

Market-oriented Skills Development in SMEs:
The Skills Ecosystem in Canterbury, New Zealand

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Abstract

New Zealand public policy aims to increase skill levels in the labour force, taking into account that businesses are predominantly small and medium-sized enterprises, or SMEs; two-thirds of New Zealand enterprises have zero employees, and almost two thirds of businesses that do employ staff have no more than five employees. There is considerable evidence that small and medium-sized enterprises generally face significant barriers to engagement with formal training programmes. Consequently, the LEED programme of the OECD initiated a project to identify ways of overcoming barriers to workforce development in SMEs. New Zealand participated in that project, submitting a case study on the Canterbury region. This paper explains the study's conceptual framework and presents the major research results. It finishes with an analysis of differences in the data between highly innovative and less innovative SMEs. The large differences between the high and low innovation firms were in their participation in: marketing and promotion training; business planning training; research and development training; and job-specific technical skills (formal training). This suggests the innovative firms may be more driven by the search for new market opportunities.

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Leveraging Training and Skills Development in SMEs: A Regional Skills Ecosystem Case Study

1 Introduction

A key element in New Zealand public policy aims to increase skill levels in the existing labour force, on the basis that 80 per cent of those currently employed will still be in the workforce in 2020 (New Zealand Government, 2008, p. 6). Effective policies to support training and skills development in the workforce must take into account that New Zealand businesses are predominantly small and medium-sized enterprises, or SMEs (Long *et al*, 2000; Coetzer, 2002; Vaughan, 2002; Fraser, 2005; TEC, 2005; Coetzer, 2007; Coetzer *et al*, 2007; Massey and Ingley, 2007). Two-thirds of New Zealand enterprises have zero employees, and almost two thirds of businesses that do employ staff have no more than five employees (MED, 2009). The New Zealand Centre for SME Research describes these firms as ‘micro enterprises’; see, for example, Cameron and Massey (1999). Table 1 presents data on the distribution of employing enterprises as at February 2008 – more than 90 per cent employ between 1 and 19 employees, and only 1.4 per cent employ 100 staff or more.

Table 1: Number of Employing Enterprises by Number of Employees, New Zealand, February 2008

Employee Size Group	Number of Enterprises	Percentage of All Enterprises with Employees	Cumulative Percentage
1-5	100,459	66.2%	66.2%
6-9	20,526	13.5%	79.8%
10-19	16,771	11.1%	90.8%
20-49	9,104	6.0%	96.8%
50-99	2,579	1.7%	98.5%
100-499	1,859	1.2%	99.8%
500+	340	0.2%	100.0%
TOTAL	151,638	100%	

Source: MED (2009, p. 9).

This feature of the New Zealand economy, which is shared by other economies, is significant because there is considerable evidence that small and medium-sized enterprises generally face significant barriers to engagement with formal training programmes. Data across OECD countries show that small to medium sized enterprises (SMEs) participate 50 per cent less in training activities than large firms, with some systematic access gaps meaning that younger, better educated workers in high-skilled occupations (such as managers, professionals and technicians) have greater access to training opportunities than the less-educated ones (OECD, 2008a, p. 5). Further, Coetzer (2002, p. 5), Vaughan (2002, p. 5) and OECD (2008a, pp. 21-26) all draw attention to the important role that informal training plays in SMEs. Coetzer cites the Australian study of Field (1998) which reported a rich and complex picture of learning in SMEs despite limited use of structured training, while Vaughan (2002, p. 5) suggests that ‘attention to informal training carried out in or by SMEs can provide valuable insight into the priorities and training needs of SMEs’.

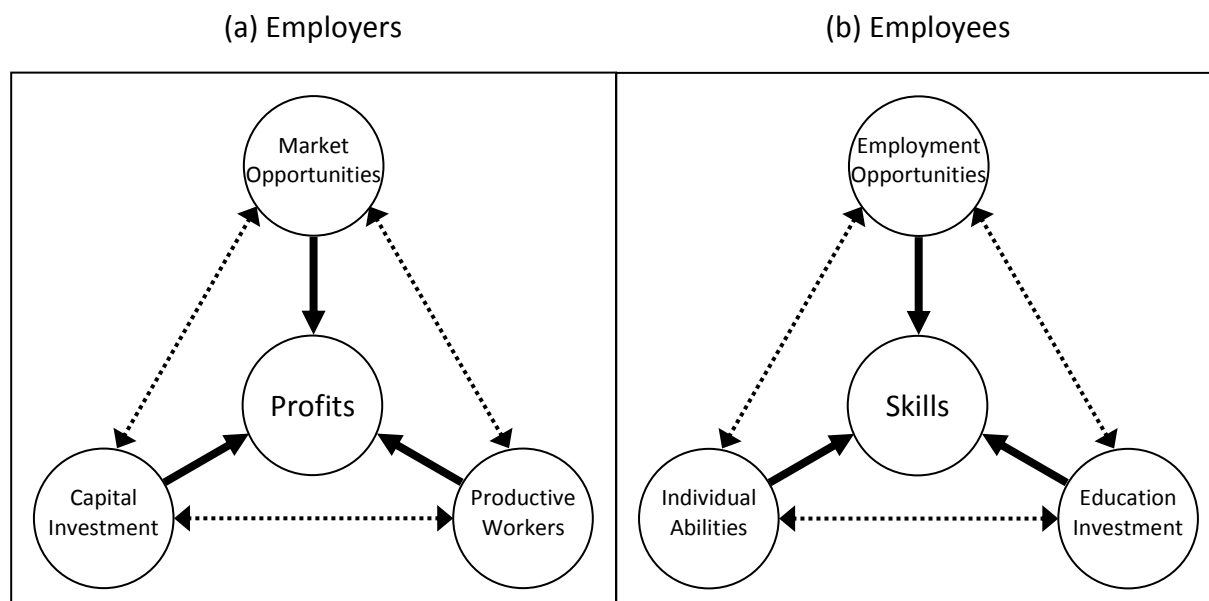
Against this background of strong evidence, the LEED programme of the OECD initiated a project to identify ways of overcoming barriers to workforce development in SMEs. New Zealand was a participant in that project. The research for the project involved gathering and analysing new data on SMEs labour force participation in formal and informal training, analysing the impact of training and skills development activities in firms, and examining local approaches to learn how incentives can be provided to employers and employees for training activities that generate results for all employees (OECD, 2008b, p. 3). This paper presents the key results of this research (reported in more detail in Dalziel, 2010a), paying particular attention to differences revealed in the data between highly innovative and less innovative SMEs.

