NCVER

Inter-firm cooperation in training

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Australian Government
Department of Education, Employment and Workplace Relations

A National Vocational Education and Training **Research** and **Evaluation** Program **Report**

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About the research

Inter-firm cooperation in training by Richard Cooney and Michael Long

Competition between firms has been identified as being the basis of efficient markets. Competition leads to benefits for consumers and drives firms to greater efficiencies in the production of goods and services. However, research and experience suggest that cooperation among firms provides benefits in a range of business service activities such as marketing or training services. For many firms, particularly small-to-medium-sized firms, cooperation with other firms becomes a key strategic focus in the effort to realise business efficiencies.

Based on a survey of 600 firms in five manufacturing industries, Richard Cooney and Michael Long investigate cooperation among firms in the provision of training. It explores various aspects of cooperation in these industries and identifies the policy implications of such training arrangements for the vocational education and training (VET) sector.

Key messages

- A modest proportion (less than 20%) of Australian manufacturing firms participates in cooperative training arrangements. For those firms that do, such arrangements are only part of their overall training effort.
- Cooperation in training occurs largely through pre-existing business-to-business relationships. Cooperative training arrangements help firms to reinforce these relationships, provide better-quality training and save money.
- The VET sector currently has only a marginal involvement in cooperative training arrangements. To expand this role, training providers need to develop networks within the business community and arrangements capable of meeting the needs of a cluster of firms.

While acknowledging the low response rate of the survey (21%) and the potential sample bias towards firms that provide training, this report provides an important contribution to understanding the nature and extent of inter-firm cooperation in training and the potentially significant role that the VET sector has in these relationships.

Readers interested in employers' use of vocational education and training should also see:

- *Australian vocational education and training statistics: Employers' use and views of the VET system 2007 – Summary* (NCVER, 2008)
- *Reasons for training: Why Australian employers train their workers* by Andy Smith, Eddie Oczkowski and Mark Hill (NCVER, forthcoming).

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Executive summary

Industry policy emphasises the importance of competition between firms as the basis of efficient markets and as a stimulus for improved firm efficiency. Yet research has shown that much can be gained from cooperation among firms in a range of activities, especially those involving the transfer of knowledge, such as training. These cooperative arrangements are common in the more regulated training systems of Germany and France. Recent reforms in the United Kingdom have sought to improve the level and quality of training by promoting, within a less regulated training environment, cooperative training activities among employers.

This study focused on cooperation among firms when training their employees. Specifically, it examined jointly conducted training by two or more firms and sought to discover the characteristics of these firms, the kinds of business practices that support such cooperation, the kinds of training that are delivered jointly and the benefits that arise from such training for the participating firms.

This report presents the results of a survey of 598 Australian manufacturing firms in five industries:

- clothing and footwear
- engineering
- information technology
- scientific and medical equipment
- processed foods and beverages.

The survey was conducted between August and November 2005. The response rate of 21.0% to the survey means that caution is required when interpreting and using the results. Comparison with other studies suggests that the sample may be biased towards firms that provide training, which means that the estimates of the level of inter-firm cooperation in training may be too high. Any bias should have less effect on comparisons among firms that provide training and on descriptions of the benefits and barriers to cooperation in the provision of training.

How many firms have cooperative training arrangements?

Only a modest proportion of Australian firms (17.6%) provided employee training in cooperative arrangements with other firms. Among firms that did not have cooperative training arrangements, 14.2% provided no training, while the remaining 68.2% provided only stand-alone training. Cooperative training was only one component of the training effort of the small number of firms that engaged in it.

How significant or important are the cooperative training arrangements?

Cooperative training arrangements are an important part of the total training effort of firms that have established them. Almost one in ten firms (8.7%) believed that cooperative training arrangements form a very significant part of their total training effort. A similar proportion (10.7%)

indicated that cooperative training arrangements were very important for the business, while 13.7% rated such arrangements as being a very significant part of their business.

Which firms cooperate with other firms in providing training?

The comparisons reported in this section are between firms that provide employee training with and without any cooperative training arrangements. They exclude firms that provide no training to avoid confusing the likelihood of providing employee training at all with the likelihood of having cooperative training arrangements.

Among firms that provide some training for their employees, the firms more likely to cooperate with other firms to provide joint training are in a strong business position in competitive markets. They are profitable medium-sized and larger firms with a growing workforce. These firms see the skills of their workforce as a source of competitive advantage, and joint training is only one part of their total training effort.

Firms engaged in cooperative training do so as part of direct business-to-business relationships. They are likely to be vendors of capital equipment and work with firms outside their own industry. The provision of training is in many cases seemingly part of a package of services delivered in conjunction with new capital equipment and technology.

There is little evidence of firms being part of local or regional networks for the joint delivery of training. Furthermore, network agents, such as technical and further education (TAFE) institutes, employer associations and other training brokers, have little involvement in the provision of cooperative training.

Why do firms cooperate with other firms to provide training?

Firms who do participate in cooperative training arrangements derive a number of significant business and training benefits from cooperation. Cooperation strengthens direct business-to-business relationships and it provides a higher quality of training at reduced cost through the use of shared facilities, training materials and trainers. Firms were generally pleased with the outcomes of their cooperative training, with 10.4% indicating that such training resulted in significant improvements to employee skills and performance. A similar proportion (11.4%) also rated the benefits from cooperative training arrangements for the overall training effort as significant.

There were also suggestions that cooperative training arrangements helped management to keep up to date with trends and new developments in training.

What are the characteristics of the cooperative training arrangements?

Firms typically engaged in cooperative training arrangements with only one to three other firms (73.7%). Firms had a small number of partners for joint training and this was mainly facilitated by the informal liaison of human resources personnel. Most cooperating firms received no support from outside bodies (80.6%).

Training for basic vocational qualifications and licences was more likely to be delivered jointly, as was training in new technology, new products and new work methods.

What are the implications?

While few firms currently participate in cooperative training arrangements, the potential for such arrangements among firms seems encouraging.

- Nearly a third of firms with cooperative training arrangements expect that these arrangements will become more important in the future.
- More than two-fifths of firms that provide employee training without cooperative training arrangements would be likely to accept cooperative training opportunities if offered.
- A fifth of firms that do not provide any employee training would be likely to accept cooperative training opportunities if offered.

There is scope for more cooperation between firms in training their employees and there are benefits to be gained in doing so. Some firms that did not currently have cooperative training arrangements with other firms indicated that assistance from government, industry or employer organisations would encourage them to seek out cooperative arrangements.

Addressing the limited understanding possessed by some employers of the possible forms of cooperation may contribute to expanding cooperative training activity. Strengthening the role of third party agents to facilitate cooperative arrangements would also stimulate the formation of such arrangements. The challenge for the vocational education and training (VET) system is to develop inter-firm networks capable of meeting the needs of these firms, which is dependent upon the establishment of institutions and agents with the ability to facilitate the creation and maintenance of networks. Without policy and program support, cooperative training arrangements will continue to be the province of a small number of firms who independently initiate their own joint training activities.

Context

Introduction

Competition between firms is identified as the basis of efficient product markets. This competition is seen to provide benefits for consumers in the marketplace as well as driving the internal development of firms to become more efficient and effective. Recent research, however, suggests that there are also many benefits for firms to be derived from cooperation, especially for the development of product and process innovations. The role of cooperation between firms in the creation of new knowledge and the development of new skills—leading to innovations—is becoming more widely understood. Further, looking more broadly than within individual firms, the development of networks of firms with specialised competencies that cooperate to produce innovative and high-value-added products and services is also seen to be increasingly important for general economic development (Bureau of Industry Economics 1995; Business Council of Australia 2006).

Cooperation to promote innovation is important, but it is equally important for the supply of business services (for example, marketing, financial or training services) to firms that are not able to supply them internally. Small and medium-sized firms seeking to develop knowledge- and skill-intensive production systems may not be able to meet their skill development needs internally and so are forced to look outside the firm. In order to make best use of advanced technology and develop flexible and responsive production systems, firms need to invest in human capital creation. The development of such human capital within the firm is often dependent upon participation in inter-firm networks (Crouch, Le Gales & Trigilia 2001; Keeble & Wilkinson 1999).

Whatever may be the motivation for entering into cooperative arrangements, cooperation in relation to training, which for the purposes of this study is defined as formal training undertaken jointly with one or more partner firms, is emerging as a key characteristic of firms' training effort. Research suggests that there are several well-established characteristics of firms that are related to a higher incidence of training.

- ✧ Firms with a greater number of employees are more likely to provide training, and employees within larger firms are more likely to receive training (ABS 1998; Lynch & Black 1998).
- ✧ Firms within the public sector have a higher incidence of training than firms within the private sector (ABS 2003).
- ✧ Human resource policies affect the level and effectiveness of training within a firm. In particular, companies with flexible work systems have higher levels of training (Erickson & Jacoby 2003; OECD 1999; Pil & MacDuffie 1996).
- ✧ Firms experiencing rapid technological progress and rapid output growth have higher levels of training (ABS 1997; Bartel & Sicherman 1998; Pil & MacDuffie 1996).
- ✧ Firms that participate in multiple networks outside the firm are more likely to provide more training (Erickson & Jacoby 2003).

Cooperation in training is emerging as an important element of inter-firm arrangements. However, cooperation in training has been little studied and the characteristics of firms that provide training jointly are relatively unknown. Participation in networks seems to be related to training, but this training may be stand-alone training within a single firm. In order to develop an understanding of

cooperation in training we turn to a consideration of the different forms of cooperative activity that have been identified.

Forms of inter-firm cooperation

As firms seek partners to achieve a range of business outcomes, cooperation with other firms has assumed a strategic importance for managers. Partnerships may be formed to establish a long-term supply of goods and services essential to business operations; they may be formed to gain the knowledge and skills required to develop new products and new processes, or they may be formed on a short-term basis to open up new business opportunities. Cooperation serves a variety of business needs and objectives, and hence a great variety of cooperative arrangements exist. In studying the existence of inter-firm cooperative arrangements here, we are seeking to understand the practice of joint training arrangements between firms. The focus of this report is therefore on identifying forms of inter-firm relationships that may assist such joint training arrangements.

Lead firm networks

One form of cooperation is that between one large firm and its group of supplier firms. For large firms, the development of synchronised supply chains is dependent upon close cooperative relationships between themselves and first-tier, second-tier and third-tier suppliers. Cooperation has become a feature of buyer–supplier relationships, as the traditional arm's length relationship between firms, based solely on price in the market, is supplemented by the development of closer cooperative relationships mediated by criteria specified in contracts. Price alone may no longer be the determinant of a business relationship, as preferred supplier relationships come to rely on a range of criteria, including quality, innovation and responsiveness. Criteria such as these may be used to select business partners and monitor business relationships. Whether it is the quality of incoming goods or services, the ability to develop new products or the ability to offer continuing price-downs, contracts between buyers and suppliers establish closer working relationships as a wide range of performance information is shared between the partners.

Monitoring the performance of the contract becomes the basis of closer working relationships between the partners, and this may also be reflected in the redrawing of organisational boundaries. This reconceptualisation of the organisation may flow from a focus upon the coordination and management of end-to-end business processes, rather than the management of activities within a single firm. New management practices such as 'total quality management' and 'business process re-engineering' have facilitated this focus upon business process, and recent developments in information and communications technologies have facilitated their implementation. Developments such as bar-coding, radio ID tagging, shared computer networks, electronic data interchange and a raft of other technological advances have meant that the performance of entire end-to-end processes, such as those in a supply chain, can be monitored and virtually integrated.

This change in the character of single firms in supply chains—from developing stand-alone production systems to synchronised production systems—has an effect upon the provision of training, since the integration of business processes across firms entails not only the integration of technological systems, but also of management practices. Training for the skills required to use integrated technological systems and training for new management practices may thus become an important feature of lead-firm networks. This training may be supplied by the lead firm itself or through third-party organisations. For the small and medium-sized supplier firms down the supply chain, cooperation is necessary to supply the goods, such as employee training and skill development, that each individual firm alone may be unable to provide, but which are needed to synchronise operations along the supply chain. Moreover, there is a normative dimension to cooperative relationships that eludes many arm's length relationships. Norms of trust and reciprocity leading to open communications are significant and these are required to overcome some of the risks related to inter-firm cooperation. Cooperative activities involving information-

and knowledge-sharing—such as training—may help to consolidate the norms of reciprocity and exchange that are important for managing the risks of such cooperation, for example, the risks of knowledge spillover. Shared training and skill development has thus come to assume a greater significance in lead-firm networks (Cousins & Crone 2003; Lincoln, Ahmadjian & Mason 1998; Sako 1999).

