

THE IMPORTANCE OF PROXIMITY IN ECONOMIC COMPETITIVENESS: RETHINKING THE ROLE OF CLUSTERS IN LOCAL ECONOMIC DEVELOPMENT POLICY

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ABSTRACT: Economic development practitioners have thoroughly embraced industry clustering; assuming competitiveness enhancements accrue if local inter-firm linkages can be strengthened. This research attempts to measure the complexity of inter-firm linkages by applying the Waits and Howard (1996) cooperation continuum to the Machinery & Equipment manufacturing cluster in southeast Melbourne. The basic hypothesis is that if location influences inter-firm linkage complexity, then complex linkages should be focused at the local level rather than regionally, nationally or internationally. The results indicate that few of the cluster members maintained linkages that could be regarded as complex. Indeed, a dearth of complex linkages was found and, where they existed, the importance of proximity is questionable, with many of the more complex linkages being maintained at the broad metropolitan level or indeed interstate or internationally.

1. INTRODUCTION

Economists attempting to explain economic competitiveness highlight that knowledge and inter-firm relationships play an important role in determining economic growth. These broad understandings of growth incorporate geographical perspectives, as geography is recognised as a key influence on the use and diffusion of knowledge, and the structure and intensity of inter-firm linkages. Such thinking has been embraced by both national and regional economic development practitioners, with the emphasis on geography and economic performance leading to policies designed to encourage industry clusters.

Attempts to explain the role that industry clustering plays in economic growth can be traced back to Marshall's (1920) concept of industrial districts and have re-emerged under various guises since then, such as in agglomeration economies (Scitovsky, 1963; Blair, 1991), industrial complexes (Piore and Sabel, 1984; Granovetter, 1985), creative milieus (Maillat, 1991) and growth poles (Perroux, 1955).

Lloyd and Dicken (1990) summarise this literature by suggesting that the basic idea is that linkages between firms, institutions and other economic agents, located in geographical proximity, generate advantages of scale and scope.

Furthermore, as firms recognise the benefit of these linkages, they may attempt to minimise distance between themselves and their trading partners and, at the same time, facilitate communication between themselves and customers and suppliers. In that attempt greater clustering will result.

2. TOWARD CLUSTER POLICY

The common thread in the substantial literature on this perspective is that firms in proximate location to each other are likely to be more competitive. That logic is reinforced by the raft of case-oriented literature which explained the success of certain regions in Europe and North America (e.g. Signorini, 1994; Saxenian, 1994). Applications to Third World and Asian economies have also been produced (Markusen and Park, 1993; Meyer-Stamer, 1995). These success stories have generated much interest among development practitioners to find ways to replicate and promote similar synergies in other regions.

Feser and Bergman (2000 p.4) highlight that:

...a specific area of application interesting to policy makers has developed from these ideas: the identification and nurturing of industry clusters. This is a concept popularised by Porter (1990), in his efforts to stimulate a new approach to corporate strategy that is itself based heavily on the industrial district model at the regional level.

Doeringer and Terkla (1995) however suggest that, at least in recent years, industry clusters have become a development policy fad. They argue that a number of cities, states and regions in the US and Europe have begun developing cluster-based strategies, though the logic behind such initiatives is often poorly specified or simply not recognised as relevant. Their review of practitioner journals suggests that, at least at the local level in the US, the approach frequently involves little more than the identification of current regional specialisations as targets for traditional development initiatives. This perspective has been enhanced by the work of Tremblay, 1993; Anderson, 1994; and Morfessis, 1994.

It is clear that a better understanding of the clustering process is needed. That provides the broad context for this paper.

Cluster-based development policy has been embraced by Australian economic development practitioners. Some of the most high profile examples include those embarked on by the Adelaide MFP Corporation Ltd, Cairns Regional Economic Development Corporation, Hunter Valley Economic Development Board, the Queensland Government, in the South East Queensland Economic Development Strategy, and more recently the Office of Western Sydney.

Each of these initiatives followed a similar path. Regional concentrations of industries were identified, usually through a combination of quantitative and qualitative processes, before cluster 'maps' were constructed – highlighting the horizontal and vertical linkages between the regional industry specialisation and their customers, suppliers and enabling infrastructure (such as education institutions, research and development institutions, specialised labour pools, etc.). After the cluster constituents were identified, collective action plans were

developed to address common opportunities and problems. Out of this process a cluster working group was formed to inform and drive ongoing development initiatives.

It is implicitly assumed in each of these development scenarios that the cluster constituents had functional linkages between them. That is, links that were more than simple buyer-supplier transactions were naturally associated with co-location. While agglomeration theory establishes that competitive advantage may arise from these simple buyer transactions and transaction cost economics suggests that co-location of buyers and sellers, and other relevant parties, will deliver advantage by minimising operating cost structures, neither theory argues that co-located firms will necessarily band together to collectively capture common opportunities and ameliorate common problems. It is this step from the broad theory (and the reported case studies) to implied local action that constitutes a major weakness in the use of cluster theory in policy applications.

This paper explores that step by analysing the nature of the relationships between co-located firms within a selected Australian region, and so provides insight regarding the level of co-operation or collaboration that exists in Australian industry clusters. The core idea of this paper is that geographic co-location or apparent clustering does not necessarily infer the existence of inter-firm linkages that deliver the assumed benefits of cluster theory. The case study results are analysed to show the legitimacy of directing development resources at clusters in the hope of improving regional prosperity.

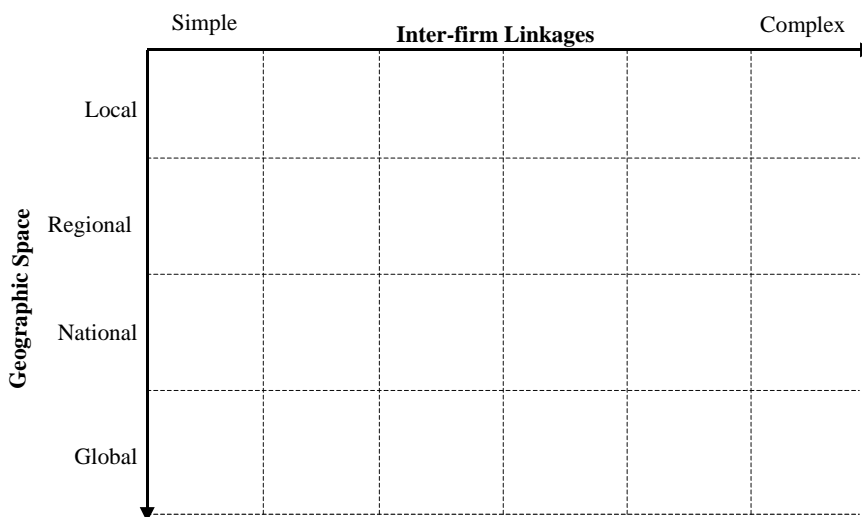


Figure 1. The General Research Framework.