Section 2 of the paper explains the conceptual framework for the study followed by a presentation of the major results of the research in Section 3. Section 4 provides an analysis of differences revealed in the data between highly innovative and less innovative SMEs. The large differences between the high and low innovation firms were in their participation in: marketing and promotion training; business planning training; research and development training; and job-specific technical skills (formal training). This suggests the innovative firms may be more driven by the search for new market opportunities. Section 5 is a brief conclusion.

2 Conceptual Framework

A useful framework for analysing regional systems of skills training is the “skills ecosystem” concept developed by authors such as Finegold (1999), Buchanan *et al.* (2001), Windsor and Alcorso (2008) and Buchanan and Jakubauskas (2010, pp. 44-49). A skills ecosystem is ‘a self-sustaining network of workforce skills and knowledge in an industry or region’ (Windsor and Alcorso, 2008). It seeks to integrate the perspective of employers and employees (see Figure 1). Employers are motivated by market opportunities; when the market opportunities are matched with appropriate capital investment and the employment of productive workers, this creates profits that are necessary for the enterprise to be sustainable. To develop marketable skills an employee needs to invest in education and training in way that matches his or her personal abilities and employment opportunities.

Figure 1: Components of a Skills Ecosystem



Source: Dalziel (2010b and 2010c).

The two components are brought together into a single diagram in Figure 2. The diagram is constructed by recognising that it is the employer’s profits that give rise to employment opportunities and it is the employee’s skills that define productive workers. Thus profits and skills reinforce each other at the heart of the diagram. The figure acknowledges that a skills ecosystem is led by market opportunities and founded on the individual abilities of the labour force.

Figure also 2 illustrates the coordination problem within a skills ecosystem. Employers make capital investment decisions separately from the education investment decisions of current and potential employees. This separation means that employers can be constrained (at least in the short-run) by skill gaps in the labour force while potential workers can waste time and financial resources by investing in education that is out-of-date or produces skills for which there is no employer demand. One of the major purposes of the policy environment within which the skill ecosystem sits is to address this coordination problem.

For the current research project, the study made a distinction between formal and informal training. This distinction was explained to participants in the study’s survey as follows:

Formal Training refers to learning that occurs in an organised and structured environment (e.g. in an education or training institution or on the job) and is explicitly designated as learning (in terms of objectives, time or resources). Formal learning is intentional from the learner’s point of view. It typically leads to validation and certification.

Informal Training refers to learning resulting from daily activities related to work, family or leisure. It is not organised or structured in terms of objectives, time or learning support. Informal learning is in most cases unintentional from the learner’s perspective.

As well as focusing on formal and informal training, the research was informed by another important theme in the international literature. Coetzer (2002, p. 2) cites several studies that argue 'we have entered a knowledge-based era where the emphasis is increasingly on human capital, rather than financial and physical assets' so that 'individuals at every level have to think for themselves, exercise initiative, innovate, and solve problems at the source as quickly as possible'. The OECD has formalised this feature of modern enterprise in a concept termed Knowledge-Intensive Service Activities abbreviated as KISA (see especially OECD, 2006; a New Zealand application to the software industry has been reported by Williams, 2006). The concept is well summarised by Martinez-Fernandez (2006, p. 109):