Business-to-business relationships

Supply chain relationships have assumed a growing importance but direct business-to-business relationships have also become more important as firms seek business partners with complementary knowledge assets to support innovation. Business partners with specialised knowledge of new technologies, product distribution and marketing may be sought out to provide business services that cannot be supplied internally. The transfer of technology in particular has assumed increasing importance as firms seek providers who can deliver leading-edge solutions. The transfer of formal knowledge, along with associated technological products is important, and hence training often forms part of the package of services that accompanies technological products. Training services may therefore be an important element of direct business-to-business relationships since they assist in developing internal capabilities in the use of new technology or the production of innovative goods and services (Leiponen 2006; Leonard-Barton 1992; Marceau 1999).

Learning networks and learning regions

Relationships between firms with direct business links influence cooperation, but relationships may also exist between firms having no direct business links. These relationships may be created through the shared use of local resources. One spur for the development of such relationships is the growing need for knowledge creation. Knowledge leading to the creation of new technologies, new products and new services is vital for business innovation but, equally, knowledge of business processes and of new management techniques and practices is vital for organisational innovation. Knowledge is a key resource not only for business outputs but also for internal organisation (Business Council of Australia 2006).

Inter-firm cooperation may be characterised as a process of knowledge creation. New knowledge is created within the firm as a consequence of close interaction with other firms and this new knowledge confers a competitive advantage upon its creators. Looking beyond synchronised supply chains that may be global in nature, organisational knowledge creation is frequently a local good created by the local interaction of firms and knowledge resources, such as research institutes, colleges and universities. Regions and industries create new knowledge based upon local patterns of interaction and these patterns of interaction may exist between competing firms in the same region or industry, non-competing firms and between firms and local resources. These interactions between firms may exist, in other words, not because it is a requirement of business relationships—as in a supply chain or in direct business-to-business relationships—but because the advantages of cooperation outweigh the disadvantages. New inter-organisational relationships based upon learning and knowledge creation have developed amongst non-competing firms who come together to share experiences and learn from each other; amongst firms—both competing and non-competing—who share local resources, and; amongst firms who develop business relationships specifically to leverage new knowledge (Keeble et al. 1999; Lubatkin, Florin & Lane 2001; Maskell & Malmberg 1999; Maskell & Tornqvist 1999).

Location may thus become a source of competitive advantage due to the availability of human capital and specialised knowledge resources. Local networks of firms may be created to exploit:

- *internal and external learning*: where firms learn through internal innovation and from each other. Firms both gain and diffuse new knowledge and apply it to the development of specialised production processes and/or products.

- *tacit and explicit knowledge*: commodified or explicit knowledge is available globally but tacit knowledge can only be exchanged locally by observing practice. Formal and informal networks of knowledge exchange are important where tacit knowledge and skill are frequently required to solve problems.
- *exploratory and exploitative learning*: firms may participate in basic discovery and/or the exploitation of discoveries. Local access to discoveries and the resources needed to exploit them are critical for innovation.

Location may thus lead to the creation of 'local production systems' or patterns of interaction between firms to develop and exploit new knowledge. This knowledge creation within and between firms is embedded in the skills and competencies of people in the locality; hence training has an important role to play in the development of learning networks and regions. The training and the development of human capital is thus both an input to the creation of new knowledge and also an outcome of that knowledge creation (Belussi 1996; Crouch, Le Gales & Trigilia 2001).

Intermediate institutions, third-party agents and network brokers

The development of local, district and industry networks of firms frequently requires not only access to local knowledge resources, but also an external stimulus. Network brokers, intermediate institutions and third-party agents are significant for the formation and maintenance of networks. Collective action on the part of firm managements does not happen spontaneously but rather can be facilitated by a variety of intermediate institutions and third-party agents, including local authorities, skills councils, technical colleges, group training companies etc. These institutions and agents may be sponsored by government or by firms themselves. Third-party agents or network brokers are used to build the temporary institutions of the network. They broker network formation and development and the provision of services to network members (Cooney 2003; Finegold 1999; Forrant & Flynn 1998l; Huggins 1998; Provan & Human 1999).

Finegold (1999, p.70) notes the importance of network agents in his study of networks amongst high-technology firms in Silicon Valley. He finds that:

> A key to the flexibility of these networks is their capacity for collective knowledge creation and diffusion. This form of knowledge interdependence is fostered by intermediate institutions that provide a forum for individuals to meet and exchange learning.

The role that network agents can play in the development of networks is significant, but the kinds of supports and local resources required by agents to be effective remain unclear.

Cooperation and the training effort of firms

Inter-firm cooperation may take a number of forms; some forms extend direct business relationships, such as participation in supply chains or the development of business-to-business relationships, while others are based upon the use of shared resources. These shared resources may be local resources such as universities and technical colleges or national and industry resources such as skills councils and employers' associations. How these forms of cooperation affect the training effort of firms is the focus of this study. Which firms engage in joint training, what kind of training is provided jointly, what benefits firms derive from joint training and which business practices support joint training, are some of the key questions to be explored in this study.

Methodology

The study

This study of inter-firm training arrangements in Australia was prompted by a growing interest in this area. Concepts of learning networks and skill ecosystems have attempted to establish some theoretical underpinnings to the practice of inter-firm cooperation in the training area, but much basic research remains to be done. This study begins the process in the Australian case—of establishing the nature, scope and extent of cooperation.

This study was also stimulated by the research undertaken for the Bureau of Industry Economics report, *Beyond the firm*, which, among other findings, highlighted the importance of cooperation in training for a number of Australian manufacturers. The design of the sample and the wording of some questions are taken from that survey.

Research questions

This study set out to examine seven key questions about inter-firm cooperation in training.

1 What is the extent of inter-firm cooperation in training in Australia?

   How many and what proportion of firms cooperate with other firms in the provision of training? What proportion of the training effort of firms is covered by cooperative arrangements with other firms?

2 What are the differences between regions and industries regarding inter-firm cooperation in training?

   Which industries cooperate more than others in the provision of training and why? Which regions cooperate more than others in the provision of training and why?

3 What types of training elicit the greatest cooperation between firms?

   Is cooperation greater for management or technical training? Is cooperation greatest for firm-specific, industry-specific or generic skills? Is cooperation greater for nationally accredited training or other forms of training?

4 What kinds of inter-firm arrangements facilitate cooperation in training?

   What role do cooperative training arrangements play in inter-firm cooperation? To what extent are arrangements formalised?

5 What are the perceived benefits of inter-firm cooperation in training?

   Are the benefits to be found in an improved quality of training, greater amount of training, reduced cost of training, or some combination of these? Does cooperation give firms the ability to provide training that would not otherwise be available?

6 What role does the formal VET sector play in cooperative training arrangements between firms?

   Has VET policy facilitated or hindered cooperation between firms in the provision of training? Are inter-firm arrangements substitutes or complements for formal VET provision? Which network agents are significant for network development?

7 What difficulties are encountered when establishing cooperative training arrangements?

How can VET policy address these difficulties? How can registered training organisations and skill councils address these difficulties?

Conduct of the study

The study was undertaken by means of a postal and web-based survey of firms in five manufacturing industries. A questionnaire was developed for the survey which included elements of the questionnaire used in *Beyond the firm* (Bureau of Industry Economics 1995). While training was a relatively minor part of the Bureau of Industry Economics survey, the questionnaire used in this study asked a broader range of questions about inter-firm cooperation on training (appendix 2). The draft questionnaire was presented to an expert reference panel for comment and was then piloted with a small sample of firms to check that the questions were meaningful to respondents and produced reliable information.

The sample included five industries:

- clothing and footwear
- engineering
- information technology
- scientific and medical equipment
- processed foods and beverages.

These industries range from sunrise through mature, to possibly sunset industries, and include both low- and high-technology production processes.

Data gathering and analysis

The data were collected through a mail survey conducted between August and December 2005. Three contacts were attempted.

- An initial letter explained the purpose of the survey and asked a suitably qualified respondent to complete the questionnaire. Respondents could complete a pencil and paper version of the questionnaire and return it in a reply-paid envelope or complete the questionnaire online. A reminder card was sent to non-respondents.
- A second reminder letter was sent and contained a new copy of the questionnaire. Again respondents could complete a pencil and paper version of the questionnaire and return it in a reply-paid envelope or complete the questionnaire online.
- Follow-up telephone interviews were conducted with 63 respondents who indicated that they would like to comment further on the questions posed in the survey.

The sample

Table 1 shows the details of the sampling:

- The population is the number of firms supplied by Dunn and Bradstreet. The specification of the industries followed the Australian and New Zealand Standard Industrial Classification (ANZSIC) codes used to specify the population for *Beyond the firm*. These were converted to the standard industrial classification codes provided in the Dunn and Bradstreet sampling frame. Because the standard industrial classification codes were generally more specific than the

ANZSIC codes, a good, but not perfect, correspondence was established with the original classifications used in *Beyond the firm*.

The firm of Dunn and Bradstreet maintains databases of Australian firms as an integral part of its credit information and debt management services. The currency, accuracy and comprehensiveness of the information are underwritten by the requirement for their commercial usefulness. The lists are compiled from a wide variety of sources, including the Australian Securities and Investment Commission, state and territory land titles offices, other public records, credit providers and through self-reporting by firms. While it would be desirable to have access to a sample frame in which each current employer in Australia was listed, as Adena notes: 'There is no such list' (2006, p.4). These lists provide an alternative and have been used as sampling frames in other National Centre for Vocational Education Research (NCVER) studies of firms, as well as in surveys conducted by Australian Government departments and agencies. The coverage of firms, while it can be expected to be good, is not perfect.

- The engineering industry had substantially more firms than any of the other industries. A random sample of 750 engineering firms was selected for inclusion in the study. All firms from the other industries were included. Questionnaires were mailed to 3449 firms.
- Return-to-sender responses were received from 255 firms, a rate of 7.4%.
- 56 responses (1.6% of respondents) were out of scope. The original sample design on which this study is based excluded firms with fewer than four employees or with more than 500. Firms which the sampling frame indicated were out of scope were removed from the population, but inevitably some firms that were sent questionnaires proved to have too few or too many employees, or they proved to be in a different industry.
- 52 firms refused to participate in the survey; that is, 1.5% of the firms that were sent a questionnaire that was not returned as address unknown.
- Valid responses were received from 598 firms.
- The raw response rate was 19.1% of firms that were sent a questionnaire. The response rate is 21.0%, if allowance is made for firms that would have been out of scope among non-respondents.

A response rate of just over one in five is less than desirable. The low response rate is an important caveat to consider when interpreting results from the survey.

Table 1 Number of firms in the population and the sample and response rates

Industry	Population	Mailed out	Wrong address	Out of scope	Refusals	Valid responses	Response rate
	n	n	n	n	n	n	%
Clothing & footwear	728	728	61	14	10	113	19.8
Engineering	2541	750	53	15	16	153	25.2
IT & telecommunications	701	701	48	12	6	100	17.6
Scientific & medical equipment	666	666	47	7	8	121	21.2
Processed food & beverages	604	604	46	8	12	111	22.1
Total	**5240**	**3449**	**255**	**56**	**52**	**598**	**21.0**

Note: The response rate is based on a mailout adjusted for 'out of scope' firms among non-respondents.

The analyses presented in the next chapter are weighted to compensate for the differential response rates across industries and firm size (measured by the number of employees) and for the initial sub-sampling of engineering firms. The population to which they correspond is the initial population of 5240 firms. The weighting schema is presented in table A1. The weighting removes response bias resulting from the differential response rates between the five industries and smaller and larger firms, but cannot remove any bias within those categories.