Figure 1 depicts the task at hand. It highlights that we need to better understand the character of the inter-firm linkages that actually exist in clusters of firms, and at the same time the geographic scope of these linkages. The cells of Figure 1 provide an array of alternative patterns of linkages between firms. In

the top right hand corner is the implied outcome of industrial district theory, where complex links are expressed locally; in contrast is the bottom left hand corner, where even simple connections are made with global rather than local partners. For clusters to have a major regional impact, it is obvious that the behaviour of firms needs to be more toward the top of this figure than the bottom, and more toward the right than the left. In essence, the desired outcome is that complex links have local expressions.

This research will fit the behaviour of some Australian firms into the framework of Figure 1. To do so first requires an ability to identify the different types of linkages arrayed across the top of the figure.

3. DIFFERENTIATING SIMPLE VS. COMPLEX INTER-FIRM LINKAGES

Approaches that differentiate between the types of inter-firm linkages are few. In fact, a thorough search uncovers only three, and each of these is qualitative in nature. These have been developed by Maillat (1991), the Bureau of Industry Economics (BIE) (1995) and by Waits and Howard (1996).

Maillat differentiates between trivial (simple) links and determining (complex) links in the innovation process, arguing that collaborative links with research institutes and other firms form determining links, whereas customer contacts and other rudimentary relationships with service providers, equipment suppliers, etc. form trivial links. While Maillat's framework is useful in conceptualising the varying complexity of linkages between firms, it requires very substantial qualitative data assembly from a broad array of firms in many sectors within a region. The research looked for a less resource intensive approach.

A BIE (1995) framework uses a continuum-based description of the nature of customers, sellers, products/ services, transactions and social norms to describe arm's length (simple) and cooperative (complex) transactions between firms. While the BIE's framework both supports and adds to the theory of clustering, especially transaction cost theory, it too would be difficult to utilise in the current research because of its complexity.

The Waits and Howard (1996) framework developed for cluster research in Arizona, USA, describes thresholds of cooperative activity, as well as providing descriptions of the types of cooperative activities that cluster-based firms undertake. An attraction of the Waits and Howard framework is that it does not account for all of the functional relationships between firms. It excludes buyer-supplier linkages and other simple linkages. Instead, detailed descriptions of relatively complex linkages are provided, ranging from 'informal network' activities to true 'partnership-based' activities. These more complex linkages are labelled as co-informing activities, co-learning activities, co-marketing activities, co-purchasing activities, co-production activities and co-building activities (see Figure 2); these are ascending in order of complexity, and provide a way to explore the significance of the complex links between firms within a cluster.

Figure 3 depicts how the Waits and Howard framework sits over the task at hand specified previously. If the basic ideas of cluster theory hold (and provide

a firm base for policy) the linkage pattern for a firm should appear as displayed in this figure.

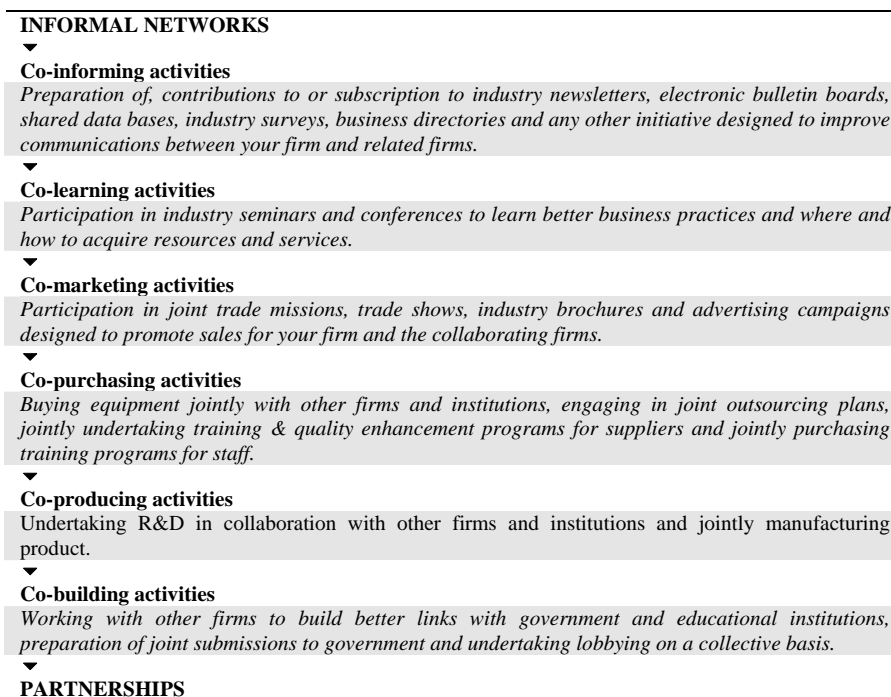


Figure 2. The Wait and Howard (1996) ‘Cooperation Continuum’.

The figures displayed in the remainder of this paper depict the inter-firm linkages identified in the case study. The location of the linkage partner is shown vertically with local, regional, national and international locations listed down the graph. The complexity of the linkage, using the Waits and Howard (1996) cooperation continuum, is shown across the page from ‘simple’ to ‘complex’ linkages. While the figures are not drawn exactly to scale, the size of the oval representing the level of cooperative activity within each linkage type (e.g. co-informing) indicates the proportion of firms within each segment that had that type of inter-firm linkage. Similarly, the shading of each oval represents the average perceived importance of the linkage type to business operation, as reported by the segment interviewees. In short, the bigger the oval the greater the proportion of interviewees participating in the linkage type; while the darker the oval the greater the perceived importance of the inter-firm linkage.