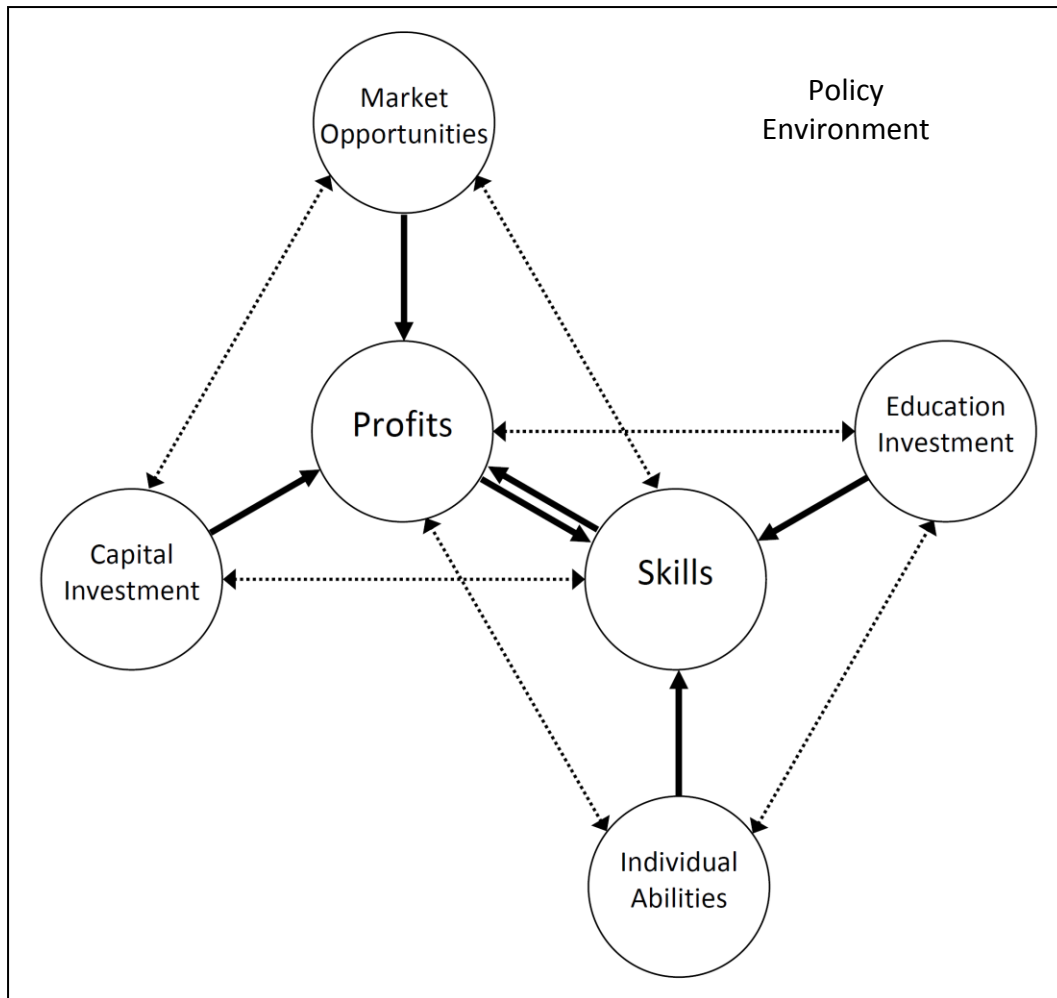
Knowledge Intensive Service Activities (KISA) are defined as the activities originated by the production and integration of knowledge-intensive services crucial for the innovation process of the firm. They may be undertaken by firms in manufacturing or service sectors, and in combination with manufactured outputs or as stand-alone services (OECD, 2003, p. 2). Typical examples of KISA include R&D services, management consulting, IT services, human resource management services, legal services (such as those on IP-related issues), accounting, financing, and marketing services. Activities oriented toward the use and integration of knowledge are instrumental for building and maintaining a firm's innovation capability. In practice, KISA in a firm are achieved by the use of in-house, or the combination of in-house and external, expertise. The capacity of the firm to perform these KISA more effectively may indeed be what differentiates a firm from its competitors.

Three aspects of the KISA concept were particularly relevant for the study. First, it includes what is often considered the core activity for an innovating firm (research and development, or R&D), but it also recognises a much wider range of activities ranging from accounting to marketing. This is consistent with previous research on the ICT sector in New Zealand which reported industry criticism that government support for innovation tended to focus on R&D, whereas 'the funds used for research grants could be made more effective if they were leveraged with access to capital, if they encouraged early adoption of good company governance structures, and if a portion of the grants could be accessed for international marketing' (Saunders and Dalziel, 2006).

Second, OECD research has identified that small firms can experience difficulty accessing knowledge-intensive service activities. In a Norwegian aquaculture study, for example, researchers found that 'small low technology family firms were struggling to survive, and regarded KISA, if they thought of them at all, as a luxury they could not afford' (OECD, 2006, p. 39). More generally, the research found that (OECD, 2006, p. 40):

In many of the studies, however, small firms provided their own services because they could not afford to purchase them on the market. They recognised the need for, say, business planning or accounting, or personnel management services, and so they developed sufficient expertise to perform the needed services themselves. Sometimes they begrudged the time and effort away from what they saw as their core business, and hoped that in the future they would be able to buy the service in the market place.

Figure 2: The Skills Ecosystem



Source: Dalziel (2010b and 2010c).