Findings

The results of the survey of inter-firm cooperation are discussed in this chapter under seven headings:

- ✧ Participation in cooperative training arrangements
- ✧ Why firms do not participate in cooperative training arrangements
- ✧ Why firms participate in cooperative training arrangements
- ✧ The characteristics of cooperative training arrangements
- ✧ The types of training provided
- ✧ The significance of cooperative training arrangements
- ✧ Benefits of cooperative training arrangements.

Participation in cooperative training arrangements

The majority of participating firms (85.8%) indicated that they provided some form of training (table 2). Looking specifically at cooperative training arrangements, these were reported by 105 (17.6%) firms in the sample. Of the remaining firms, 14.2% provided no employee training at all and 68.2% provided some training but had no cooperative training arrangements.

Training for the purposes of this survey includes all formal instructional activities, whether accredited for recognised qualifications, accredited for licensing and certification, or whether non-accredited. 'Formal training' was defined for respondents as a structured, planned activity where the main purpose is learning skills or knowledge. The training may occur off site, on site or on the job.

Other surveys of firm-based training suggest that the incidence of formal training is lower than reported here. The Training Expenditure and Practices Survey found that 83.3% of employers in the manufacturing industry provided some training for their employees in the 12 months to June 2002. Almost 34% provided structured training and 83.2% provided unstructured training (ABS 2003, p.14, table 2).[1] Results from the 2005 Survey of Employer Use and Views of the VET System point to a substantially higher incidence of annual formal employee training—35% of manufacturing firms had at least one apprentice or trainee, 16% provided some nationally recognised non-apprenticeship training, 51% provided unaccredited formal training and 83% provided informal training, while only 11% provided no training (NCVER 2006, p.4). Even allowing for a substantial overlap of the categories of formal training, these values point to a notably higher incidence of formal training among firms in the manufacturing industry than found in the Training Expenditure and Practices Survey.

[1] *Structured training* includes training activities that have a specified content or predetermined plan designed to develop employment-related skills and competencies.

Table 2 Participation in cooperative arrangements with other firms for employee training by industry and other characteristics of the firm

Characteristics of firms	No training		Some training				
			No cooperation		Some cooperation		Mean
	n	%	*n*	%	*n*	%	%
Industry							(0.16)
Clothing & footwear	33	27.9	72	13.0	8	6.1	11.1
Engineering	19	46.4	105	48.2	29	51.2	22.0
IT & telecommunications	14	12.7	67	13.4	19	13.8	21.4
Scientific & medical equipment	10	6.6	89	14.0	22	12.7	19.4
Processed food & beverages	9	6.3	75	11.4	27	16.2	27.3
Number of employees							(0.00)
5–9	34	48.7	77	23.4	13	15.9	14.8
10–19	28	32.6	125	32.8	25	20.5	13.7
20–49	15	12.9	116	26.2	35	32.7	24.1
50–99	3	4.9	46	8.5	16	19.4	36.8
100–500	1	1.0	40	9.2	11	11.6	24.4
Number of years in business							(0.08)
Less than 5 years	3	3.3	19	4.3	6	6.0	26.3
5–less than 10 years	8	9.9	44	11.0	10	7.9	15.4
10–less than 20 years	31	37.9	146	36.3	31	26.2	15.4
20 years or more	39	48.8	196	48.4	53	59.9	23.9
Registered training organisation							(0.39)
Is a registered training organisation	2	3.2	13	3.3	1	1.9	12.8
Is not a registered training organisation	78	96.8	382	96.7	99	98.1	20.9
Over the last 3 years, the number of employees has:							(0.05)
Declined by more than 10%	17	20.4	53	13.1	8	9.8	15.9
Been more or less stable	51	65.8	207	54.5	52	47.3	18.0
Increased by more than 10%	13	13.8	139	31.2	40	42.9	25.9
The firm is less than 3 years old	0	0.0	6	1.2	0	0.0	0.0
Ownership							(0.98)
Unincorporated firm	6	10.9	7	1.8	2	1.9	21.0
Australian private company	73	86.8	327	82.5	80	84.0	20.5
Australian public company	0	0.0	16	3.6	4	2.4	14.3
Subsidiary of an Aust. company	1	1.4	6	1.8	2	1.4	16.6
Subsidiary of an o'seas company	0	0.0	24	6.1	7	6.3	20.8
Overseas company	0	0.0	19	3.6	3	2.9	17.0
Other	1	0.9	4	0.6	1	1.1	33.8
Profitability in 2003–04							(0.05)
Made a pre-tax profit	51	66.1	297	77.7	85	86.9	22.5
Break even before tax	12	15.6	34	8.5	5	6.8	17.2
Made a loss before tax	14	18.2	52	13.8	6	6.4	10.7
Number & location of workplaces							(0.00)
Only one site	65	82.3	260	67.2	49	46.7	15.0
More than one site, all in same state	8	6.8	50	11.8	22	22.8	32.9
Sites in more than one state	5	5.1	60	12.7	20	20.8	29.3
At least one site overseas	3	5.8	34	8.3	9	9.6	22.8
Main owners work for the firm							(0.56)
Yes	80	99.0	358	90.3	89	92.1	20.6
No	1	1.0	44	9.7	10	7.9	17.2

Characteristics of firms	No training		Some training				
			No cooperation		Some cooperation		Mean
	n	%	*n*	%	*n*	%	%
Main product or service is sold to:*							
Other firms for processing	14	21.8	66	18.5	15	19.3	21.3
Other firms as capital equipment	13	22.5	75	23.8	28	34.1	27.1
Wholesalers, retailers, consumers	59	70.5	273	62.1	67	60.4	20.1
Main market is:							(0.60)
Local region or state	37	51.0	114	34.4	34	37.6	21.5
Australia and New Zealand only	20	25.5	112	24.6	17	19.9	16.8
Some export	18	20.5	138	33.1	38	36.4	21.6
Primarily export	5	3.0	40	7.9	9	6.1	16.2
Market for the firm has:							(0.32)
Many competitors	45	56.5	224	54.3	64	59.5	21.8
Few or no competitors	34	43.5	180	45.7	36	40.5	18.4
The firm faces:							(0.02)
Intense competition	18	25.3	96	20.9	23	18.4	18.2
Strong competition	41	44.0	196	50.2	60	65.2	24.7
Moderate competition	14	23.1	74	18.3	12	11.2	13.4
Some or little competition	6	7.6	38	10.6	4	5.2	10.9
Demand for main product/service							(0.19)
Is expanding	25	27.4	185	45.2	53	53.6	23.3
Is stable	40	55.9	189	45.1	41	40.2	18.6
Is contracting	13	16.7	34	9.7	7	6.2	14.1

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Values are based on 85 firms with no training; 408 with training but no cooperative training; and 105 firms with cooperative training arrangements. Any discrepancies are due to missing responses for particular questions. Values in parentheses are probabilities of no relationship among the means. Characteristics marked with an asterisk allow multiple responses and hence the sum of firms can exceed the totals. The mean is the percentage of firms participating in cooperative training arrangements among those firms that provide some training.

Source: Survey of inter-firm cooperation in training.

Nevertheless, 85.8% of manufacturing firms providing formal training is a relatively high estimate. The low response rate to the survey provides a possible source for the high estimate—firms that provide training were more likely to respond—and underlines the caution that needs to be exercised in generalising results from this report. However, several other factors could also contribute to the higher estimate. The sample includes only five sub-categories of manufacturing, including firms that are providers and manufacturers of information technology and telecommunications and scientific and medical equipment, firms that might be expected to have higher-than-average levels of training (although firms in the category 'processed foods and beverages' reported higher levels of training). Estimates of the incidence of training may also be higher because the sample excludes firms with fewer than five employees and these small firms typically have a lower incidence of training (ABS 2003; NCVER 2006).[2] Finally, some respondents may have used a broader definition of formal training when responding to the relevant questions in the questionnaire.

Any sample bias favouring firms that provide formal training for their employees is likely to result in overestimates of the incidence of inter-firm cooperation in training. It need not affect estimates of the nature of such training and the reasons for it.

Firm size, firm sector, human resource policies and technological change are related to the extent of training, but the relationship of training provision to the competitive environment of firms is less

[2] The survey also excludes firms with more than 500 employees. Larger firms are more likely to provide formal training for their employees. The number of larger firms excluded is likely to be substantially less than the number of small firms.

direct. When Australian employers were asked why they had increased their training expenditure, only 9% of firms that had reported an increase in training in the previous year suggested that this was the result of competition (Fraser 1996 citing unpublished results from the ABS 1994 Training Practices Survey). In fact 'competition' was the least reported of all the suggested factors, and only 3% considered it to be the most important factor driving their increased training expenditure.

Comparisons between firms that participate in cooperative arrangements and those that do not risk confounding any differences with the provision of training per se. The results in table 2 are presented separately for firms that reported providing:

- ✧ no training of their employees at all
- ✧ some training for their employees without any cooperative arrangements
- ✧ some training for their employees with cooperative arrangements.

The comparison between the latter two groups—those who provide training with and without cooperative arrangements with other firms—is the more meaningful in identifying characteristics of firms that are more likely to be associated with participation in cooperative training arrangements. Simply comparing firms that participate in cooperative training arrangements with those that do not confuses the influences on cooperative training arrangement with the influences on the provision of training per se.

Selected characteristics of the firm

Table 2 shows the distribution of firms across selected characteristics for the three categories of training, as well as the mean incidence of cooperative training arrangements among those firms that provide some training. It shows the following.

- ✧ There is no significant difference among industries in the extent to which those firms that provide some training participate in cooperative training arrangements. Although firms in the clothing and footwear industry are less likely to participate in cooperative training (6.1%) than are firms in the other four industries, the overall differences are not significant. Firms in the clothing and footwear industry are also less likely to provide any training than are firms in the other industries.
- ✧ Given that firms with more employees typically provide higher rates of training for their employees, it might be expected that they would also be more likely to participate in cooperative training arrangements. The results support this expectation but also show that cooperation is not limited to large firms. Medium-sized firms (20–49 employees) that may not be able to supply training services internally are the most engaged in joint training. Small-sized firms (up to 19 employees) are only about half as likely as larger firms to engage in cooperative training arrangements. Firms with 100 or more employees are less likely to participate in cooperative training arrangements (24.4%) than are those with 50 to 99 employees (36.8%).
- ✧ Developing cooperative arrangements with other firms takes time. The longer a firm has been in business, the longer it has had to develop cooperative arrangements. The results in table 2 provide little support for this proposition, although this may partly reflect the distribution of firms across the number of years in business—only a small percentage have been operating for fewer than five years.
- ✧ Firms can be registered to deliver nationally accredited training to their employees and to the employees of other firms. The effect of being a registered training organisation on the likelihood of participating in cooperative training arrangements is uncertain. On the one hand, it may be an indicator that the firm is an innovator in training and open to different arrangements. On the other, it might indicate a stand-alone approach to training. Although the direction of the results in table 2 supports the latter interpretation, there were too few registered training organisations in the sample for the difference to be significant.