4. IDENTIFYING INDUSTRY CLUSTERS: INDUSTRY SELECTION

The Machinery and Equipment (M&E) manufacturing industries in Melbourne’s southeast were chosen after a quantitative analysis indicated

geographic clustering and after discussions with economic development practitioners in the region confirmed the local significance of the industries.

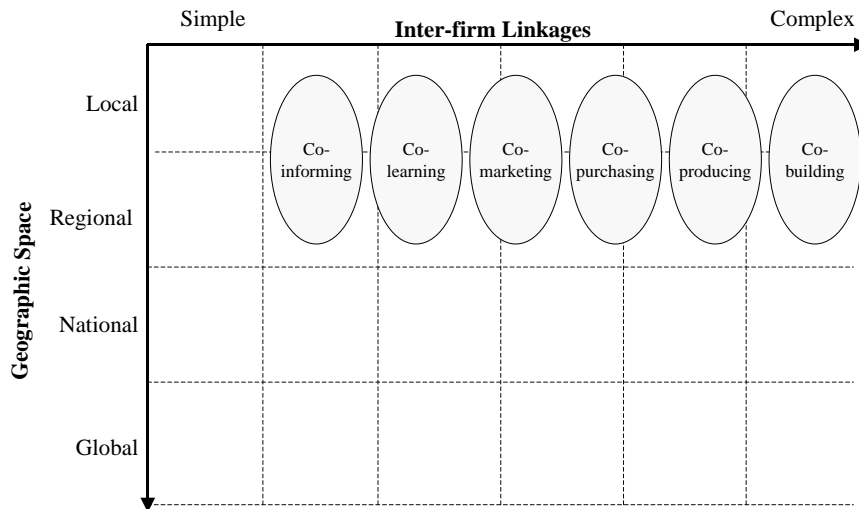


Figure 3. The Modified Research Framework.

The quantitative analysis employed job estimates from ABS Journey To York data to quantify the significance of employment within the industries within the region, using Location Quotients (LQs).¹ The approach assumed that a significant concentration, which could be interpreted as a cluster, exists when LQs were > 1 (i.e. the industries were over represented).

Results showed the several of the M&E manufacturing industries were over-represented as regional employers compared to their significance in the national economy. Table 1 details the LQ results for all of the ANZSIC² industries within the M&E manufacturing realm that are over represented in the region.

4.1 Identification of Firms

*Yellow Pages*³ data was then used to identify firms within the M&E manufacturing industries with locations in southeast Melbourne. A lengthy list of firms resulted.

¹ Location Quotients are measures of the relative concentration of industries at a regional level benchmarked against a wider reference region; in this case Australia. An $LQ > 1$ indicates an over-representation at the regional level, whereas an $LQ < 1$ indicates an under-representation.

² Australian and New Zealand Standard Industrial Classification.

³ via *Australia on Disk* published by Dependable Database Data Pty Ltd (2001).

4.2 Export Confirmation

To focus the research, the lengthy list drawn from the Yellow Pages was sieved so that only exporters remained. This was achieved by telephoning each of the companies and asking:

- Did they make regular sales to overseas customers?
- What was the approximate annual value of overseas sales?

The location, main business activity and main export activity of each exporter were also confirmed in this initial contact.

The decision to focus the research on export oriented firms in the cluster was taken, as it was assumed that exporters would be more prone to cooperative behaviour with their regional counterparts, i.e. as direct local competition between the industry constituents may be less constraining to linkage development. As a result, of this approach fifty M&E manufacturers were identified as exporters.

Table 1. Machinery and Equipment (M&E) Manufacturing LQ Statistics.

<i>ANZSIC</i>	<i>Location Quotient</i>
28 Machinery and Equipment Manufacturing	
2820 Other Transport Equip Mfg, undef	8.75
2810 Motor Vehicle, Part Mfg, undef	6.77
2812 Motor Vehicle Body Manufacturing	6.68
2866 Pump & Compressor Mfg	4.38
2839 Profsnl, Scientfc Equip Mfg nec	4.28
2813 Automotive Elctrcl, Instrmnt Mfg	3.65
2864 Machine Tool & Part Mfg	3.25
2819 Automotive Component Mfg, nec	3.10
2850 Electrcl Equip Aplnce Mfg undef	2.96
2842 Telecmn Brdcstng Trnscvg Eq	2.81
2829 Transport Equipment Mfg, nec	2.80
2830 Phtgphc Scientfc Eq Mfg undef	2.50
2823 Railway Equipment Manufacturing	2.21
2859 Electrical Equipment Mfg nec	2.16
2851 Household Appliance Mfg	1.99
2841 Computer, Business Machine Mfg	1.89
2852 Electric Cable & Wire Mfg	1.71
2800 Machinery, Equipmnt Mfg, undef	1.66
2869 Industl Machnry, Equip Mfg nec	1.60
2840 Electronic Equip Mfg undef	1.58
2811 Motor Vehicle Manufacturing	1.37
2865 Lftng, Matral Hndng Equip Mfg	1.33
2860 Industl Machnry Equip Mfg undef	1.17

Source: ABS Census of Population and Housing 1996, Workplace Destinations.

5. CONFIRMING GEOGRAPHICAL CLUSTERING

The location of each of M&E manufacturing firms within southeast Melbourne is depicted in Figure 4. A high degree of geographic clustering around Dandenong and its immediate surrounds is evident. Some firms are obviously adjacent. Consequently, the M&E manufacturing industries were confirmed as good candidates for exploring complex inter-firm linkages in a geographic cluster of firms.