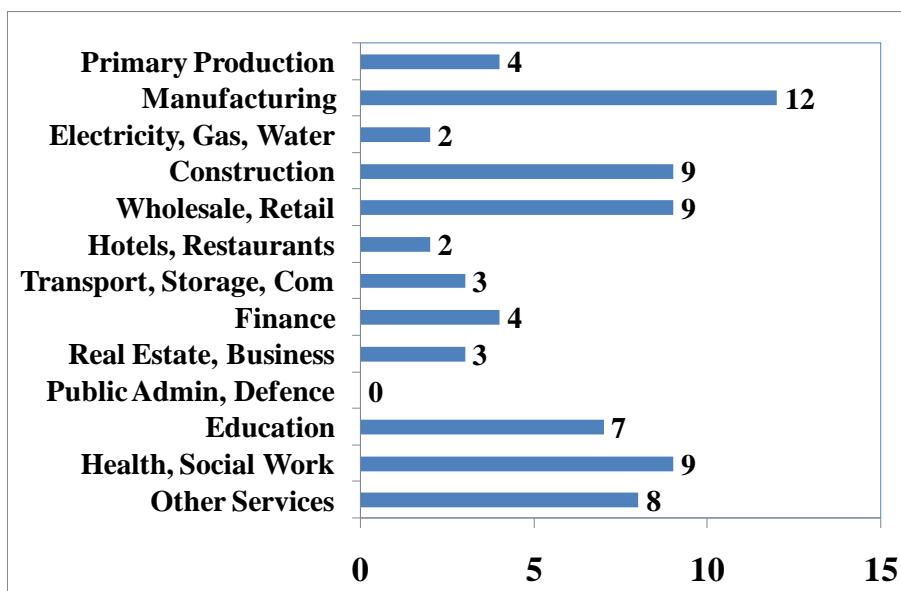
Third, the link between KISA and innovation capability depends on the absorptive capacity of staff to recognise and make use of new knowledge, which in turn raises fundamental issues about staff training (OECD, 2006, pp. 44-45). This includes processes of learning by doing, participation in training from external providers (including suppliers of inputs to the firm) and creating systems to record and share new knowledge that is co-produced through customer relationships and industry networks.

The New Zealand study adopted the research method designed for the international project by the OECD (2008b). This comprised: (1) a web-based survey of SMEs in a region of New Zealand (Canterbury) that invited participants to provide information on themes related to training and skills development in their enterprise; (2) a workshop held in Christchurch on 1 July 2009 with invited participants with expertise in the Canterbury skills ecosystem; and (3) five case studies of small firms in Canterbury that examine in greater depth barriers and opportunities for formal and informal training of employees. This paper focuses on the quantitative results in the web-based survey.

3 Results of the Research

The OECD research team prepared a web-based survey to collect new data on skills training in small to medium-sized enterprises based in Canterbury, New Zealand. Invitations to complete the survey were sent to SMEs listed in the databases of the Canterbury Employers' Chamber of Commerce, the Ashburton Business Association, Enterprise Ashburton, the South Canterbury Chamber of Commerce (with the Aoraki Development Trust), the Canterbury Development Corporation and the Apparel and Textile Industry Training Organisation. The survey was administered in two waves. In the first wave, the survey was open to respondents from the first four organisations above from 4 June to 24 June. This produced 55 valid replies. In the second wave, the survey was open to respondents from the last two organisations from 6 August to 31 August. This produced a further 17 replies, so that the results presented in this first part of the report are from 72 SMEs. There was a good cross section of industry sector representation in the sample, as presented in Figure 3.

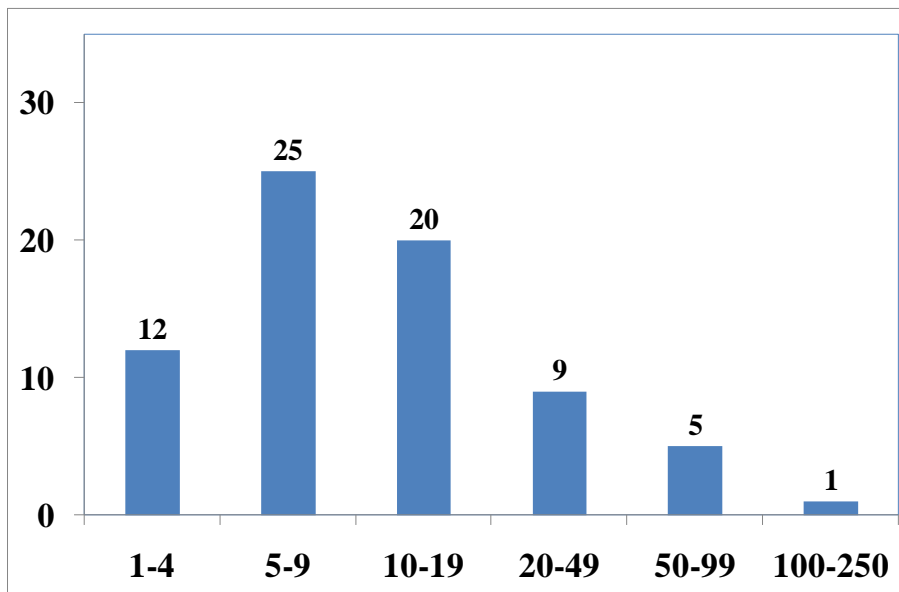
Figure 3: Responding Enterprises by Industry Sector



Source: Dalziel (2010a), Figure 1, p. 17.

The project used the standard OECD definition of a SME as any enterprise with 250 or fewer employees. It should be noted that the top half of that range would generally be considered a large enterprise in New Zealand; the New Zealand Centre for SME Research adopts a cut-off figure of less than 100 employees (Massey and Ingley, 2007, p. 4), for example, while for many purposes the Ministry of Economic Development in New Zealand defines an SME as an enterprise with fewer than 20 employees (see MED, 2009, p. 7). Figure 4 presents data on the size of the enterprises who responded to the OECD survey. 57 out of the 72 firms met the MED definition of 19 or fewer employees, while all but one firm met the definition of the New Zealand Centre for SME Research.