- The effect of 'hard times' on participation in cooperative training arrangements is also difficult to forecast. Declining employment in a firm might motivate management to look for alternative arrangements in order to reduce training costs. It might also, however, be a flag that indicates poor management or a firm that has poor partnership relationships generally. Conversely, firms with expanding employment might also have innovative management with good external relations and a need to reduce training costs for the expanding workforce. The results support the proposition that a firm with growing employment is more likely to have cooperative training arrangements: one-quarter of firms whose workforce had grown by more than 10% in the previous three years were involved in cooperative training arrangements compared with 18.0% of firms whose workforce was stable and 15.9% of firms with a declining workforce.
- The type of ownership of a firm has no significant relationship to the extent to which firms engage in cooperative training arrangements, although this may be only because the overwhelming majority of firms in the sample are Australian private companies and there are too few firms in the other categories of ownership to provide significant differences.
- More profitable firms are more likely to engage in cooperative training arrangements (22.5%) than firms that are making a loss (10.7%) or breaking even (17.2%). This is unlikely to be a causal relationship since profit is obviously driven by many things other than cooperative training arrangements. Nevertheless, cooperative training arrangements may be part of the matrix of a firm's management and market characteristics that contribute to profitability.
- The number of sites from which a firm operates might be expected to be associated with the likelihood of participating in cooperative training arrangements, because participation in intra-firm networks may lead to participation in inter-firm networks. Firms operating from multiple sites may also be larger firms and hence more likely to participate in joint training. There is some evidence of multi-site firms participating more widely in joint training. Firms operating from multiple sites in more than one state or territory are twice as likely to have cooperative arrangements (29.3%) than firms operating from one site (15.0%). As well as the number of sites, the location of the sites may have an effect. Increasing geographical dispersion might be associated with more cooperative training arrangements as the number of potential partner networks increases. But this does not seem to hold for firms with at least one plant overseas, for which participation in cooperative training arrangements is near the average (22.8%).
- In the sample the main owner of the firm worked for the firm in about nine out of every ten firms. An interesting feature relating to the involvement of the main owner with the firm was the different patterns for training and for cooperation in training. The owner worked for the firm for nearly all of the firms that did not participate in training. Given that a firm participated in training, however, firms in which the owner was involved were no more likely to participate in cooperative arrangements.
- Arguably, firms that sell their goods and services to other firms are more likely to be involved in cooperative relationships with other firms. Any effect on cooperation in training, however, seems to be restricted to firms that sell their product or service as capital equipment (27.1%) rather than as input to other firms' production processes (21.3%). Firms that sell directly to wholesalers, retailers or consumers are not more likely to participate in cooperative training (20.1%). The statistical significance of each of these characteristics is not shown in table 2 because they are not mutually exclusive, but the relationship of provision of cooperative training to sale of capital equipment to other firms is statistically significant ($p=0.03$).
- There is no statistically significant relationship between the market for the main goods or services of a firm and participation in cooperative training arrangements. Local networks for local markets did not contribute to participation in cooperative training arrangements. The introductory discussion and results elsewhere point to the importance of geographical location as the foundation for some (but by no means all) networks of firms.
- The number of competitors a firm has for its main product or service has no effect on its participation in cooperative training arrangements. The level of competition, however, has a 'Goldilocks' effect—too much (intense) competition and too little (moderate, some or little) competition was associated with lower participation in cooperative training arrangements, while

firms that faced strong competition had higher levels of participation. Later multivariate analyses suggested that both 'intense' and 'strong' competition were linked to higher levels of a firm's participation in cooperative arrangements (see table 5). Competition in the marketplace need not prevent cooperation in training.

- Consistent with the known characteristics of firms that provide training and earlier results for employment growth, firms for which demand for their product is expanding (23.3%) are somewhat more likely to participate in cooperative arrangements for the provision of training to their employees than are firms for which demand is stable (18.6%) or contracting (14.1%). These differences, however, are not statistically significant.

Relationships with customers, suppliers and other firms

Although most firms operate in markets with many competitors and intense or strong competition, firms still do cooperate with other business partners to varying degrees. Respondents were asked to describe on a scale of 1 to 5 their relationships with:

- their customers
- their suppliers
- other firms in their own industry
- other firms outside their industry.

Cooperation in training is only one aspect of the cooperative arrangements that may exist between firms and their various business partners. It seems likely, however, that training could form part of the cooperative arrangements with any of these four types of partners and that the degree of overall cooperation is likely to be reflected in cooperative training arrangements.

Table 3 shows the distribution of firms by their level of cooperation with the four types of potential partners. It also shows, for those firms that provide some training, the percentage of firms with cooperative training arrangements.

The extent to which firms cooperate with their various partners differs substantially. Almost two-thirds of firms with cooperative training arrangements claim to have highly cooperative arrangements with customers and just over two-fifths have highly cooperative arrangements with suppliers. Fewer than one in five claims to have highly cooperative arrangements with other firms in their own industry or in another industry.

The impact of the level of cooperation on the incidence of cooperative training arrangements is not significant, regardless of the form of cooperation. The multivariate analyses (table 5), however, suggest that firms with highly cooperative relationships with their suppliers or with other firms outside their industry are more likely to cooperate with other firms in their provision of training; more cooperative relationships with firms outside a firm's own industry translate into greater cooperation with firms for employee training.

While this finding might suggest that the cooperative training arrangements tend to be with firms outside the industry, this is not the case. Later results suggest that approximately 40% of firms with cooperative training arrangements have those arrangements with other firms in the same industry or line of business (table A3), although *line of business* is possibly a broader term than *industry* and would include suppliers.

Table 3 Participation in cooperative arrangements with other firms for employee training by cooperative relationships with customers, suppliers and other firms

Characteristics of firms	No training		Some training				
			No cooperation		Some cooperation		Mean
	n	%	*n*	%	*n*	%	%
With customers							(0.71)
5 Highly cooperative	52	66.8	246	63.7	60	60.0	19.6
4	21	23.7	117	27.8	31	32.3	23.2
3	3	6.2	25	6.1	5	4.3	15.4
2	2	1.9	4	1.0	1	0.9	17.7
1 Arm's length	1	1.4	6	1.4	3	2.5	31.8
With suppliers							(0.16)
5 Highly cooperative	41	51.0	152	40.3	41	40.5	20.5
4	24	29.8	179	41.4	44	47.4	22.8
3	11	15.4	55	14.9	8	7.1	11.0
2	2	1.5	10	2.6	4	3.1	23.0
1 Arm's length	2	2.3	4	0.7	3	1.9	41.5
With other firms in own industry							(0.12)
5 Highly cooperative	13	17.4	42	13.5	16	15.0	22.4
4	11	15.2	97	24.5	25	22.8	19.3
3	23	33.9	112	27.6	33	34.2	24.3
2	10	12.9	76	18.6	17	20.6	22.3
1 Arm's length	22	20.6	70	15.8	8	7.4	10.8
With other firms outside industry							(0.36)
5 Highly cooperative	15	21.7	43	13.3	13	13.8	21.4
4	11	18.0	93	25.3	33	33.1	25.6
3	25	36.6	122	29.0	24	25.1	18.5
2	10	10.8	73	17.6	13	12.2	15.4
1 Arm's length	15	12.9	63	14.8	17	15.8	21.9

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Values are based on 73 firms with no training; 423 with training but no cooperative training; and 102 firms with cooperative training arrangements. Any discrepancies are due to missing responses for particular questions. Values in parentheses are probabilities of no relationship among the means. The mean is the percentage of firms participating in cooperative training arrangements among those firms that provide some training.

Source: Survey of inter-firm cooperation in training.

Competitive advantages and impediments to growth

The extent to which firms develop cooperative arrangements for training may be related to their own perceived competitive advantages. For instance, it is likely that training may be more important to a firm if its competitive advantage lies in the skills or expertise of its workforce and this may carry over to a higher incidence of cooperative training arrangements. Cooperative arrangements (training or otherwise) can themselves be an important competitive advantage for the firm.

From a predetermined list, respondents were asked to select the three main competitive advantages of their firm and rank them in order of importance (table 4). A minority of respondents selected the three advantages but did not rank them. Hence in table 4 the results are presented without any regard to ranking—any mention of the competitive advantage (one, two, three or unranked) was sufficient for inclusion.

Table 4 Participation in cooperative training arrangements by the firm's competitive advantages and impediments to growth

Characteristics of firms	No training		Some training				
			No cooperation		Some cooperation		Mean
	n	%	*n*	%	*n*	%	%
Competitive advantages							
Distribution or delivery	11	16.5	77	18.4	18	20.3	22.1
Flexibility in meeting customer needs	47	65.5	227	56.4	53	56.5	20.4
Key individual(s)	9	13.2	53	12.2	11	9.8	17.1
Low cost	10	15.3	33	7.9	5	5.1	14.2
Marketing	3	2.6	25	5.2	6	6.9	25.3
Prestigious brand/good reputation	23	23.9	159	35.2	45	44.1	24.3
Product design/service design	26	34.2	111	28.7	24	28.4	20.3
Quality of products and services	58	76.0	260	60.7	70	64.1	21.3
Range of products and services	5	6.1	92	22.4	24	22.0	20.2
Technology/good ideas	13	16.7	87	24.2	19	17.3	15.5
Skills of workforce/expertise	19	26.6	94	26.3	30	35.7	25.9*
Cooperative arrangements	3	3.5	12	2.2	4	2.6	23.8
Other	4	3.5	12	2.1	0	0.0	0.0
Main impediments							
Access to funds for expansion	15	20.3	160	37.1	42	40.8	21.9
Declining or stable demand for main product or service	42	59.2	163	37.4	34	32.4	18.1
Shortage of skilled labour	23	30.7	164	47.6	41	54.1	22.5
Industrial relations	43	47.2	228	48.6	68	56.3	24.4
Domestic competition	51	63.2	220	53.2	46	46.6	18.3
Overseas competition	10	14.7	76	16.9	13	10.8	14.0
Management strategy	14	14.7	64	15.0	14	15.2	20.6
Other 1	4	3.4	10	2.7	3	2.9	21.5
Other 2	4	4.0	10	2.9	3	3.2	21.5

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Values are based on 85 firms with no training; 408 with training but no cooperative training; and 105 firms with cooperative training arrangements. Any discrepancies are due to missing responses for particular questions. All characteristics allow multiple responses and hence the sum of firms can exceed the totals. The mean is the percentage of firms participating in cooperative training arrangements among those firms that provide some training. An asterisk indicates statistical significance at $p<0.05$.

Source: Survey of inter-firm cooperation in training.

Table 4 shows that the quality of their products and services was the most frequently cited competitive advantage for firms in the sample, followed by flexibility in meeting customer needs and having a prestigious brand or a good reputation. Workforce skills were cited by about three in ten respondents, although much more frequently among those firms that had cooperative training arrangements. Few firms cited cooperative arrangements as a competitive advantage in themselves.

The incidence of cooperative training arrangements among firms that supplied some training differed significantly for only one of the competitive advantages listed in table 4. Firms that cited the skills or expertise of their workforce as a main competitive advantage were more likely to have cooperative training arrangements (25.9%).

Firms were also asked about impediments to their growth. They were asked to select three impediments from a list and rank them. Again, a number of respondents listed the three impediments but did not rank them. Accordingly, the results in table 4 include any mention of an impediment, ranked or unranked. The most frequently cited impediments were overseas competition, domestic competition and a shortage of skilled labour. None of the listed impediments to growth was associated with higher participation in cooperative training arrangements.

Adjusted participation in cooperative arrangements

Many of the characteristics of firms are interrelated. For instance, owners of firms are more likely to be working in smaller firms and smaller firms are less likely to be registered training organisations. Multivariate statistical analysis helps to sort out these relationships and determine which variables are related to having cooperative training arrangements in their own right and which are only related by virtue of their relationship with other characteristics of firms.

The analysis uses a logistic regression (table A2) and converts the logits to their corresponding percentages, given the population mean and distribution of the variable. Where possible, characteristics of firms were recoded to two categories, and statistical significance was determined by the Wald chi-squares for binary variables or a partial log likelihood chi-square for variables with more than two categories. Table 5 shows the characteristics of firms that mostly have statistically significant relationships with provision of cooperative training arrangements after controlling for other firm characteristics, given that the firm provides some training.

- *The number of employees:* firms with between 20 and 500 employees were more likely to participate in cooperative training arrangements with other firms (27.4%) than were firms with between 5 and 19 employees (13.8%), a finding consistent with the overall higher level of training in larger firms.
- *Profitability in 2003–04:* although firms that were not profitable (broke even or made a loss) were less likely to provide cooperative training arrangements for their employees (14.4%) than firms that were profitable (22.2%), this difference was not statistically significant after controlling for other variables.
- *Closeness of relationships with customers:* firms that had highly cooperative relationships with their customers were *less* likely to participate in cooperative training arrangements (19.3%) than were other firms (34.2%), controlling for other characteristics, although this difference is not statistically significant.
- *Closeness of relationships with suppliers*: firms with highly cooperative relationships with their suppliers were more likely to participate in cooperative training arrangements (22.1%) than were other firms (12.6%), controlling for other variables.
- *Closeness of relationships with firms in the same industry*: there was no relationship between closeness of relationships with other firms in the same industry and participation in cooperative training arrangements.
- *Closeness of relationships with firms outside the industry*: controlling for other variables, firms with cooperative relationships with firms in other industries were more likely to participate in cooperative training arrangements (26.0%) than were other firms (17.0%).
- *The main product or service is sold to other firms as capital equipment*: after controlling for the influence of other variables, 27.8% of firms that mainly sell capital equipment are statistically more likely to participate in cooperative training arrangements than other firms (18.0%).
- *The level of competition*: firms selling their main product or service in a more competitive environment are more likely to cooperate with other firms in the provision of training (23.0%) than are firms that are not in an intense or strong competitive market (12.3%).
- *Workforce skills as a competitive advantage*: firms that cited the skills of their workforce as a main competitive advantage were more likely to have cooperative training arrangements (27.4%) than other firms (17.7%).