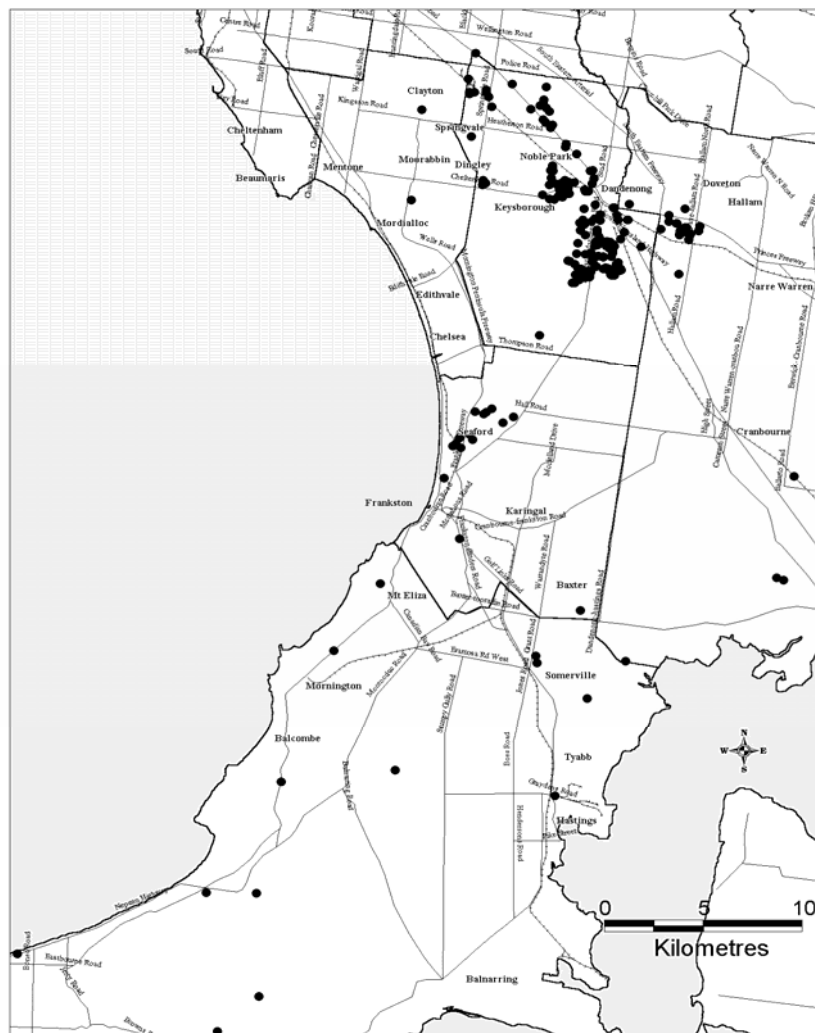


Figure 4. Location of Machinery and Equipment (M&E) Manufacturers.

6. FIRM LINKAGE BEHAVIOURS: MAJOR FINDINGS

Twenty-two M&E manufacturers were contacted for detailed interviewing. This represents 44 percent of the M&E exporters identified in the telephone screening survey.

The structured interview had two basic steps. The first was to identify the identity and location of entities involved with the firms, called their linkage partners. This step in effect describes the cluster of activities within which the selected firms fit. This involves the firms and suppliers, customers, competitors, research institutes and industry associations with which the interviewee firm had established links. The second was to explore the complexity of these linkages using the Waits and Howard framework as displayed in Figure 3.

The interview was structured around 10 questions (Appendix A). One of the questions (Q9) restated the Waits and Howard framework in terms of actual participation in co-operative activities (complex linkages). This was followed by an attempt to gauge the value each firm placed on these complex linkages.

Interviewee participation in simple to complex linkages with their linkage partners is detailed in the tables that follow (1 = participation, 0 = no participation), as is the perceived importance of these linkages, measured via a Likert scale from 1 to 5, with 1 representing 'not useful' increasing in importance to 5 - 'very important/ indispensable'.

6.1 Segmentation of Respondent Firms

Two basic types of operation immediately emerged within the M&E manufacturing firms interviewed. These were Original Equipment Manufacturers (OEMs) of Client Specific Solutions and Assemblers of Finished Components. The higher value adding 'OEMs' were distinguished from 'Assemblers' through the special relationship assemblers had with offshore manufacturers and their reduced propensity to deal directly with end customers. Indeed, while the linkage partners of the OEMs and the Assemblers were largely common, the complexity of relationships differed markedly. The authors are of the opinion that the accurate reporting the results demands this segmentation. For a more detailed discussion of the merits of this segmentation, readers are referred to McDougall (2004).

6.2 Assemblers of Finished Components: Linkage Complexity

Table 2 details the participation rates of six Assemblers interviewed in complex linkages and the perceived importance of these linkages to business operation. It shows that participation is low but the perceived importance of these linkages by the participant is high. More detailed discussion follows under the respective headings of the cooperative thresholds.

Co-informing Activities

Only one respondent undertook co-informing activities locally. This was basically limited to attending the regularly monthly breakfast meetings of a group called Southeast Networks. This is a network of manufacturing firms in

the region who meet to share experience, discuss best practice and build local relationships. In essence, the respondent firm attended because “it is one of the few occasions where local manufacturers can sit down together and see how they can help each other out”.

Table 2. Linkage Complexity in the ‘Assemblers of Finished Components’ Segment.

Machinery Assemblers		Co-inform	Co-learn	Co-market	Co-purchase	Co-produce	Co-build
Firm A	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm B	Participate?	0	1	0	0	0	1
	Importance?	n.a.	5	n.a.	n.a.	n.a.	5
Firm C	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm D	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm E	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm F	Participate?	1	0	0	0	0	0
	Importance?	4	n.a.	n.a.	n.a.	n.a.	n.a.
Number of Participating Firms		1	1	0	0	0	1
Average importance of participation to business operation		4	5	n.a.	n.a.	n.a.	5

Notes: 1 = not useful, through to 5 = very important/indispensable, n.a. = not applicable.

What is not recorded in Table 2 is the relationship that these Assemblers had with their international suppliers - be that through common ownership, exclusive distribution rights or manufacturing under license arrangements (which was the case for 4 of the 6 firms interviewed). Table 2 is presented this way because these contractual relationships blurred the ‘other firms’ component of the questions used to identify complex linkages, i.e. the linkage was considered to be ‘in-house’ whether that was legally the case or not, as the interviewees were effectively a representative of the offshore supplier.

If this position is not taken, then Table 2 would read markedly different because the market intelligence, research outcomes, product knowledge, etc. disseminated by offshore finished component suppliers would be taken into consideration. All respondent firms benefit from this contact and would undoubtedly rate the linkage as indispensable to business operation.

Importantly, this type of linkage occurred only with the ‘related’ international supplier and did not spill over into more collaborative relationships with other firms regardless of location.

Co-learning Activities

Only one firm participated in co-learning activities. This related to attending conferences and seminars sponsored by industry and professional organisations, which were organised at a state or national level. A high importance was placed on this participation.