Figure 4: Responding Enterprises by Number of Employees



Source: Dalziel (2010a), Figure 2, p. 18.

The majority of respondents (49, or 68.1 per cent) reported no apprentices or trainees. There were 17 replies reporting one or two apprentices or trainees, while only 6 indicated more than two. Respondents were asked whether their business had formal training and career development plans for employees (e.g. plans for career advancement and promotion), and did it have an annual budget for training expenditure (e.g. formal/informal training; on/off the job; covering direct costs). 34 firms reported that they had a formal plan (47 per cent), and 45 firms that they had an annual training budget (63 per cent).

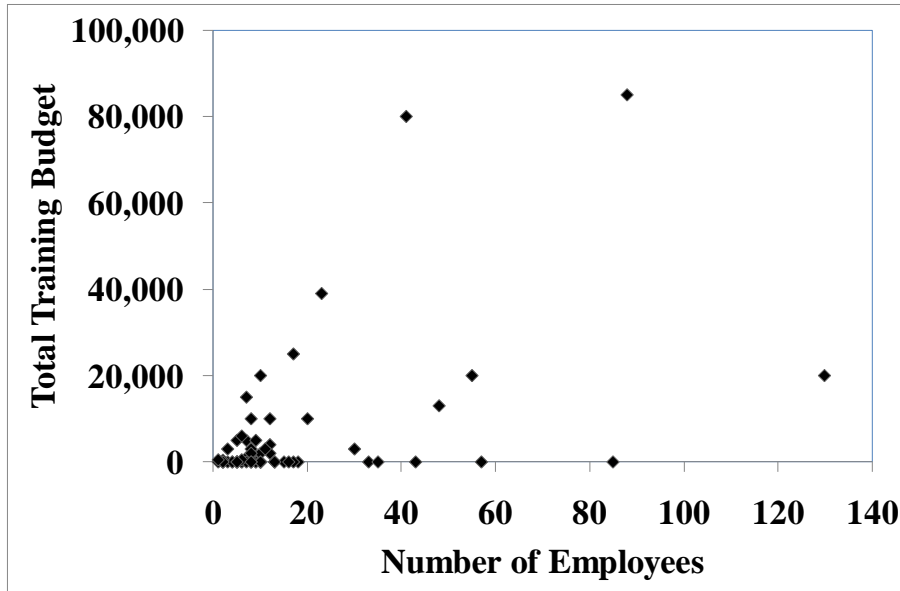
The last group were asked to indicate the size of the budget. Figure 5 presents data on the total annual training budget (including those who reported they had no budget, but excluding four firms that either did not answer or appeared to give an answer measured in percentage rather than dollar units) analysed by the size of the enterprise. Firms with less than 20 employees (the MED definition of an SME in New Zealand) tended to have low budgets; 32 out of 55 firms in this category reported no annual budget, and only five firms reported an annual budget greater than \$5,000.

Firms were asked to identify benefits to themselves from the participation of their employees in training, using seven pre-defined categories:

- Increased productivity
- Increased innovation (new/improved products or services or new/improved management processes)
- Market positioning (local, national, international)
- Increased competitiveness
- Upgraded skill levels
- Increased levels of education attainment
- Increased levels of trainers' expertise in designated areas

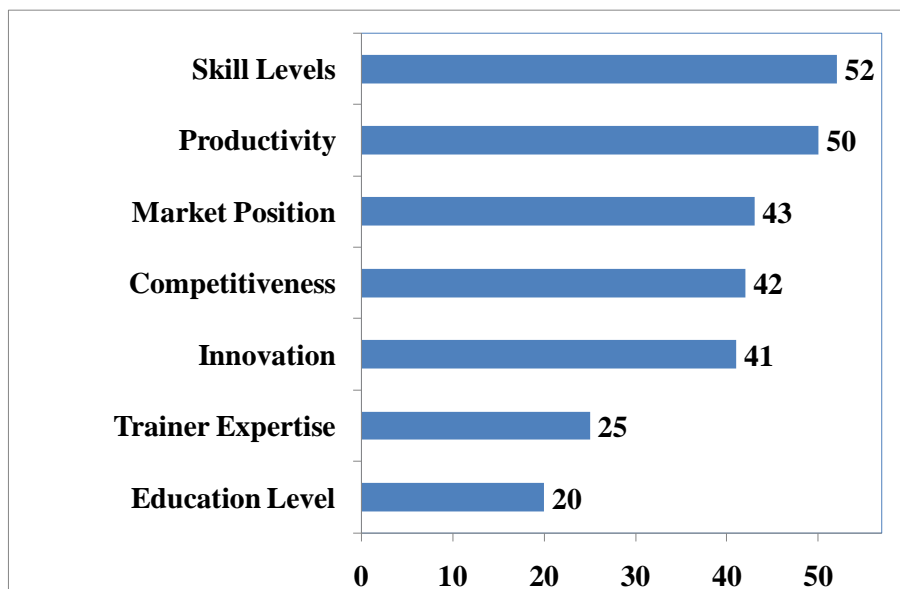
More than two-thirds of the sample (52 and 50 respondents respectively) recognised that the formal training contributed to high skill levels and higher productivity in the firm (see Figure 6). More than half of the sample also recognised contributions to market position, competitiveness and innovation at the enterprise level.

Figure 5: Total Annual Training Budget by Size of Enterprise



Source: Dalziel (2010a), Figure 9, p. 23.