These results reinforce the picture that cooperative training arrangements are more likely among larger firms operating in competitive markets and with close relationships with their suppliers or firms in other industries, but not in their own industry. This effect appears stronger if the firm mainly sells capital equipment to other firms. Firms that believe the skills of their workforce is one of their competitive advantages are also more likely to participate in cooperative training arrangements.

Table 5 Observed and adjusted rates for participation in cooperative training arrangements by selected firm characteristics—firms providing some training

Relationships		Participation in cooperative training arrangements		
		Distribution	Observed mean	Adjusted mean
		%	%	%
Number of employees	**p=**		(0.00)	(0.00)
5–19		53.3	14.2	13.8
20–500		46.7	27.0	27.4
Firm made a pre-tax profit	**p=**		(0.03)	(0.08)
Yes		74.1	22.5	22.2
No		25.9	13.3	14.4
Firm's relationships with customers are:	**p=**		(0.76)	(0.06)
Highly cooperative (4, 5)		91.6	20.7	19.3
Arm's length (1, 2 3)		8.4	18.9	34.2
Firm's relationships with suppliers are:	**p=**		(0.10)	(0.05)
Highly cooperative (4, 5)		83.0	21.7	22.1
Arm's length (1, 2 3)		17.0	14.6	12.6
Firm's relationships with other firms in the same industry are:	**p=**		(0.97)	(0.58)
Highly cooperative (4, 5)		40.3	20.4	19.2
Arm's length (1, 2 3)		59.7	20.6	21.4
Firm's relationships with other firms outside the industry are:	**p=**		(0.11)	(0.03)
Highly cooperative (4, 5)		43.1	24.2	26.0
Arm's length (1, 2 3)		56.9	18.5	17.0
Mainly sells capital equipment to other firms	**p=**		(0.03)	(0.03)
Yes		25.9	27.1	27.8
No		74.1	18.3	18.0
Level of competition for main product	**p=**		(0.00)	(0.01)
Intense or strong		73.6	22.9	23.0
Moderate, limited or some		26.4	12.5	12.3
Workforce skills a competitive advantage	**p=**		(0.04)	(0.02)
Yes		28.2	25.9	27.4
No		71.8	18.3	17.7

Note: Observed means do not control for other variables. Values for the distribution and observed mean exclude missing data. The p values for observed means correspond to log-likelihood chi-squares. Adjusted means are based on 513 firms and derived from a logistic regression equation (see table A2 for details) with imputation of missing values. The adjusted means are derived from logits by setting the overall mean and distribution and solving logits for the category means. The p-values for the adjusted values correspond to Wald chi-squares from the logistic regression and are adjusted for the finite population correction. All values are weighted.

Source: Survey of inter-firm cooperation in training.

Why firms don't participate in cooperative training arrangements

Unless a particular course of action is compelling or the norm, asking someone why they haven't followed that course of action is often a little more tenuous than asking them why they actually do something. Cooperative arrangements in training are not the norm—the majority of firms (82.4%) do not have them—and they may not have them simply because the question has never arisen. The firm either has no perceived training requirements or their needs have been met adequately by their existing training arrangements. Firms may never have declined the opportunity to participate in cooperative training arrangements because there may never have been any offers or it may never have occurred to managers to seek out opportunities for cooperation.

Responses to questions about the main reasons for not training with other firms should be interpreted in this context. If respondents say that, for instance, they don't participate in cooperative training arrangements because of concerns about poaching of staff, this may well be a secondary reason. If the opportunity to participate in cooperative training had arisen, they may have had concerns about participating because of poaching. The primary reason, however, may well be that the opportunity has never arisen.

Table 6 shows responses to a series of reasons for not training with other firms. These are presented separately for firms that provide some training and firms that do not, a separation that partly captures the perceived need for employee training. There are several frequent responses.

- There is no need to seek partners because current arrangements are adequate (36.1%). This was the most frequent response overall and for firms that provide training. One manager expanded upon this in the following terms:

  > We have people who sell training to us; as a matter of fact we have one on-site today. They look at our requirements and deliver training to those. The arrangement works well for us. We have someone supply the training and the government pays for it. We are always open to improvement but at the moment we are not actively seeking extra training.

- They do not have a need for training (31.1%), which is most frequent for firms that provide no training.

- There are no suitable firms to work with (29.3%). For firms with highly specialised needs, partner firms may simply not be available, as this manager explains:

  > It is difficult to train people in areas that are not available locally. We have specialised technology. We paid a person to come out from Germany to train our people in the use and servicing of equipment.

These reasons capture aspects of need and opportunity. Other issues are concerns inherent to cooperation among firms in general.

- The potential for poaching staff (17.8%) is one issue. Several managers we interviewed were concerned about this, with one manager commenting:

  > As for working with other firms [to train apprentices] I don't want to train them only to have them snatched out from underneath me. When we train we look after our own.

- Loss of intellectual capital (22.9%) was another issue of concern. Knowledge spillover was of equal concern with poaching for some managers:

  > We do not like to train the opposition. We have our own techniques for things. We do not like to share how or why we do things, even the sequence of operations, it is all-important to our advantage over the competition because basically we know why we beat the competition.

Other reasons for not training with other firms included a lack of knowledge about the VET system (11.6%) or cooperative training arrangements (28.0%). A minority of responses related to other concerns such as:

- cost and time and lack of funds
- lack of interest from other employers
- a rural company, so not applicable
- remote location
- only firm left in our industry and location
- one of only three firms worldwide in our own line of business
- no training in Australia for scientific glass blowers
- training provided through own registered training organisation

- ✧ more confident with own type of training; own in-house training is very effective
- ✧ faster and cheaper to train on site and keep control of training
- ✧ training is product- and process-based
- ✧ on-the-job training only provided.

Many of these responses are captured by the sentiment that firms' current training is adequate and so they have no need for training and have no potential partners. A theme common to a number of these responses is that respondents viewed cooperative training arrangements as restricted to firms in the same location or industry or as being suitable mainly for narrowly technical skills. This is clearly not the case (see table 6).

Table 6 Main reasons for not training with other firms

	Provision of training		
	No training	Training	All
	%	%	%
Reasons for not training with other firms			
Do not have a need for training	51.9	27.1	31.1
No suitable firms to work with	16.5	31.8	29.3
Lack of knowledge about cooperative training activities	16.7	30.1	28.0
No need to seek partner firms for training—have suitable arrangements in place	25.9	38.1	36.1
Worried about other firms poaching our employees	12.4	18.8	17.8
Worried about other firms gaining knowledge of our products or processes	24.1	22.7	22.9
Lack of knowledge of the VET system	8.9	12.2	11.6
Lack of time/resources to seek out partner firms	14.4	22.4	21.1
Lack of industry/government support to develop joint training	5.4	10.7	9.9
Other	9.0	4.5	5.3
Likely to take up cooperative training arrangements	19.0	41.4	37.9

Note: Percentages are weighted and exclude missing responses. Values are based on 85 firms with no training and 408 with training but no cooperative training arrangements. Multiple responses were allowed and hence the sum of firms can exceed 100%.

Source: Survey of inter-firm cooperation in training.

Despite the reasons given for not training with other firms, when asked whether they would like to be involved in cooperative training arrangements if they were offered to their firm, 37.9% of respondents said yes. As might be expected, the percentage was substantially higher for firms that offered some training (41.4%) compared with firms that did not (19.0%). It is perhaps surprising that even a fifth of firms that currently provide no formal training to their employees would be willing to participate in cooperative training arrangements. It may be that these firms have a need for training that they cannot meet under current circumstances and hope that cooperative arrangements with other firms might make it possible to do so.

Why firms do participate in cooperative training arrangements

Firms participate in cooperative training arrangements for a variety of reasons. Sometimes they have no choice—they have to go to a particular product or service supplier for the necessary training for that product or service and have built a relationship with that supplier over many years; or they may need particular training to satisfy regulatory requirements. In other instances, however, firms choose to enter into cooperative training relationships.

From a predetermined list, respondents who had cooperative training arrangements with other firms were asked to indicate the main reasons for deciding to enter into the arrangement. The

responses sometimes need to be treated with a little caution. Arrangements have often been in place for many years and determining the original reason or reasons for entering into them might involve some reinterpretation after the fact. In other cases, however, the arrangements fulfil particular and readily identifiable needs or have an obvious basis in the organisation and ownership of the firm. A later chapter discusses the benefits that firms receive from cooperative training arrangements. The discussion there also addresses the question of why firms enter into cooperative training arrangements.

Table 7 Main reasons for deciding to cooperate over provision of employee training

Main influences on decision to cooperate over training	Number of firms	%
Reduce the cost of training	39	34.3
Address labour and skill shortages	32	38.6
Extend existing arrangements with other firms	39	43.8
Undertake joint projects with other firms	15	17.5
Support from government	9	8.0
Support from an industry or employer association	17	13.8
Address regulatory compliance needs	24	20.8
Other	11	9.1

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Based on 105 firms that provided any employee training in cooperative arrangements with other firms. Multiple responses were permitted and hence the sum of firms exceeds 105.

Source: Survey of inter-firm cooperation in training.

The most frequently cited reason for becoming involved in cooperative training is to extend existing arrangements with other firms (43.8%, table 7). More traditional training-specific reasons are also prominent—38.6% of firms use their cooperative training arrangements to address skills shortages and 20.8% to address regulatory compliance needs. Reducing the costs of training is also important (34.3%).

The results in table 7 also point to the facilitating effects of government (8.0%) and industry or employer associations (13.8%) on participation in cooperative training arrangements.

A range of responses were made under the *other* category, many of which could fit under the explicit codes and were used just to emphasise the importance of a particular reason. Among the comments were those that emphasised:

- the cost savings from shared training
- the extended opportunities that cooperative training arrangements provided for employees, particularly apprentices
- the importance of partnerships with suppliers who had both an interest in supporting well-informed and well-trained customers and frequently a near monopoly on that knowledge and training
- the increasing standardisation of training and qualifications required by business-to-business relationships and regulatory authorities.

The characteristics of cooperative training arrangements

The introduction outlined the various forms that inter-firm cooperation can take. Arrangements may be characterised by:

- lead-firm networks
- business-to-business relationships

- learning networks and learning regions
- intermediate institutions, third-party agents and network brokers.

Examining the features of the cooperative arrangements the results show the following (table A3).

