innovation, regional exporters of all sizes made continuous improvements to their production processes. These activities involve small changes to production configurations to adopt them to the introduction of new products and product varieties. This result reinforces the product emphasis in regional firms export strategies as against a cost competitive focus which is reinforced by the data in Table 3 below.

Regional exporters corporate strategic orientation includes both development of the product range to meet client requirements and production improvement in costs and quality. This reflects the imperatives of operating in international markets where responsiveness to client needs for improved product characteristics must be matched with achievement of continually changing international cost and quality standards. This double orientation tends to increase with size among small and medium sized firms. Small firms are more likely to have a single focus on client needs and development of their product range compared with medium-sized firms. However, this is matched by large firms where 50 percent have a purely client product range focus.

Table 3

Corporate Strategy Orientation By Size of Firm
% of Firms

Size	Clients, Development of Product Range	Production, Cost and Quality Factor	Both Products and Cost/Quality
1 – 9 employees	40.6	3.1	56.3
10-19 employees	45.0	-	55.0
20-49 employees	30.8	11.5	57.7
50-99 employees	30.0	10.0	60.0
100-199 employees	9.1	-	90.9
100 plus employees	50.0	-	50.0

Note: Tables do not add to 100 as multiple responses were accepted.

Table 4

Perceived Position in Market by Firm Size
% of Firms

Size	World Leader	Asia-Pacific Leader	National Leader	Other
1- 9 employees	43.8	6.3	25.0	25.0
10-19 employees	35.0	15.0	25.0	25.0
20-49 employees	53.8	3.8	19.2	23.1
50-99 employees	40.0	20.0	20.0	20.0
100-199 employees	72.7	-	27.3	-
200 plus employees	50.0	33.3	16.7	-

Note: Tables do not add to 100 as multiple responses were accepted.

As shown in Table 4, a significant proportion of regional exporters regard themselves as World or Asia-Pacific leaders in their particular product market. Leadership positions in world markets are not achieved using 'follower' or imitator innovations strategies. More firms in each size category were more likely to nominate themselves as 'world leaders' then any of the other options. Large-medium sized firms most frequently saw themselves in this role, followed by small-medium sized firms, large firms and very small firms. That smaller firms can perceive themselves as world leaders relates to situations where they have a unique product filling a niche market where no or few effective competitors exist.

In some ways, NSW regional exporters have the characteristics of Schumpeter I type firms being small firms focused on developing and commercializing a superior product or design which provides them with market leadership for a period of time. However, they differ from the early model discussed above in that these firms are both the inventor and innovator of the new product or design variation. As shown in Tables 1 and 2, the majority of the regional exporters are involved in new product developments which are predominantly self-developed within their own firms. The exporters are thus predominantly innovators and also regaard themselves as world or Asia-Pacific regional leaders in their product markets.

(b) Local Versus Global Networks

The second element in understanding regional information flows is determining how regional innovators/exporters access information in market developments. These data are provided in Tables 5 and 6 below.

Table 5

Use of External Networks by Size of Firm
% of Firms

Size	Visits from Service Provides (41)	Publications or Newsletters (72)	Internet (63)	Travel to Clients/ Agents (88)	Meetingsof External Organisation (67)	Trade & Business Magazine (78)	Equip-ment or other Supplies (36)
1-9 employees	34.4	56.3	68.8	71.9	50.0	71.9	28.1
10-19 employees	30.0	65.0	45.0	85.0	50.0	60.0	55.0
20-49 employees	50.0	61.5	61.5	92.3	76.9	69.2	30.8
50-99 employees	40.0	100.0	60.0	70.0	70.0	100.0	30.0
100-199 employees	36.4	81.8	45.5	90.9	72.7	90.9	27.3
200 plus employees	33.3	83.3	66.7	100.0	83.3	66.7	33.3
All SME's	38.4	66.7	58.6	81.8	61.6	73.7	34.3
All Firms	38.3	67.3	58.9	82.2	62.6	72.9	33.6

Note: Tables do not add to 100 as multiple responses were accepted.