The comments made under Co-informing Activities above about the relationship with international finished component suppliers also apply here. That is, 'related' supplier sponsored events have been excluded from Table 2. The activities of relevance would be systematic arrangements for delivering market intelligence, research outcomes and product knowledge, i.e. through supplier sponsored conferences etc.

Co-marketing and Co-purchasing Activities

The survey found no evidence of engagement in these types of linkages.

Co-producing Activities

This type of linkage was not evident in the stated activities of interviewees. This of course excludes the relationship local Assemblers had with 'related' international suppliers of finished components, which were either 'in-house' operations or governed by a binding legal contract that assures the local assemblers of supply throughout the duration of the contract.

Co-building Activities

Only one firm participated in this form of linkage. This involved the organisation participating in advisory groups used by government agencies to inform the Australian Standards for manufactured goods. This activity was rated highly in terms of its importance to business operation, as it directly affected decisions that would eventually influence the future cost structure of manufacturing operations.

Assessment of Co-operative Activity

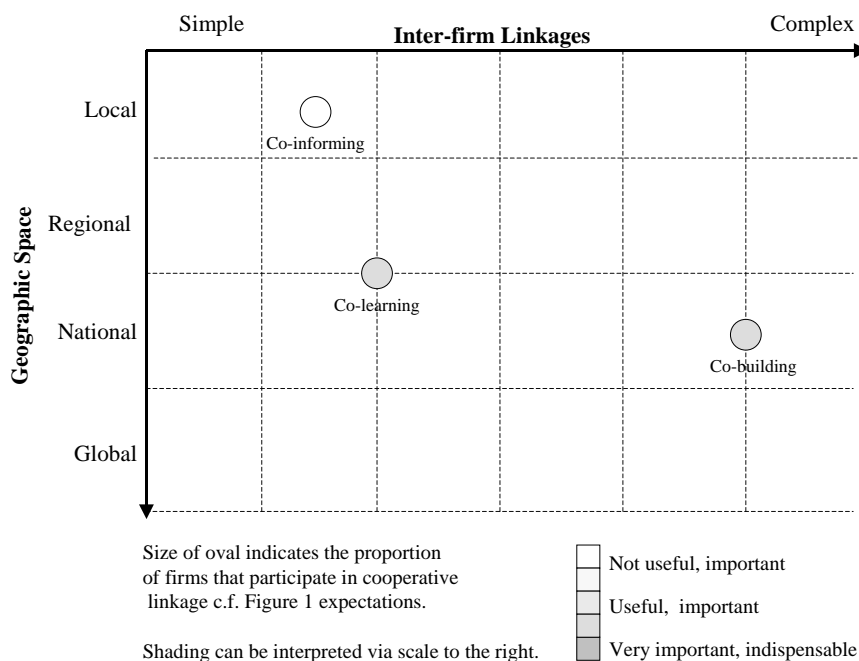
Co-operative activity was limited in this segment of the M&E manufacturers (if 'related' international supplier activities are excluded). In fact there were only three instances of cooperation and two of these were with industry associations, professional associations or regulators that were located outside the region, and were lower level activities in terms of the thresholds of cooperative intensity. In summary, complex linkages are virtually non-existent at the local level.

Figure 5 details the linkages found as well as their geographic context. The depiction is hardly what one would expect if the basic ideas of cluster theory operated.

When the relationships with 'related' international suppliers are considered, it is arguable that the co-operation evident is really only a traditional customer servicing activity. That is, the international suppliers are really only giving their 'distributors' better information so that they are equipped to sell more of their own products. While these are cooperative relationships *prima facie*, it is

arguable that they really fall within the gamut of 'arm's length' commercial transactions, as they are linkages that are both necessary and expected by domestic assemblers.

Figure 5. Assembler of Finished Components: Linkage Complexity/ Geographic Spread.



6.3 Original Equipment Manufacturers: Linkage Complexity

The Original Equipment Manufacturers (OEM) caused two more adjustments to be made regarding the interpretation of survey findings. Firstly, this whole industry segment is geared towards working extensively with customers to meet their needs through appropriate client-specific equipment design. This promotes extensive cooperation with customers in the design stage of production. Here firm size appears to be related to the geographic space in which the linkage occurs. That is, very small firms cannot afford to have technical staff off-site for extensive periods of time and, as a result, appear to be located close to their regular/ primary customers (i.e. the customers are located in the region). On the other hand, medium and larger sized firms can service interstate and international clients effectively from their location in southeast Melbourne, as the off-site project design costs are less significant when compared to the production costs proper.

Secondly, the outsourcing of production via subcontracting relationships is

prolific within the industry due to the specialisation of skills required to produce original equipment. Although this might suggest a special relationship between manufacturers and sub-contractors, the survey respondents on the whole indicated that specialist services (e.g. CNC machining, heat treaters) were abundant in the region and therefore these relationships were generally driven by price and convenience (assuming quality specifications could be met).

Both of these findings can be related to the abundance of 'engineering' skills in the local region. This high labour force quality, which reflects southeast Melbourne's role as one of Australia's leading manufacturing hubs, appears to provide a significant locational advantage for the respondent firms.

These linkage types have not been included in the following results, as they would potentially blur the picture of truly cooperative activities within the supply chain. The decision to present the data this way accords with the treatment of customer servicing activities undertaken by the offshore suppliers of finished components in the previous section. That is, the design phase of production, which is undoubtedly collaborative, has been grouped within 'arm's length' commercial relationships.

Table 3 outlines the actual participation in inter-firm linkages and the perceived importance of these linkages to business operation of the 16 OEM respondent firms.

Informal Networks

The level of linkage complexity between OEMs was limited and was predominantly confined to activity associated with 'personal' networks, i.e. less complex than the thresholds utilised by the Waits & Howard framework describe.⁴ The activities included:

- the intense use of local sub-contractors to fulfil specific standardised production requirements (as discussed);
- the implied reliance on existing and potential sub-contracting relationships when tendering for a contractual work necessitating significant outsourcing;
- the informal swapping of potential customer leads and referrals between operators; and
- intermittent problem solving with individual non-competing firms.