Figure 6: Benefits to the Firm of Formal Training

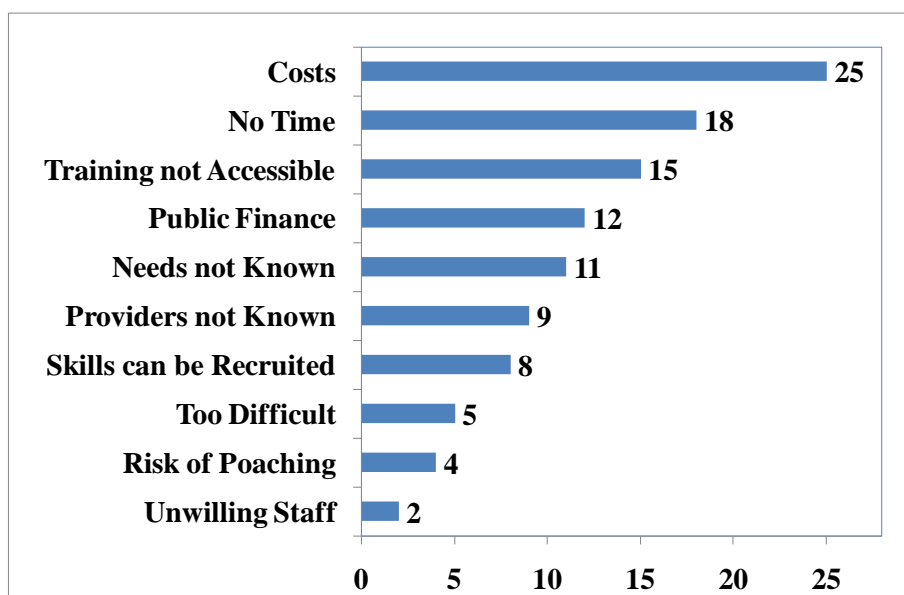


Source: Dalziel (2010a), Figure 15, p. 29.

Half of the respondents indicated that there were training activities that they would have liked to carry out in the previous twelve months but did not. The survey explored the barriers leading to desired training not being carried out. Again respondents were provided with a list of predetermined options, which they were asked to consider for medium to high skilled employee training and for low skilled employee training:

- High costs/too expensive
- People recruited with skills needed (initial training sufficient)
- Lack of public financing
- Impossible to interrupt production/no time
- Difficult to assess enterprise needs
- Staff not willing to participate in training
- Training is too difficult to implement
- Risk of poaching after training
- Too difficult to identify suitable training providers
- Too difficult to access training (location; availability at a suitable time)
- Other barriers

Figure 7: Barriers for Medium to High Skilled Employee Training

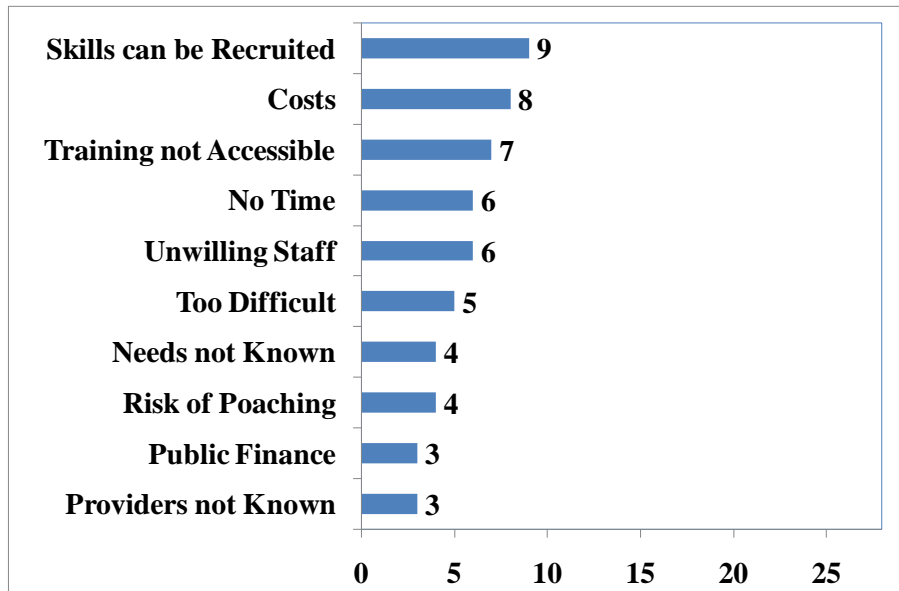


Source: Dalziel (2010a), Figure 18, p. 31.

The responses are summarised in Figures 7 and 8. The lower response rate for low skilled employee training is not surprising; only 25 per cent of the sample reported that they employ workers in the occupation categories identified as low skilled. Nevertheless, there are some interesting similarities and differences in the two lists. With one exception, the top three barriers for both sets of employees are costs, no time and training not accessible. The exception is that firms reported that skills can be recruited for low skilled occupations, whereas this response is well down the list for the medium to high skilled occupations. This may reflect that the industry training system is largely geared towards lower skill levels.

Another point of difference is that unwilling staff was given as the fifth reason for low skilled employees, but was the last reason for medium to high skilled employees. Another similarity is that risk of poaching is not important in either list, supporting the suggestion made earlier that perhaps firms tend to focus on training their employees in firm-specific skills.