Vernon (1979) argued that SME information sources were more locally based and limited to personal exchanges or a trickling down of information from local MNCs. If we take large firms (200 or more employees) as a proxy for MNCs in this argument, it can be seen from Tables 2 and 5 that this proposition does not hold for NSW regional exporters. Small and medium firms of all size categories have significant technological linkages outside the region. The percentage of SME firms with technological partnerships and cooperation with public research institutions is just below that for the large firm category. The higher proportion of large-medium firms with technology licensing arrangements was actually higher than that of large firms. The usage of external sources of market information by small and medium firms was very similar to that of large firms.

Table 6

Use of Local Networks by Size of Firm
% of Firms

Size	Local Industrial Development Offices (31)	Meetingsof Local Organisations (42)	Network with Local Business People (35)	Local Service Providers (24)	Informal or Recreational Activities (13)
1-9 employees	34.4	37.5	25.0	31.3	12.5
10-19 employees	35.0	30.0	30.0	25.0	20.0
20-49 employees	23.1	53.8	42.3	23.1	11.5
50-99 employees	30.0	40.0	40.0	30.0	10.0
100-199 employees	18.2	45.5	36.4	0.0	0.0
200 plus employees	16.7	0.0	16.7	0.0	16.7
All SME's	29.3	41.4	33.3	24.2	12.1
All Firms	29.0	39.3	32.7	22.4	12.1

Note: Tables do not add to 100 as multiple responses were accepted.

However, as shown in Table 6, small firms had a significantly higher usage of local market information networks than large firms which supports Vernon's notion that they are more involved in locally based information networks. This does not, however, substitute for being involved in external linkages. Rather it indicates that, if the regional context does play a role in transforming international ideas into regional innovations, this is more likely to occur with smaller than larger firms among exporters.

Vernon also argued that MNCs / large firms prefer City locations. The lack of such firms in our regions may indeed support this proposition, at least in the negative. Indeed, most of the foreign owned regional exporters had originally been local firms which had been acquired by a multinational. Nor did the regional exporters themselves have a strong overseas presence. Only eight (7.6%) had an overseas subsidiary, 13 or

12.3% had a joint venture overseas and nine (8.5%) had licensed their product for overseas production.

Thus regional exporters do utilize external linkages as a means of accessing new technologies in order to enhance their own innovation programs. A significant number of these involved overseas firms particularly from the USA and Western Europe. While a few of these collaborations were with local regional Universities the majority involved Universities or public sector research institutions elsewhere in Australia and occasionally overseas.

As can be seen, regional firms of all sizes are more likely to utilize external market information sources than local networks. The most frequently used mechanism was individual overseas travel to visit clients, agents and partners. This was the most common mechanism for all firm sizes but was slightly more frequently used in firms with 10-49 employees and 100 or more employees.

Other frequently used information sources were trade and business management and industry association publications and newsletters. Trade and business magazines were a particularly important information source for very small firms (1-9 employees) and medium-large sized firms between 50-199 employees. Industry association publications and newsletters were more frequently used by larger firms, 50 employees and above.

Other significant sources of market information were attending meetings of organizations outside the region i.e. in the capital city Sydney, and the Internet. Although managers from 50 percent or more of all regional exporters attended meetings outside the region, it was more prevalent for medium and large than small firms with some tendency to increase with employment size. Internet usage was not closely correlated with firm size. Highest usage was by both the very smallest (1-9 employees) and the largest firms (200 or more employees). It was also significant among small-medium sized firms.

Visits from external service providers and equipment and other suppliers were less frequently used as sources of market information. Service providers were more commonly used by small-medium firms while the main users of equipment and other suppliers as sources of information were small firms with (10-19 employees).

Regional exporters were strongly linked into external market information sources. Thus regional exporters have good access to information on developments in their product market which can be utilized to improve both their innovation and exporting performances. As shown on Table 7, 70 percent of the SMEs regarded their current market information sources as adequate. Satisfaction was highest among very small firms (1-9 employees) and small-medium firms (20-99 employees) and lowest among small firms (10-19 employees) and larger-medium firms (100-199 employees).