Co-informing Activities

Co-informing activities were undertaken by five of the sixteen firms surveyed. These fell into 2 categories:

- Attending a monthly breakfast meetings of Southeast Networks. These meetings are oriented to manufacturers generally and usually include a guest speaker who outlines some regional capability or business improvement technique (e.g. performance benchmarking). The major

⁴ Note: where a specific activity identified fell within a higher threshold (e.g. co-purchasing), that specific activity has been documented under that higher threshold's heading.

- gain associated with attendance, which is cost free, was increased awareness of what industrial support was locally available; or
- Membership of non-local industry and professional organisations. These are usually coordinated at the state level and are held in central Melbourne.

Table 3. Linkage Complexity in the Original Equipment Manufacturers Segment

Original Equipment Manufacturers		Co-inform	Co-learn	Co-market	Co-purchase	Co-produce	Co-build
Firm A	Participate?	1	0	0	0	1	0
	Importance?	4	n.a.	n.a.	n.a.	5	n.a.
Firm B	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm C	Participate?	1	1	0	1	1	0
	Importance?	4	3	n.a.	4.5	5	n.a.
Firm D	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm E	Participate?	1	1	0	0	1	0
	Importance?	4	3	n.a.	n.a.	n.a.	n.a.
Firm F	Participate?	0	0	0	0	1	0
	Importance?	n.a.	n.a.	n.a.	n.a.	3	n.a.
Firm G	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm H	Participate?	1	0	0	0	0	0
	Importance?	4	n.a.	n.a.	n.a.	n.a.	n.a.
Firm I	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm J	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm K	Participate?	0	0	0	0	0	1
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	5
Firm L	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm M	Participate?	0	0	0	0	0	0
	Importance?	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Firm N	Participate?	0	0	0	1	0	0
	Importance?	n.a.	n.a.	n.a.	1	n.a.	n.a.
Firm O	Participate?	0	1	0	0	1	0
	Importance?	n.a.	5	n.a.	n.a.	5	n.a.
Firm P	Participate?	1	0	0	0	0	0
	Importance?	2	n.a.	n.a.	n.a.	n.a.	n.a.
Number of Participating Firms		5	3	0	2	5	1
Average importance of participation to business operation		3.6	3.7	n.a.	2.8.	4.5.	5.0

Notes: 1 = not useful, through to 5 = very important/indispensable, n.a. = not applicable.

The activity was rated universally as important to business operation.

The most cooperative information trading within this context was done on an individual network basis. Here company X, which was involved in the same export markets as company Y, would trade export market intelligence and know-how with company Y. Notably, the first contact made between company X and Y was through SE Networks.

Co-learning Activities

Three firms indicated that they participated in co-learning activities. Two of these were associated with technical conference attendance. These were not locally driven exercises usually and required interstate or international travel. The other instance of co-learning reported concerned the free of charge supply of staff to train client employees to better understand and therefore refer (i.e. on-sell) the original equipment manufactured. While this is recorded in Table 3, this activity could just as equally be discarded on the 'customer servicing' grounds applied elsewhere.

The technical conference attendance was rated at '5' and '3' out of 5 in terms of importance to business operation by the relevant firms. The customer sales training that should potentially be discarded was rated at '3'.

Co-marketing-Activities

The interviewing process uncovered no co-marketing activities.

Co-purchasing Activities

Two of the sixteen interviewees participated in co-purchasing activity. One was the shared use of trade creditor accounts between a particular OEM and his individual network of non-competing organisations. That is, when the interviewee wished to purchase a large quantity of raw material to meet an anomaly in production demand, he would utilise other firms' trade accounts in order to receive the trade discount, remunerating the actual purchasers when the debt was due (and vice versa). This activity was rated as unimportant.

The other instance of this linkage type was concerned with the development of local metal product fabricators by an individual OEM. More specifically, the manufacturer worked with the fabricators so that they could feasibly provide a 'just in time' inventory system for the manufacturer, reducing stock holding costs and improving response times. This activity was rated as important to business operation.

*Co-producing Activities*⁵

A variety of co-production activity was uncovered. Five separate instances were identified and these included:

- Three instances of speculative product development with local suppliers for intended commercialisation. These activities required extensive

⁵ As already discussed, subcontracting in the OEM segment is not regarded as a co-production activity.

contact and substantial in-kind resources (i.e. time), and were rated as very important to operations. Notably, the firms engaged in this were small in scale.

- The sharing of product testing facilities by a relatively large automotive component manufacturer with one of its customers. The customer was General Motors Holden, which has no 'production' activities within the local region, but which is represented in Dandenong. This was rated as of medium importance and was offered by Holden more to consolidate the customer relationship than anything else.
- The collaborative product based R&D by a large engineering firm in conjunction with CSIRO at Clayton (local area) and the Comalco Research Institute in Thomastown (wider metropolitan area). This required the contribution of research funding and was rated as essential to product and business improvement.

Co-building Activities

One manufacturer was a member of an advisory committee established by Standards Australia. This required the periodic review and development of relevant Australian Standards. Though that membership was coordinated by a non-local organisation, and the contact was inexpensive and infrequent, the importance of those contacts was regarded as indispensable (5), as it influenced the ongoing benchmarks required of domestic producers.

Assessment of Co-operative Activity

Co-operative activity was limited in the OEM segment. All round participation in cooperative activity was low (maximum of 5 out of 16 firms within any of the cooperative thresholds). The co-informing activities were locally or regionally based, participated in by few firms but were rated as being of high to medium importance to business operation. Co-learning, on the other hand, was more nationally or internationally oriented. Co-purchasing, regarded as important, was undertaken by one firm and was locally focussed. Co-producing was evident to some extent and was predominantly locally based. The one instance of co-building was non-local (Figure 6).

7. ARE COMPLEX LINKAGES EXPRESSED LOCALLY?

The central question posed by this research was "Are complex inter-firm linkages expressed within a specific geographic region?" To answer this question the research set out to map the geographic spread of simple-to-complex inter-firm linkages made by firms engaged in like industrial activities and located proximately to each other (refer Figures 1 and 3).

If cluster theory is correct and inter-firm links are expressed locally, we would expect to see a high proportion of firms maintaining complex linkages with local linkage partners. Diagrammatically that would translate to significantly sized co-marketing, co-purchasing, co-producing and co-building ovals and relatively dark shading within these ovals, all located toward the upper right hand corner of the grid used to interpret these results.