Figure 8: Barriers for Low Skilled Employee Training



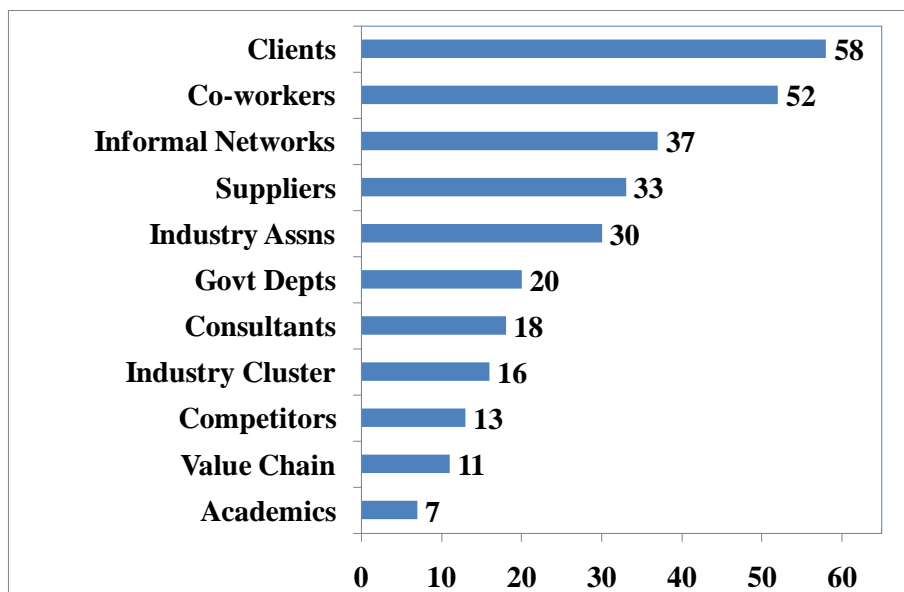
Source: Dalziel (2010a), Figure 19, p. 31.

Section 3 of the survey explored *informal* training activities that might increase the skills, knowledge or competencies of employees. Employees may learn through interactions with others (see the bullet point list below) or by participating in projects to improve work processes (such as quality control and product development). In these situations, the skills, competencies or knowledge gained are not part of recognised or formal education and training programmes. The survey sought to identify the most important sources of learning from the sample, and asked respondents to indicate the importance of the following groups in the other training activities their business did during the previous 12 months:

- Co-workers
- Suppliers
- Clients
- Business consultants
- Competitors
- Firms from the same industry clusters
- Firms from value-chain
- Industry associations
- Government departments
- Informal networks
- Other

Figure 9 shows the number of respondents who stated that each category was highly important in the previous twelve months. Clients and co-workers clearly stand out as the most important sources of informal training, with another important group comprised of informal networks, suppliers and industry associations. The very low value for academics (7 out of 72 firms, and bottom of the list) is consistent with policy concern in New Zealand that there needs to be stronger incentives for university and polytechnic staff to be more engaged with their local business communities.

Figure 9: Highly Important Sources of Informal Training in the Last Twelve Months

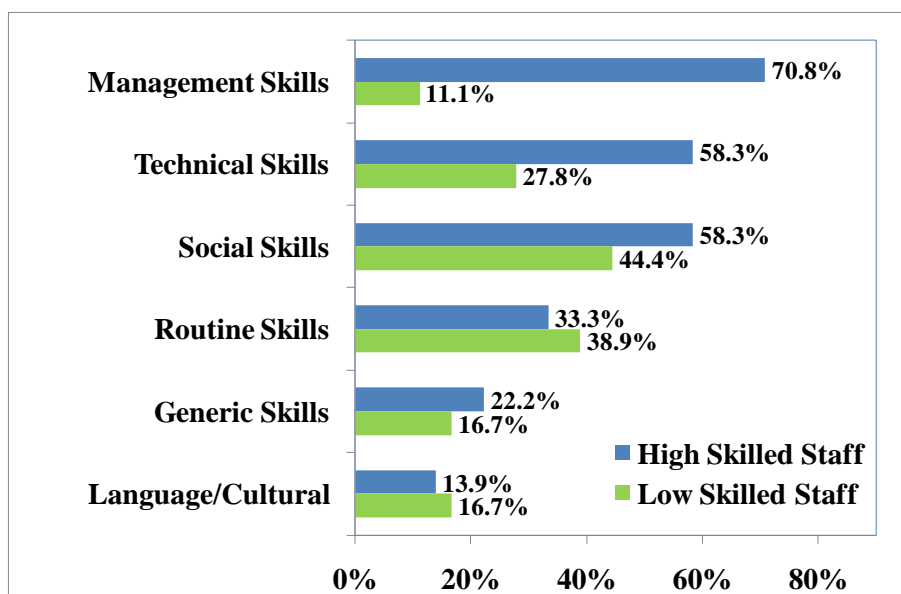


Source: Dalziel (2010a), Figure 21, p. 34.

Firms were asked what percentage of their employees participated in these type of activities during the past 12 months. The most common response was that all staff were involved (39 per cent of the sample), with a further 13 per cent reporting that between 80 and 99 per cent of their staff participated in informal training activities. Only 7 per cent reported that less than one-fifth of their staff were involved in informal training.