- Most firms in cooperative training arrangements have few partners: half (51.2%) have only two or three partners and a further 22.5% have only one partner. Only a small proportion (8.0%) of cooperative training arrangements involves ten or more other partners.
- Most of the cooperative training arrangements have been in place for several years: 47.4% had been operating for more than three years and 17.8% for two or three years. The modest proportions that had been in place for less than a year (23.8%) or only one year (8.9%) suggest that, while some arrangements persist for many years, new training partnerships are constantly being formed.
- The level of churn in cooperative arrangements is shown by the proportion of firms that cooperate with different firms from time to time: 39.6% cooperate with different firms from time to time and 5.5% cooperate with both the same and different firms. These values might overstate the volatility in cooperative training arrangements. An arrangement might endure, even if some of the partners change over time.
- Almost 70% of firms share the same objectives as their partners in cooperative training arrangements; however, 13.7% do not share the same objectives as their partners and 17.7% don't know. This reflects the fact that about two-fifths (38.3%) of partners are in the same industry or line of business. Partners who are customers or suppliers (66.9%), for instance, are less likely to share common goals and interests.
- Human resources staff play a key role in coordinating cooperative arrangements, mainly through informal liaison (43.7%) and less frequently through formal arrangements (7.2%). Depending on how broadly the term 'human resources staff' was interpreted, smaller firms without specialised human resources staff might be disadvantaged in forming cooperative training arrangements with other firms. This is not necessarily the case for some other modes of coordination. Where one partner plays a lead role (for instance, where a product supplier arranges training for the employees of firms that purchase those products) (31.5%) or where a TAFE institute coordinates the training (19.6%), smaller firms may not be disadvantaged. The relatively high proportion of 'other' responses (14.9%) was not well described and included references only to a sales representative of the main training provider and personal contacts.
- The majority of cooperative training arrangements receives no support from outside the partners (80.6%), although a significant minority receive support from an industry or employer association (19.2%) or a TAFE institute (15.8%).
- There is a tendency for cooperative training arrangements to imply a closer overall business relationship with partners, although partners in cooperative training arrangements cover the full spectrum in terms of the closeness of their overall business relationship.

The types of training provided

Given that firms with cooperative training arrangements differ in many regards from other firms, it might be expected that the training delivered through cooperative arrangements will also differ from that provided through non-cooperative arrangements. Table 8 shows the incidence of the types of training provided by firms with and without cooperative training arrangements and, separately, the types of training provided through inter-firm cooperation. The results are limited. They do not provide any information about the extent (expenditure or hours) of training in each category, merely whether there was some training or none. Nevertheless, there are some interesting differences as demonstrated by the following.

- ✧ Firms with cooperative training arrangements have a greater incidence of training across all types of training than firms that do not. This is consistent with these firms having a greater total training effort.
- ✧ The difference in the incidence of training between firms with cooperative training arrangements and those without varies across categories of training. For instance, the difference is nearly 15 percentage points for training for the introduction of new products, but there is no difference at all for training in new work techniques. Firms with cooperative training arrangements have a slightly higher incidence of training for:
  - professional certification and occupational health and safety
  - new product information
  - new management issues
  - basic and advanced vocational qualifications for existing employees.
- ✧ The incidence of the various types of training delivered through cooperative arrangements is, as should be expected, less than the incidence of all training provided by those firms with cooperative training arrangements. The cooperative arrangements are only part of their overall training effort for each type of training.

Table 8 Type of training provided overall and through cooperative arrangements with other firms—firms that provide some training

Type of training	All training			Cooperative training only
	Firms with no cooperative %	Firms with some coop. %	All firms %	Firms with some coop. %
Training for accredited vocational qualifications				
Entry-level training e.g. apprenticeships	47.6	59.1	49.8	37.4
Basic voc. qualifications for existing employees	36.4	52.2	39.5	38.1
Advanced voc. quals for existing employees	25.8	42.3	29.1	16.2
Training for organisational development				
Management or supervisor training	42.7	54.8	45.1	24.5
For new management issues	24.9	38.7	27.7	10.5
For improved comm./consultation in the w'place	31.3	44.5	33.9	17.7
Technical and product training				
Training in new technology (e.g. computer skills)	59.7	73.2	62.3	47.0
Training in new work techniques	50.4	54.0	51.1	41.5
Training for new product introduction	45.0	60.4	48.0	45.5
Training for regulatory or standards compliance				
Training in quality or supplier certification systems	33.7	45.8	36.1	12.2
Training for occupational health and safety	55.9	72.5	59.2	34.2
Training for vocational licences	23.6	35.4	25.9	21.2
Training for professional certification	20.2	34.4	23.0	8.0
Other	4.8	3.9	4.6	1.5

Note: Percentages are weighted and exclude missing responses. Values are based on 408 firms with training but no cooperative training and 105 firms with cooperative training arrangements. Multiple responses were allowed and hence the sum can exceed 100%.

Source: Survey of inter-firm cooperation in training.

- ✧ The incidence of the types of training delivered through cooperative arrangements is relatively greater for some types of training compared with the overall training profile of firms with cooperative arrangements. For instance, the difference between the incidence of provision of basic vocational qualifications through cooperative arrangements (38.1%) and overall for firms with cooperative arrangements (52.2%) is only 15 percentage points compared with an average difference of about 25 percentage points. This suggests that, for firms with cooperative training arrangements, these arrangements are relatively more important for the delivery of basic

vocational qualifications than for other qualifications. Training for which cooperative training arrangements may be relatively more important includes:

- basic vocational qualifications
- training in new work techniques and product information
- training for vocational licences.

The areas in which firms with cooperative training arrangements have a relatively greater incidence of training than other firms are not necessarily the same as those in which cooperative training is delivered.

The significance of cooperative training arrangements

The significance of cooperative training arrangements differs among the firms that have them. The survey asked three questions about the significance or importance of inter-firm cooperation for training:

- the significance of cooperative training compared with the total training effort of the firm
- the significance of cooperative training as part of the business
- the importance of cooperative training to the business.

Respondents were asked to rate each of these on a scale from 1 to 5, where 1 corresponded to low and 5 to high.

The results (table 9) show that:

- For 8.7% of firms, cooperative training arrangements form a very significant part of their total training effort. By contrast, about a quarter of firms (23.2%) considered cooperative training arrangements to constitute only a small part of total training effort.
- 13.7% of firms viewed cooperative training arrangements as a very significant part of the business, while one-fifth (20.5%) indicated that such arrangements formed only a small part of the business.
- One-tenth of firms considered that cooperative training arrangements were very important for the business, while, for 13.3% of firms, cooperative training arrangements were not seen as very important.

The broader importance of cooperative training arrangements appears greater than their contribution to training alone. This may reflect the two major aspects of the arrangements—the training delivered and the business relationships within which they are embedded and to which they contribute.

The benefits of cooperative training arrangements

Cooperative training arrangements involve sharing resources, which in itself is likely to lower the costs of training. The results show that more than half of firms participating in cooperative training arrangements share (see table A4):

- trainers and instructors (58.7%)
- training facilities (50.6%)
- curriculum (51.2%).

Approximately one-third of firms also shared training materials (34.3%) and assessment of the skills developed (30.9%). A small percentage (11.9%) also shared their records of training, although this may partly reflect a lack of training records being kept.

Table 9 Significance of cooperative training arrangements with other firms

Significance	Number of firms	%
Compared with total training effort, cooperative training is:		
5 A very significant part	11	8.7
4	19	24.6
3 A moderate part	29	22.3
2	22	21.3
1 A very small part	22	23.2
Cooperative training is:		
5 A very significant part of the business	16	13.7
4	21	23.4
3 A moderate part of the business	28	25.7
2	21	16.8
1 A very small part of the business	17	20.5
The importance of cooperative training for your business:		
5 Very important	11	10.7
4	32	35.5
3 Moderately important	27	26.6
2	18	13.9
1 Not very important	12	13.3

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Based on 105 firms that provided any employee training in cooperative arrangements with other firms. Any discrepancies are due to missing responses for particular questions.

Source: Survey of inter-firm cooperation in training.

Employee training can have benefits for the firm, the employee, or both, and cooperative training arrangements are no exception. A minority of firms (6.0%) see no benefits from their cooperative training arrangements from a management perspective, but the majority do. The main benefits from the management perspective include:

- ✧ stronger ties with other business partners (55.4%)
- ✧ knowledge of trends in training (23.8%)
- ✧ knowledge of training practices in partner firms (25.2%).

The strong strategic interest in cooperative arrangements—forging closer business relationships with their partners—sits uneasily with many firms' descriptions of their relationships with those partners. Most firms don't describe their relationships with the training partners as highly cooperative, although perhaps the term 'cooperative' does not quite capture the broader strategic benefits that firms see as flowing from their training arrangements.

Firms see some other benefits flowing from their cooperative training arrangements, particularly a greater knowledge of the VET system (11.3%), which may flow from the involvement of TAFE institutes in some partnerships. Other outcomes mentioned included benefit to the community; the promotion of global standards; knowledge of new products; and, last but not least, cost savings.

The main benefits of cooperative training arrangements from the perspective of training and employees focused on the quality and usefulness of the training. The cooperative training arrangements provide:

- ✧ more targeted training that addresses specific business needs (46.2%)
- ✧ a broader training experience for workers (42.3%)
- ✧ access to better-quality training (36.8%)
- ✧ access to more highly specialised technical training (35.2%).

The results from the survey suggest that cooperative training arrangements have three sets of benefits for the firm: benefits associated with promoting broader business relationships; the more traditional benefits of more highly skilled workers; and, from earlier discussion, cost-savings. Table A4 highlights firms' evaluations of the impact of the training on the second of these—employee skills and performance. Respondents were asked to rate the impact of cooperative training on the skills and performance of their employees on a scale from 'no significant improvement' (1) through 'moderate improvement' (3) to 'significant improvement' (5). The majority of firms were clustered around responses 4 (40.6%) and 3 (32.5%), although some were at the top of the scale and reported a significant improvement (10.4%).

These responses don't include any allowance for the extent of the cooperative training. Table 9 shows that the training delivered through cooperative arrangements is often only a small part of their total training effort and therefore may itself sometimes be quite small. Similar considerations apply to responses about the benefits of cooperative training arrangements for the overall training effort (table A4). These show that nearly half the firms rate their cooperative training arrangements in the top two categories, in terms of benefits to overall training. The distribution of responses on the benefits of cooperative training to the overall training effort is more concentrated at the upper end of the scale than the corresponding rating for contribution to total training effort. This may suggest that the benefits from cooperative training exceed those from other training activities on a pro-rata basis.

Future trends

Respondents in firms that had some cooperative training arrangements were asked:

In the future, this firm's cooperative arrangements for training:

- ✧ will become more important?
- ✧ will become less important?
- ✧ will not change very much?

Table 10 shows the responses to this question: 38.5% said that they would become more important, while only 4.1% believed that they would become less important.

Table 10 Future changes in the importance of cooperative arrangements for training

Future changes in cooperative arrangements for training	Number of firms	%
Will become more important	32	38.5
Will become less important	3	4.1
Will not change very much	68	57.4

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Based on 105 firms that provided any employee training in cooperative arrangements with other firms.

Source: Survey of inter-firm cooperation in training.

Implications

Inter-firm cooperation in training

This study examined the extent to which manufacturing firms engaged in cooperative training arrangements. The study sought to identify the characteristics of firms that engage in cooperative training, the kinds of business practices that support such cooperation, the kind of training that is delivered jointly and the benefits that arise from such training for the participating firms.

The key finding of the study is that cooperation in training is associated with direct business-to-business relationships. There is little evidence of firms engaging in local or regional networks to deliver training, and network agents—whether TAFE colleges, employers associations or training brokers—have a very limited role in the provision of this form of training. Cooperative training is largely delivered as part of a service package by providers of capital equipment and new technology. This training strengthens business relationships and develops skill and knowledge relating to the new equipment in the purchasing firm.

The characteristics of firms with cooperative arrangements

Firms that engage in cooperative training are likely to be in a strong business position in competitive markets. They are profitable and have growing employment. These firms have the capacity to invest not only in new technology but also in human capital to make the most effective use of that new technology. These firms see the skills of their employees as a source of competitive advantage, and cooperative training is just one part of their overall training effort.

Firms that cooperate in training arrangements appear to have a greater overall training effort than do other firms, and the characteristics of these firms are broadly consistent with the established characteristics of firms that supply more training. Medium and larger firms are more likely to provide some training jointly, and firms experiencing output growth and technological change are more likely to provide some training jointly. Cooperative training is thus a minor but significant part of the overall training effort of firms that engage in it. Cooperation does not of itself stimulate a greater training effort in firms.

Cooperative training may be a small part of firm training, but cooperating firms are able to identify specific benefits flowing from it. There are business benefits, as well as benefits for training and skill development. Cooperative training helps to strengthen direct business-to-business relationships and it also delivers a higher quality of training at a lesser cost. Training delivered jointly would often appear to be more highly customised to immediate business needs. It supplies up-to-date knowledge about new technology and aids in the development of new work skills and techniques. The costs of this training are reduced by the sharing of training resources such as facilities, curriculum materials and trainers.