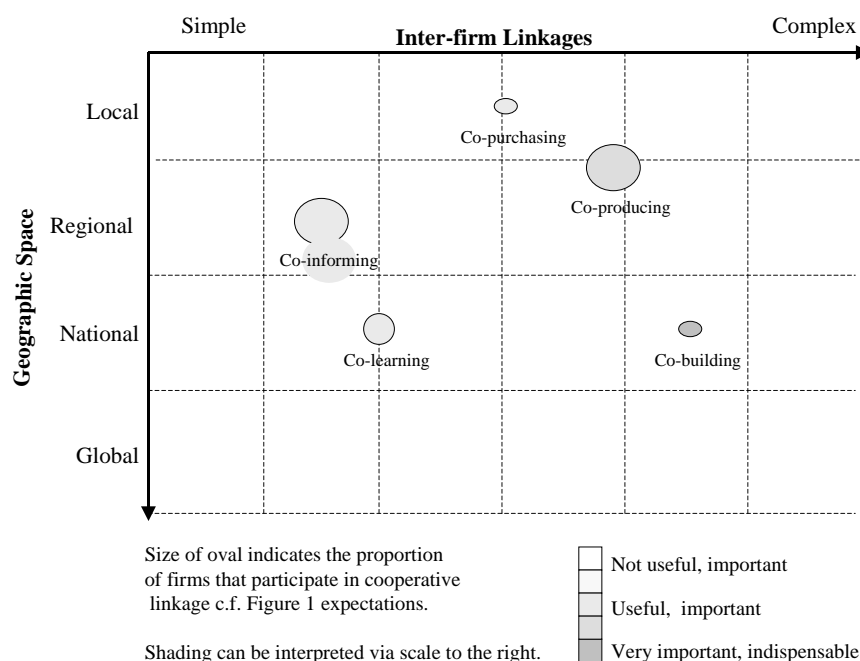


Figure 6. Original Equipment Manufacturers: Linkage Complexity/ Geographic Spread.

However, what is evident in the figures is that the oval sizes are small in size and the tendency towards the top of the grid is not marked. Indeed, where complex linkages are shown, the geographic scope to this activity is often with metropolitan or interstate linkage partners (and these is before the role of related ‘international’ suppliers of finished components (re: Assemblers) or inter-regional, interstate and international clients (re: OEMs) are even accounted for).

These findings provide a negative response to our initial research question. What the research did highlight is that inter-firm linkages do exist but that they are often with partners outside the local region. By definition this is not surprising from a sales perspective, as the firms interviewed were confirmed as exporters early in the research process. However, from an input perspective, it appears that important but simple linkages often spread throughout the metropolitan area or wider. This has marked ramifications for regional and local policy, as it raises questions about the viability of emphasising ‘locally’ based cluster initiatives.

These findings are consistent with Doeringer and Terkla’s (1995) assertions that many of the efforts aimed at developing local linkages by economic development practitioners are ill conceived, as they focus of local specialisations rather than on the benefits that are linked with agglomeration economies and the social embeddedness associated with industrial districts. As a result, these

findings support our opening remarks that suggest that in the application of cluster based development policies there is a leap of faith in transferring the broad theory into implied local action.

However, the research did suggest that small, single location firms may be more prone to making complex local linkages than large firms, especially those larger firms that have ownership or exclusive supplier relationships externally. While this research does not provide concrete evidence of this inference, further research in this regard could provide interesting insights for future development policy.

8. RESEARCH LIMITATIONS

The conduct of the research has been subject to a number of limitations. Firstly, the exclusion of non-exporters from the firms sampled for interviewing was not conclusively supported by the existing literature. This culling of the interviewee options was made on the assumption that exporters competed less locally and therefore may well be more prone to local cooperation. Given the lack of cooperation found, this basic assumption may not hold true. In fact, the competitive threats implicit in a more confined market may promote close relationships between specialist but complementary firms, as such relationships might be an avenue for immunising one-self against local competitors.

Secondly, it appears as though the underpinning data analysis was framed at too high a level of aggregation, as interviewee segments within the M&E manufacturing agglomeration soon presented themselves. As a result, the survey numbers within segments has limited interpretation, as the number of respondents - 6 Assemblers of Finished Components and 16 OEMs – is not considered representative.

The research also made some interpretative assumptions along the way when classifying complex linkages and, in doing so, excluding some linkages that are expected from linkage partners (and are part of standard transactional arrangements). These decisions meant the following linkages were excluded from the analysis:

- The provision of technical information, market intelligence and other support by international suppliers to local Assemblers of finished components;
- The intensive cooperation implicit in the design of client specific solutions by OEMs; and
- The pervasive sub-contracting of standard production inputs (e.g. heat treating) by OEMs.

The weak findings of this research might reflect the exclusion of these linkage types, which have been included in studies elsewhere with differing conclusions. In short, some subjectivity has been introduced into the analysis as attempts were made to identify linkages that went over and above the industry-specific 'norm' of inter-firm linkage.

To this end, the framework used to gauge simple versus complex linkages does not adequately distinguish between cooperative activities that are standard

relationships within one industry but which, in comparison to others, can be highly cooperative and complex. In essence, it appears that the framework adopted from Waits and Howard is better at distinguishing simple from complex horizontal linkages (i.e. within an industry) than is at distinguishing simple from complex vertical relationships between suppliers and buyers.

Accounting for this shortcoming in future will not be straightforward, as business operators are very customer-oriented and it is difficult to distinguish between what is considered standard customer servicing and what is considered long-term development initiatives (that build both buyer and supplier capacities to compete in future). Attempts to answer this question may well be misguided, as cooperative linkages in standard production relationships may well be more important than special but infrequent relationships.

If it was possible to revisit the analysis, it would be more useful to take a metropolitan perspective, to identify firms using 4-digit ANZSIC data, to focus the analysis on a limited number of 4 digit agglomerations so that representative samples could be interviewed, and to structure the research in a way that better distinguishes between the complexity of linkages with horizontal and vertical linkage partners. Exposing the relative importance of complex horizontal and vertical relationships and how they are geographically spread would provide a rich insight on the broad issue.

9. HOW DOES THE RESEARCH INFORM FUTURE POLICY?

Notwithstanding the limitations, the research provides the following insights for future industry/ cluster development policy.