Table 7

Current sources of Information Adequate
% of Firms

Size	% Yes
1 – 9 employees	71.9
10 - 19 employees	5.0
20 - 49 employees	80.8
50 - 99 employees	80.0
100-199 employees	54.5
200 plus employees	66.7
All SMEs	69.7
All Firms	68.9

From Table 8, there was not much variation in terms of whether firms regarded their current access to market information as adequate or not according to the types of sources used. Firms which utilized individual travel were slightly more likely to say it was inadequate. However, overall these results suggest it is more to do with how individual managers utilize their market information sources then the type of resource itself which determines the adequacy of information.

Table 8

Adequacy of Information by Source Used
% Small and Medium Sized Firms.

External Source	Information Adequate	Information Inadequate
Visits from service providers	73.7	26.3
Publications & Newsletters	72.7	27.3
Internet	75.9	24.1
Travel to Clients, Agents	69.1	30.9
Meetings of External Organisations	73.8	26.2
Trade & Business Magazines	74.0	26.0
Equipment or Other Suppliers	79.4	20.6

The learning region concept highlights the importance of circulating knowledge within the local economy in order to enhance innovation and hence regional growth. The data from this survey indicates that local networks are relatively under-utilized in NSW regions compared with external linkages as sources of knowledge. There was little cooperative marketing in these regions, except for the Murrumbidgee area where export agents were used by small agriculturalists. While technological partnerships did exist, they were rarely with other local firms.

If the hypothesis supplied by overseas experience that local networking does improve regional innovation performance is correct, then the lack of usage of local networks and cooperative technological and marketing developments may well be limiting the export potential of regional SMEs; or at least making growth more difficult than it need be. This is somewhat supported by the data in Table 9 which shows that the export intensity

of regional firms tends to reduce after 20 employees. However, export growth rates are less affected as shown in Table 10, rising with firm size except for a few firms in the 50 to 99 employees group.

International networks also play a crucial role in the learning region concept, allowing regional firms to access global knowledge about new market opportunities. A number of writers argue that the international knowledge networks tend to be concentrated in metropolitan cities. Thus their distance from these city networks creates a disadvantage for regional SMEs. The survey respondents provided some confirmation of this proposition. Basic business and market knowledge was available in the regions, certainly sufficient to meet the needs of new start-up firms. However, more developed exporters complained of not being able to access more specialised information necessary to help them expand their market distribution and client base once their initial export business had been established. Such information is more readily available to City-based exporters. The distance factor is thus likely to be impacting on the growth rates of regional exporters after the initial start-up phase.

Table 9

Size of Firm by Export Intensity.
Average Export/Turnover Ratio.

Company Size	(N2001)	2001	2000	1999	1998	1997	1995	1990	1985
1-9 employees	(32)	42.23	38.01	36.58	35.96	30.25	25.53	16.25	21.67
10-19 employees	(20)	54.68	47.80	50.03	44.72	46.49	33.89	28.33	26.67
20-49 employees	(25)	35.87	26.82	21.44	17.59	14.81	7.35	1.33	0.33
50-99 employees	(08)	35.55	31.27	32.51	30.08	33.09	13.60	1.67	0.00
100-199 employees	(11)	24.87	23.44	22.09	20.70	19.97	29.00	27.00	5.75
200 or more employees	(06)	33.72	32.82	32.07	36.48	35.98	37.75	26.00	23.00

Table 10

Size of Firm by Average Annual Growth in Exports 1997 - 2001

Firm Size	All Cases %	(N2001)	Exported 1997 to 2001 %	(N:2001)
1 to 9 employees	61.33	(30)	36.25	(14)
10 to 19 employees	88.33	(19)	33.26	(15)
20 to 49 employees	167.66	(23)	77.29	(12)
50 to 99 employees	40.56	(8)	39.29	(5)
100 to 199 employees	87.95	(11)	87.95	(11)
200 or more employees	15.50	(6)	16.09	(5)

(c) Level of Regional Integration and Knowledge Creation

The analysis in the first section of this paper identified four territorial production systems. NSW regional exporters appear to be a hybrid of two of these systems. To some extent they represent a horizontal production system of numerous small specialised and independent firms. This system should facilitate interaction and cooperation among firms resulting in the spread of knowledge throughout the region. However, as discussed above, the degree of interaction among regional exporters, while present, is limited. Thus they also exhibit aspects of a production system organised into independent firms which have their major linkages to external organisations with few inter-firm linkages with local institutions.