Inter-firm networks are underdeveloped

Cooperating firms typically have a small number of partners—between one and three—and there was no clear pattern of close relationships between cooperating firms. These firms are more likely to have cooperative arrangements with firms outside their industry than with suppliers, customers and other firms in their industry. Only about half of the firms cooperate with partners from the same industry in training.

These findings suggest that firms are initiating their own cooperative arrangements on a small scale and that there are few well-developed networks for training activities. In the absence of well-developed networks that build norms of trust and cooperation, firms seem to be concerned about problems of knowledge spillover and the poaching of skilled employees, and this may influence their preference for cooperating with firms outside their own industry.

The lack of evidence for network development is also reflected in the limited role of network agents and institutions in developing and maintaining training activities between firms. The major form of network facilitation indeed was for one of the cooperating firms to take responsibility for training and to drive training activities. Firms developing cooperative training arrangements claim that they have received little in the way of external stimulus or support for their training activities and most say that cooperation is facilitated by the informal work of human resources personnel within the firm.

Interest in cooperative arrangements

There is little evidence for the development of dense cooperative networks of firms when it comes to the provision of training, but there is much interest among firms in the possibilities presented by such networks. A third of firms currently cooperating expressed interest in developing that cooperation further in the future, more than two-fifths of firms that train independently would be likely to accept cooperative training opportunities if offered, and a fifth of firms that do not provide any employee training would be likely to accept cooperative training opportunities if offered. There are opportunities to develop the training effort of firms through inter-firm provision but this is unlikely to happen without further external stimulus and support. There is clearly a greater role for the promotion of network activities and for developing the role of network agents and institutions.

Conclusion

The picture of inter-firm cooperation in training in Australia is one of firms independently developing joint activities to support their existing business position and strengthen direct business-to-business relationships. These firms derive important benefits from joint training but receive little external stimulus or support for them.

Many firms have little contact with joint training activities and yet these firms—both those with stand-alone training activities and those with no training activities—have expressed an interest in the possibilities of joint training. The challenge for the VET system is to develop networks capable of meeting the needs of these firms and this is dependent upon the establishment of institutions and agents capable of facilitating network creation and maintenance. Without policy and program support, inter-firm training arrangements will continue to be the province of a small number of firms who independently initiate joint activities.

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Appendix 1: Additional tables

Table A1 Calculation of weights

Industry	Number of employees					
	5–9	10–19	20–49	50–99	100–500	**Total**
			Population			
Clothing & footwear	213	221	171	73	51	**729**
Engineering	675	843	634	228	161	**2541**
IT & telecommunications	171	217	199	52	62	**701**
Scientific & medical equipment	168	194	163	79	62	**666**
Processed food & beverages	120	150	153	71	110	**604**
Total	**1347**	**1625**	**1320**	**503**	**446**	**5241**
			Sample			
Clothing & footwear	32	41	19	14	7	**113**
Engineering	33	51	49	9	11	**153**
IT & telecommunications	24	33	24	11	8	**100**
Scientific & medical equipment	26	34	41	11	9	**121**
Processed food & beverages	12	24	36	20	19	**111**
Total	**127**	**183**	**169**	**65**	**54**	**598**
			Weights			
Clothing & footwear	0.7595	0.6150	1.0269	0.5950	0.8313	**0.7361**
Engineering	2.3339	1.8860	1.4763	2.8905	1.6700	**1.8950**
IT & telecommunications	0.8130	0.7503	0.9461	0.5394	0.8843	**0.7998**
Scientific & medical equipment	0.7373	0.6510	0.4536	0.8194	0.7860	**0.6280**
Processed food & beverages	1.1410	0.7131	0.4849	0.4051	0.6606	**0.6209**
Total	**1.2102**	**1.0132**	**0.8912**	**0.8830**	**0.9424**	**1.0000**

Notes: Population values drawn from the sampling frame (Dun and Bradstreet list of businesses). Sample values from the survey of inter-firm cooperation in training. Some missing values for the number of employees were imputed. Weights are $w_{ii} = (N_{ij}/N_t)/(n_{ij}/n_t)$ where i is industry, j is number of employees and t is the total. See table 1.

Table A2 Logistic regression for the effects of the characteristics of firms on participation in cooperative training arrangements—firms providing some training

Parameter	df	Logit	Standard error	Chi-square	p	Odds ratio
Intercept	1	-2.7476	0.6053	20.6044	0.0000	
Industry						
Clothing & footwear	1	-1.2730	0.4892	6.7701	0.0093	0.280
Engineering	1	-0.6185	0.3377	3.3542	0.0670	0.539
IT&T	1	-0.4109	0.4170	0.9709	0.3244	0.663
Scientific & medical equip	1	-0.5016	0.4094	1.5012	0.2205	0.606
Processed foods & beverages						
Firm has 20 or more employees	1	0.8545	0.2260	14.2940	0.0002	2.350
Firm made a pre-tax profit in 2003–04	1	0.5305	0.3059	3.0086	0.0828	1.700
Cooperative (4,5) with						
Customers	1	-0.7759	0.4072	3.6318	0.0567	0.460
Suppliers	1	0.6806	0.3514	3.7501	0.0528	1.975
Other firms in industry	1	-0.1370	0.2499	0.3004	0.5837	0.872
Other firms outside industry	1	0.5284	0.2437	4.7004	0.0302	1.696
Mainly sells to other firms as capital equipment	1	0.5567	0.2504	4.9438	0.0262	1.745
Markets are in the local region, state or territory	1	0.2939	0.2378	1.5270	0.2166	1.342
Faces intense–strong competition in main markets	1	0.7594	0.2771	7.5122	0.0061	2.137
Workforce skills a main competitive advantage	1	0.5611	0.2380	5.5587	0.0184	1.753

Likelihood ratio: 53.02, df=14, p=0.0000 Wald: 44.14, df=14, p=0.0000

Somer's d: 0.338 Gamma: 0.341 Tau-a: 0.110 c: 0.669

Note: The analysis is based on a sample of 513 firms that delivered some training; 20.7% of these firms had cooperative training arrangements. Questions 3 to 19 were entered into a logistic regression and backward selection was used to remove variables that were not significant. The remaining variables are either significant or near significant at 0.05. Imputation was used to replace missing values in the independent variables. See table 5.

Source: Survey of inter-firm cooperation in training.

Table A3 Characteristics of cooperative training arrangements with other firms

Characteristics	Number of firms	%
Number of firms cooperated with for provision of employee training		
One other firm	25	22.5
Two or three other firms	50	51.2
Four or five other firms	14	14.6
Between six and ten other firms	5	3.7
Ten or more other firms	6	8.0
Time cooperative arrangements have been in place		
Less than one year	16	23.8
More than one year	15	8.9
For two or three years	17	17.8
For more than three years	47	47.4
Other	6	2.2
Cooperation with same firms		
Yes, with the same firms regularly	59	54.8
No, with different firms from time to time	36	39.6
With both the same and different firms	8	5.5
Nature of firms in cooperative arrangements*		
Firms having equity or ownership links	14	9.1
Firms in close geographic proximity	31	23.6
Firms in the same industry or line of business	56	38.3
Firms who are customers or suppliers	45	66.9
Firms in a recognised group or consortium	16	11.3
Objectives similar to those of partners		
Yes	68	68.6
No	9	13.7
Don't know	25	17.7
Cooperative training mainly coordinated*		
By informal liaison of human resources staff	44	43.7
Through a formal working party of human resources staff	7	7.2
By one partner taking responsibility for providing training	32	31.5
By sharing the same RTO	10	10.4
Through an industry skills centre	5	4.2
Through a TAFE institute	12	19.6
Other	12	14.9
Support for cooperative training programs*		
Employer or industry body	27	19.2
Local authority	2	0.9
Local TAFE/university	12	15.8
No support received for joint training program	63	80.6
The overall business relationship with training partners is:		
5 A very close business relationship	12	9.5
4	29	49.0
3 A moderately close business relationship	29	18.3
2	15	14.9
1 A distant business relationship	11	8.3

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Based on 105 firms that provided any employee training in cooperative arrangements with other firms. Any discrepancies are due to missing responses for particular questions. Characteristics marked with an asterisk allow multiple responses and hence the sum of firms can exceed 105.

Source: Survey of inter-firm cooperation in training.

Table A4 Benefits of cooperation in employee training

Benefits	Number of firms	%
Shared resources		
A common curriculum for the training program	45	51.2
Shared training facilities	51	50.6
Shared training materials	36	34.3
Shared trainers and instructors	54	58.7
Shared assessment of the skills developed	26	30.9
Shared records of training	11	11.9
Other	5	5.5
Benefits from a management perspective		
No perceived benefits	6	6.0
Greater knowledge of current trends in employee training	23	23.8
Greater knowledge of training practice in partner firms	21	25.2
Greater knowledge of the VET system	11	11.3
Promotion or reinforcement of other ties with business partners	54	55.4
Other	15	12.6
Benefits from a training and employee perspective		
No perceived benefits	4	5.1
Access to better-quality training	39	36.8
Access to more targeted training addressing specific business needs	41	46.2
Access to more highly specialised technical training	34	35.2
A broader training experience for our employees	45	42.3
Greater employee learning about our customers	23	24.7
Greater employee learning about our supplier	18	20.1
Greater employee learning about our competitors	12	12.6
Other	4	4.2
Impact of cooperative training on employee skills and performance		
5. Significant improvement	11	10.4
4.	36	40.6
3. Moderate improvement	36	32.5
2.	12	12.7
1. No significant improvement	5	3.8
Benefits for overall training effort		
5. Significant benefits	11	11.4
4.	36	38.3
3. Some benefits	34	32.1
2.	13	12.4
1. Not many benefits	5	5.8

Note: Percentages are weighted and exclude missing responses. Numbers of firms are actual counts. Based on 105 firms that provided any employee training in cooperative arrangements with other firms.

Source: Survey of inter-firm cooperation in training.

Appendix 2: The questionnaire

Inter-firm Cooperation in Training

I agree to take part in the Monash University research project *Inter-firm Cooperation in Training*.

I have had the project explained to me and I have read the *Explanatory Statement*, which I keep for my records. I understand that agreeing to take part means that I am willing to complete the following questionnaire.

Name ..... **Signature** .....

Position in the firm .....

ABOUT THE RESPONDENT

1. Do you have some responsibility for employee training in this firm?

	No ☐ *please go to Question 3*
	Yes ☐ *please go to Question 2*

2. Do you have: *(mark all that are applicable)*

	Responsibility for all employee training activities in this firm
	Responsibility for some employee training activities in this firm
	Working knowledge of relevant industry training packages
	Knowledge of available training providers
	Knowledge of relevant Skills Councils / Industry Training Boards
	Other *(please specify)* .....

CHARACTERISTICS OF YOUR FIRM

3. What is the main industry of this firm?

	Clothing and footwear
	Engineering
	Information technology and telecommunications
	Scientific and medical equipment
	Processed food and beverages
	Other *(please specify)* .....

CHARACTERISTICS OF YOUR FIRM - *continued*

4. How many persons were employed by this firm in July 2005? *Employed includes anyone (full-time, part-time or casual) who was paid a wage or salary.*

- ☐ 1 - 4 ☐ *please go to Question 44*
- ☐ 5 - 9
- ☐ 10 - 19
- ☐ 20 - 49
- ☐ 50 - 99
- ☐ 100 - 500
- ☐ More than 500 ☐ *please go to Question 44*

5. How many years has this firm been in business?

- ☐ Less than 2 years
- ☐ 2 to less than 5 years
- ☐ 5 to less than 10 years
- ☐ 10 to less than 20 years
- ☐ 20 years or more

6. Is this firm a Registered Training Organisation (RTO)?

- ☐ Yes
- ☐ No

7. Over the last three years, has the number of employees:

- ☐ Declined by more than 10 per cent?
- ☐ Been more or less stable?
- ☐ Increased by more than 10 per cent?
- ☐ The firm wasn't in business three years ago

8. Which one of these statements best describes the ownership of the firm?

- ☐ Unincorporated firm
- ☐ Australian private company
- ☐ Australian public company
- ☐ Subsidiary of a (predominantly) Australian-owned company
- ☐ Subsidiary of a (predominantly) overseas-owned company
- ☐ Overseas-owned company
- ☐ Other (*please specify*) .....