Just because like firms are geographically concentrated does not imply that functional relationships exist between them. Rather, common factor inputs such as land, labour pools and transportation links may well be the primary reasons for co-location within a regions. In effect, manufacturing development policy needs to focus on broader contextual issues than on local linkage concerns.

The need to build functional relationships between like firms may not be perceived as important by the firms themselves. Indeed, if development initiatives are proposed, they may well be best directed at improving linkages between the firms and their common (and often external) markets, suppliers and supporting organisations. This of course requires some cooperation by like firms in terms of identifying their common problems and aspirations.

Hence, when conceptualising clusters and developing clusters, it is important that at least a metropolitan perspective is taken. A narrowly focussed spatial framework is likely to exclude important functional linkages that are made by firms over the entire metropolitan area.

Given the existing relationships firms have with state or nationally based industry associations and other stakeholder/ service provider groups, it may prove unwise not to involve these organisations in cluster development initiatives.

10. WHERE TO FROM HERE IN CLUSTER RESEARCH?

The results displayed here suggest that the next stage of cluster research should attempt to gauge the relative importance of inter-firm linkages compared with other locational characteristics of an agglomeration of like firms. Perhaps the importance of local inter-firm linkages are outweighed by other benefits such as proximity to specialised labour pools and specialised infrastructure. These characteristics may better explain why firms that are located together appear to be more competitive.

In terms of future research with respect to inter-firm linkages, the conceptual match of linkage types with agglomeration theory needs to be rethought. Linkages between firms in similar production modes (i.e. local competitors) will be different to linkages made with suppliers and buyers. A method that can account for these differences and the relative importance of each to underlying competitiveness is needed.

Finally, future research must incorporate more effectively the way economic space is built into the sampling methodology. Regional studies that embrace the significance of metropolitan areas (or wider) in the production process are required. With the efficiency of modern logistics, we know that upstream and downstream linkages are rarely contained with a local area.

REFERENCES

- Anderson, G. (1994) Industry clustering for economic development. *Economic Development Review*, Spring, pp. 26-32.
- Blair, J.P. (1991) *Urban and Regional Economics*, Irwin: Homewood, IL.
- Bureau of Industry Economics (1995) *Beyond the firm: an assessment of business linkages and networks in Australia*. Australian Government Publishing Service: Canberra.
- Doeringer P B. and Terkla D. G. (1995) Business strategy and cross-industry clusters. *Economic Development Quarterly*, 9, pp. 225-37.
- Feser, E.J and Bergman, E.M. (2000) National industry cluster templates: A framework for applied regional cluster analysis. *Regional Studies*, 34(1).
- Granovetter, M. (1985) Economic Action and Social Infrastructure: The Problem of Embeddedness. *American Journal of Sociology*, 91, pp. 481 – 510.
- Lloyd, P.E. and Dicken, P. (1990) *Location in Space: Theoretical Perspectives in Economic Geography*, 3rd edition. Harper & Row: New York.
- Maillat, D. (1991) Local Dynamism, Milieu and Innovative Enterprises. In J. Brotchie, *et al.* (eds) *Cities of the 21st Century: New Technologies and Spatial Systems*. New York: Halsted Press.
- Markusen, A. and Park, S. O. (1993) The state as industrial locator and district builder: the case of Changwon, South Korea. *Economic Geography*, 69, pp. 157-81.
- Marshall, A. (1920) *Principles of Economics*. Macmillan: London.
- Meyer-Stamer, J. (1995) Micro-level innovations and competitiveness. *World Development*, 23, pp. 143-48.

- Morfessis, I. T (1994) A cluster-analytic approach to identifying and developing state target industries: the case of Arizona. *Economic Development Review*, Spring, pp. 33-37.
- Piore, M. and Sabel, C.E. (1984) *The Second Industrial Divide*. Basic Books: New York.
- Porter, M.E. (1990) *The Competitive Advantage of Nations*. The Free Press: New York.
- Saxenian, A. (1994) *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Harvard University Press: Cambridge, MA.
- Signorini, L. E (1994) The price of Prato, or measuring the industrial district effect. *Papers in Regional Science*, 73, pp. 369-92.
- Tremblay, G. D. (1993) Moving towards a value-added society: Quebec's new economic development strategy. *Economic Development Review*, Winter, pp. 18-20.
- Waits, M.J. and Howard, G. (1996) Industry Clusters: A multipurpose tool for economic development. *Economic Development Commentary*, 20(3), Fall.

APPENDIX: INTERVIEW STRUCTURE

- 1 Who are your major suppliers and what do you source from them?
- 2 Where are these suppliers located?
- 3 Who are your major customers, customer types?
- 4 Where are these customers located?
- 5 Are there other organisations which are important to your business (eg universities, consultants, business associations etc?)
- 6 Where are these organisations located?
- 7 Who are your major competitors?
- 8 Where are these competitors located?
- 9 We are interested in how your firm works with other firms and institutions.
Does your firm engage in the following activities?

- Preparation of, contributions to or subscription to industry newsletters, electronic bulletin boards, shared data bases, industry surveys, business directories or any other initiatives designed to improve communications between your firm and related firms?
- (a) YES NO
- Participation in industry seminars and conferences to learn better business practices and where and how to acquire resources and services?
- (b) YES NO
- Participation in joint trade missions, trade shows, industry brochures or advertising campaigns designed to promote sales for your firm and the collaborating firms?
- (c) YES NO
- Buying equipment jointly with other firms and institutions, engaging in joint outsourcing plans, jointly undertaking training & quality enhancement programs for suppliers or jointly purchasing training programs for staff?
- (d) YES NO
- Undertaking R&D in collaboration with other firms and institutions or jointly manufacturing product?
- (e) YES NO
- Working with other firms to build better links with government and educational institutions, preparation of joint submissions to government or undertaking lobbying on a collaborative basis?
- (f) YES
-

For each activity, in turn, please describe:

- > which other firms and institutions are involved;
- > their geographic distribution;
- > the main instigator or co-ordinator of the initiative;
- > the strength of the inter firm interactions involved measured by such things as frequency of contact and level of expenditure;
- > your assessment of the importance of the activity to the business, rated on a scale of 1 to 5 (1 not useful - 5 very important/indispensable)

- 10 Does your firm have any contacts with other firms in the same industry as yourselves here in South East Melbourne? If 'yes' please describe the nature of these contacts.