The learning region concept suggests that the intensity of knowledge accumulation within a region will be increased if there are strong trading relationships within a region relative to those outside the region. Regional trading relationships will be more intensive the more the regional structure consists of small, independent specialised firms within a production chain. This structure enhances both the creative milieu effect and the endogenous development capabilities of the region.

As shown in Table 11, the main inputs sourced from the local regions by NSW exporters consisted of transport services, production inputs and services, ancillary production and capital equipment. Sales, marketing and client services and quality control were normally undertaken internally. There was a relatively low degree of outsourcing among regional exporters and, of this, only a small amount occurred in the local region. Outsourcing is one of the major areas where knowledge transfer is likely to occur followed by ancillary production as both activities require compatiability between the services supplied and the exporters requirements to meet international cost and quality standards. Significant levels of local supply of ancillary production requirements only occurred for small firms with 10 to 19 employees and large firms.

Table 11

Level of Regional Supply of Production Inputs
Average Percentage of Input Requirements Met In Local Region

Firm Size	Transport	Outsourcing Main Product.	Inputs & Services	Sales & Marketing	Quality Control	Ancillary Production	Capital Equip.
1 – 9 employ.	53	14	35	4	1	11	19
10 – 19 employ.	42	8	25	2	1	29	34
20 – 49 employ.	47	11	22	2	-	7	21
50 – 99 employ.	56	-	37	12	12	10	28
100 – 199 employ.	44	5	29	5	-	14	11
200 plus employ.	36	-	34	-	2	33	8

Regional supply of production inputs and services was highest for agricultural based activities such as wineries, food processors, export wholesalers and packers, etc. While some knowledge transfer in terms of issues such as quality requirements would occur, this will be less significant than when supplier firms are part of a manufacturing production chain as found, for example, in the Italian industrial districts.

6. Conclusions

In the context of NSW regions, the issue of the relative importance of small and large firms is not relevant. The vast majority of exporters were small or medium sized enterprises using the definition of less than 200 employees. Thus need to assess and develop the benefits of linkages between small and large firms does not arise. Furthermore, it has been demonstrated by the results of this survey that SMEs have been able to establish their own extensive linkages into the international economy.

In terms of the importance of the regional context, it has been shown that the strong external linkages developed by NSW exporters ensure that knowledge is brought into the region which facilitates intra-firm learning. However, linkages among local firms and institutions are highlighted in the economic development literature as necessary to turn a locality into a learning region. It is here where regional development based on SMEs becomes limited in NSW. While small regional exporters utilize local networks more often than large firms, we have shown that their local linkages are still relatively underdeveloped as a source of innovation activity and new knowledge. The basic requirements for this type of development are essentially in place. The next step is to develop processes which will increase the intensity of interactions among local SMEs resulting in higher levels of collaboration and knowledge-sharing.

In some ways, the diverse sector base of regional SME exporters mitigates against closer collaborations as firms lack the self-interest imperative of client-supplier relationships to drive industry-specific collaborations. However, in other ways, this diverse base is an advantage for knowledge sharing. Regional exporters are usually not competitors with each other. Thus, sharing information about opportunities and ways of entering overseas markets will be effectively costless to the 'mentor' firm in terms of its impact on their competitive position. While it may be said that firms gain nothing from local collaborative actions, information networks increase in value as more units participate. Thus the flow of information is more likely to contain something of benefit to everyone, the more firms that participate.

The innovative milieu concept was developed in Europe based on a regional framework centred around the significant presence of research institutions which generate knowledge spillovers into the local industrial structure. NSW regions do not obviously exhibit this feature. While regional SMEs have developed some technological collaborations with other firms and research institutions, these typically do not involve intra-regional linkages and rather form part of their external knowledge networks. There was some anecdocal evidence gathered during the surveys that the presence of a regional University does have an influence in some regions as a source of new entrepreneurs and skilled workers and by adding to the overall cultural attractiveness of the region as a place to locate. However, technical linkages between these institutions and local firms were scarce. This highlights another area where regional outcomes could possibly be improved by intensifying local research relationships.

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