9. In the financial year 2003-04, did this firm:

- ☐ Make a pre-tax profit
- ☐ Break even before tax
- ☐ Make a loss before tax

CHARACTERISTICS OF YOUR FIRM - *continued*

10. Does this firm have more than one site or workplace?

- ☐ No, only one site
- ☐ Yes, and all the sites are in the same state or territory
- ☐ Yes, and in more than one state or territory (but not overseas)
- ☐ Yes, and at least one site is overseas

11. Do the main owners of the firm work for the firm as directors, managers, or in any other role?

- ☐ Yes
- ☐ No

12. In general, how would you describe your firm's relationships

(circle one number in each row)	*Arm's length*				*Highly cooperative*
With customers	1	2	3	4	5
With suppliers	1	2	3	4	5
With other firms in your industry	1	2	3	4	5
With other firms outside your industry	1	2	3	4	5

MAJOR PRODUCT(S) OR SERVICE(S) OF YOUR FIRM

13. Is the major product or service produced by your firm mainly:

- ☐ Sold to other firms for further processing?
- ☐ Sold to other firms as capital equipment?
- ☐ Sold to wholesalers, retailers or final consumers?

14. Which one of these statements best describes the nature of the market for this firm's major product or service?

- ☐ Local region, state or territory
- ☐ Australian and New Zealand market only
- ☐ Some export
- ☐ Primarily export

15. In the market for this firm's major product or service, this firm has:

- ☐ Many competitors
- ☐ Few competitors
- ☐ No other competitors

16. In the market for this firm's major product or service, this firm faces:

- ☐ Intense competition
- ☐ Strong competition
- ☐ Moderate competition
- ☐ Some competition
- ☐ Limited competition

MAJOR PRODUCT(S) OR SERVICE(S) OF YOUR FIRM - *continued*

17. Demand for this firm's major product or service is:

☐	Expanding
☐	Stable
☐	Contracting

18. What are your firm's top three competitive advantages? *(Please select 3 items and then Rank from 1 to 3, 1 being the most important)*

☐	Distribution or delivery
☐	Flexibility in meeting customer needs
☐	Key individual(s)
☐	Low cost
☐	Marketing
☐	Prestigious brand/good reputation
☐	Product design / Service design
☐	Quality of products/services
☐	Range of product/services
☐	Technology/good ideas
☐	Skills of workforce/expertise
☐	Cooperative arrangements in which your firm is involved
☐	Other (please specify) .....
☐	Other (please specify) .....
☐	Other (please specify) .....

19. What are the three main impediments to growth of your firm? *(Please select 3 items and then rank from 1 to 3, 1 being the most important)*

☐	Access to funds for expansion
☐	Declining or stable demand for the main product or service
☐	Shortage of skilled labour
☐	Industrial relations issues
☐	Domestic competition
☐	Competition from overseas
☐	Management strategy
☐	Other (please specify) .....
☐	Other (please specify) .....

TRAINING PROVIDED BY YOUR FIRM

20. In the last 12 months, has your firm provided any of the following types of FORMAL* training for its employees? (tick as many as required)

* Formal training is a structured, planned activity where the main purpose is learning skills or knowledge. The training may occur *off-site* (i.e. at a TAFE College or offices of a Registered Training Provider), *on-site* (i.e. at a particular work site), or *on-the-job* (i.e. at the employee's work station).

Off-site	On-site	On-the-job	
☐	☐	☐	**No training provided**
			Training for accredited vocational qualifications
☐	☐	☐	- entry-level training e.g. Apprenticeships
☐	☐	☐	- basic vocational qualifications for existing employees
☐	☐	☐	- advanced vocational qualifications for existing employees
			Training for organisational development
☐	☐	☐	- management / supervisor training
☐	☐	☐	- training for new management initiatives
☐	☐	☐	- training for improved communication / consultation in the workplace
			Technical and product training
☐	☐	☐	- training in new technology (e.g. computer skills)
☐	☐	☐	- training in new work techniques
☐	☐	☐	- training for new product introduction
			Training for regulatory / standards compliance
☐	☐	☐	- training in quality / supplier certification systems
☐	☐	☐	- training for occupational health and safety (OHS)
☐	☐	☐	- training for vocational licences
☐	☐	☐	- training for professional certification
☐	☐	☐	**Other** *(please specify)* .....

COOPERATION WITH OTHER FIRMS FOR TRAINING

21. Do you provide any of your employee training in cooperative arrangements with other firms? *(Not including firms whose business is mainly training)*

☐ Yes ☐ *please go to Question 24*

☐ No, but provide some training ourselves ☐ *please go to Question 22*

☐ No, provide no training ☐ *please go to Question 22*

PROVIDED NO TRAINING IN COOPERATION WITH OTHER FIRMS

22. What have been the main reasons for NOT training with other firms? *(Tick as many boxes as you need to)*

- ☐ Did not have a need for training
- ☐ No suitable firms to work with
- ☐ Lack of knowledge about cooperative training activities
- ☐ No need to seek partner firms for training – have suitable arrangements in place
- ☐ Worried about other firms poaching our employees
- ☐ Worried about other firms gaining knowledge of our products or processes
- ☐ Lack of knowledge of Vocational Education & Training (VET) system
- ☐ Lack of time / resources to seek out partner firms
- ☐ Lack of industry / government support to develop joint training
- ☐ Other (*please specify*) .....

23. If cooperative training arrangements were offered to your firm, involving your employees, would you be likely to take them up?

- ☐ Yes ☐ *please go to Question 44*
- ☐ No ☐ *please go to Question 44*

PROVIDED SOME OR ALL TRAINING IN COOPERATION WITH OTHER FIRMS

24. How many other firms do you cooperate with for the provision of employee training?

- ☐ One other firm
- ☐ Two or three other firms
- ☐ Four or five other firms
- ☐ Six to less than 10 other firms
- ☐ Ten or more other firms

25. How long have you had these cooperative arrangements in place?

- ☐ Less than one year
- ☐ More than one year
- ☐ For two or three years
- ☐ For up to five years or more
- ☐ Other (*please specify*) .....

26. Do you cooperate:

- ☐ With same firms regularly?
- ☐ With different firms from time to time?
- ☐ Other (*please specify*) .....

27. Do you cooperate:

- ☐ With firms having equity or ownership ties with you?
- ☐ With firms in close geographical proximity?
- ☐ With firms in the same industry or line of business?
- ☐ With firms who are customers / suppliers?
- ☐ With firms in a recognised group or consortium?
- ☐ Other (*please specify*) .....

COOPERATION WITH OTHER FIRMS FOR TRAINING - *continued*

28. Do you have similar goals and objectives for your cooperative employee training programs as your partner firms?

	Yes
	No
	Don' t Know

29. What are the main influences on your decision to cooperate over training?

	Reduce the cost of training
	Address labour and skill shortages
	Extend existing relationships with other firms
	Undertake joint projects with other firms
	Support from government
	Support from an industry or employer association
	Address regulatory compliance needs
	Other (*please specify*) .....

30. How would you rate the extent of your cooperative training efforts? Compared to your total training effort, training undertaken in conjunction with other firms is: *(circle one number)*

A very small part — A moderate part — A very significant part

--- 1 --- 2 --- 3 --- 4 --- 5 ---

31. How would you rate the business significance of these cooperative training efforts? *(circle one number)*

A very small part for the business — A moderate part for the business — A very significant part for the business

--- 1 --- 2 --- 3 --- 4 --- 5 ---

NATURE OF COOPERATION IN TRAINING

32. What kind of employee training do you provide in cooperation with other firms?

Training for accredited vocational qualifications

- ☐ - entry-level training e.g. Apprenticeships
- ☐ - basic vocational qualifications for existing employees
- ☐ - advanced vocational qualifications for existing employees

Training for organisational development

- ☐ - management / supervisor training
- ☐ - training for new management initiatives
- ☐ - training for improved communication / consultation in the workplace

Technical and product training

- ☐ - training in new technology (e.g. computer skills)
- ☐ - training in new work techniques
- ☐ - training for new product introduction

Training for regulatory / standards compliance

- ☐ - training in quality / supplier certification systems
- ☐ - training for occupational health and safety (OHS)
- ☐ - training for vocational licences
- ☐ - training for professional certification
- ☐ **Other** (*please specify*) .....

33. What do you share when cooperatively providing training with other firms?

- ☐ A common curriculum for the training program
- ☐ Shared training facilities
- ☐ Shared training materials
- ☐ Shared trainers and instructors
- ☐ Shared assessment of the skills developed
- ☐ Shared records of training
- ☐ Other (*please specify*) .....

34. How would you rate the significance of the overall business relationship that you have with the firms involved in cooperative training programs with you? (circle one number)

Distant business relationship		Moderately close business relationship		A very close business relationship
1	2	3	4	5

COORDINATION OF TRAINING

35. How is cooperative training mainly coordinated between your firm and your partner firms:

- ☐ Through informal liaison of Human Resource(HR) or Training & Development (T&D) people
- ☐ Through formal working parties of HR / T&D people
- ☐ By one partner firm taking the responsibility for providing the training
- ☐ Through sharing the same Registered Training Organisation (RTO)
- ☐ Through an Industry Skills Centre
- ☐ Through a TAFE College
- ☐ Other (*please specify*) .....

36. What support do you receive for cooperative training programs?

	Employer or industry body
	Local authority
	Local TAFE / university
	No support received for joint training programs

37. How important is it for you to have good coordination of your training efforts with other firms?
(circle one number)

Not very important		Moderately important		Very important
1	2	3	4	5

PERCEIVED BENEFITS OF COOPERATION IN TRAINING

38. What do you see as the greatest benefits to be gained from cooperative training programs, from a management perspective?

	No perceived benefits
	Greater knowledge of current trends in employee training
	Greater knowledge of training practice in our partner firms
	Greater knowledge of the vocational education and training (VET) system
	Shared training promotes / reinforces other ties with our business partners
	Other (*please specify*) .....

39. What do you see as the greatest benefits to be gained from cooperative training programs, from a training and employee development perspective?

	No perceived benefits
	Access to a better quality of training
	Access to more targeted training addressing specific business needs
	Access to more highly specialised technical training
	A broader training experience for our employees
	Greater employee learning about our customers
	Greater employee learning about our suppliers
	Greater employee learning about our competitors
	Other (*please specify*) .....

40. How would you rate the importance of cooperative training programs for your business?
(circle one number)

Not very important		Moderately important		Very important
1	2	3	4	5

41. How would you rate the impact of cooperative training on employee skills and performance?
(circle one number)

No significant improvement		Moderate improvement		Significant improvement
1	2	3	4	5

42. How would you rate the benefits of cooperation in training for your training effort?
(circle one number)

Not many benefits		Some benefits		Significant benefits
1	2	3	4	5

FUTURE PLANS

43. In the future, this firm's cooperative arrangements for training:

☐	Will become more important?	☐ *please go to Question 45*
☐	Will become less important?	☐ *please go to Question 45*
☐	Will not change very much?	☐ *please go to Question 45*

44. This questionnaire is only for firms with between 5 and 250 employees
thanks for returning your questionnaire

EXPRESSION OF INTEREST IN THE RESEARCH PROJECT

This section is optional and does not need to be filled out. If you would like further information about the research, however, then it would be appreciated if you could provide an address where we could reach you.

45. I would be interested in receiving a copy of the results of this survey:

☐ Yes
☐ No

46. I would be prepared to be interviewed as part of this research:

☐ Yes
☐ No

Name	.....
Position	.....
Address	....
Phone	.....
Email	.....

Thank you for your time and help

The National Vocational Education and Training Research and Evaluation (NVETRE) Program is coordinated and managed by the National Centre for Vocational Education Research, on behalf of the Australian Government and state and territory governments, with funding provided through the Department of Education, Employment and Workplace Relations.

This program is based upon priorities approved by ministers with responsibility for vocational education and training (VET). This research aims to improve policy and practice in the VET sector.

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