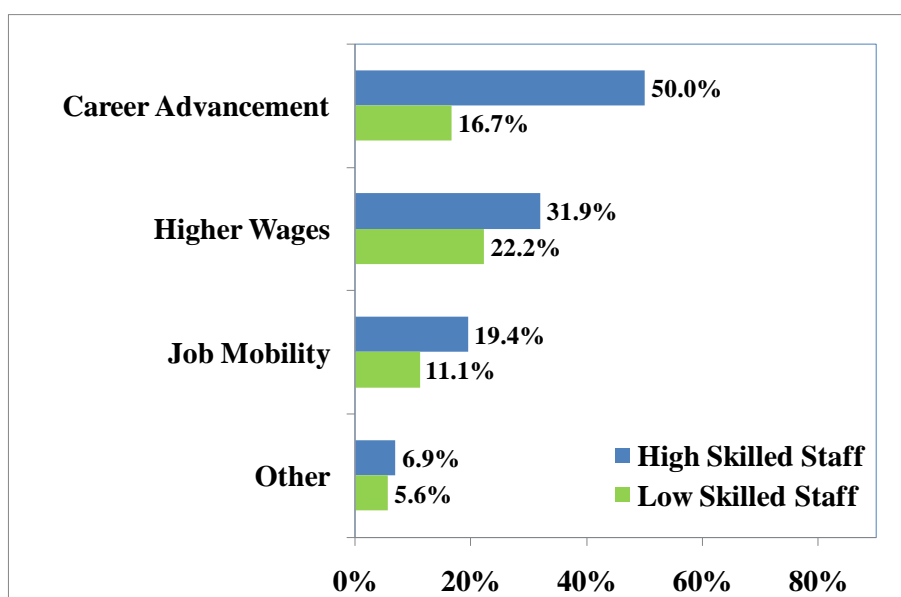
The respondents were asked to indicate the benefits to employees from their participation, both in terms of the skills gained (using the same list as reported above) and in terms of employment progression or career advancement, higher wages, or higher job mobility within the firm or industry sector. The results are presented in Figures 10 and 11, analysed by the responses for medium to high skilled staff and low skilled staff. These data are expressed as percentages. The data for medium to high skilled staff are expressed as a percentage of all respondents (72 firms), while the data for low skilled staff are a percentage of those who reported employing staff in the low skilled occupations (18 firms). The item that stands out in Figure 9 is the learning of management skills by medium to high skilled staff, reported by 51 of the 72 firms (71 per cent). Technical skills and social skills were also key improvements from participation in informal training by this skilled group (reported by 42 firms each, or 58 per cent). In contrast, social skills and routine skills were the two most common categories for low skilled staff.

Figure 10: Improved Skills from Informal Training (Per Cent)



Source: Dalziel (2010a), Figure 24, p. 36.

Figure 11: Other Employee Benefits from Informal Training (Per Cent)

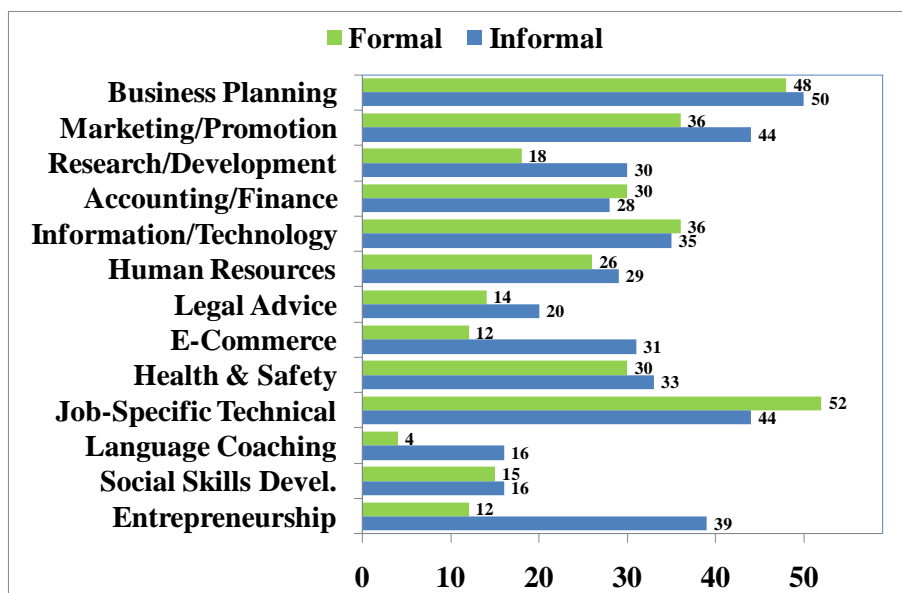


Source: Dalziel (2010a), Figure 25, p. 37.

Figure 12 brings together data comparing the respondents' reports of staff participation in *formal* and *informal* training in the previous twelve months. In most categories, the number of positive responses is similar, but there are also some obvious differences. More firms reported participation in formal training for job-specific technical skills (52 firms), for example, than in informal training (44 firms). There were six categories where a noticeably larger number of firms reported participation in informal training than participation in formal training: marketing and promotion; research and development, legal advice; e

commerce; language coaching; and entrepreneurship. The gap for the last category was particularly large. Only 12 firms reported that their staff had engaged in formal training for entrepreneurship, but 39 firms reported engagement in informal training activities.

Figure 12: Participation in Formal and Informal Training in the Last Twelve Months



Source: Dalziel (2010a), Figure 38, p. 72.

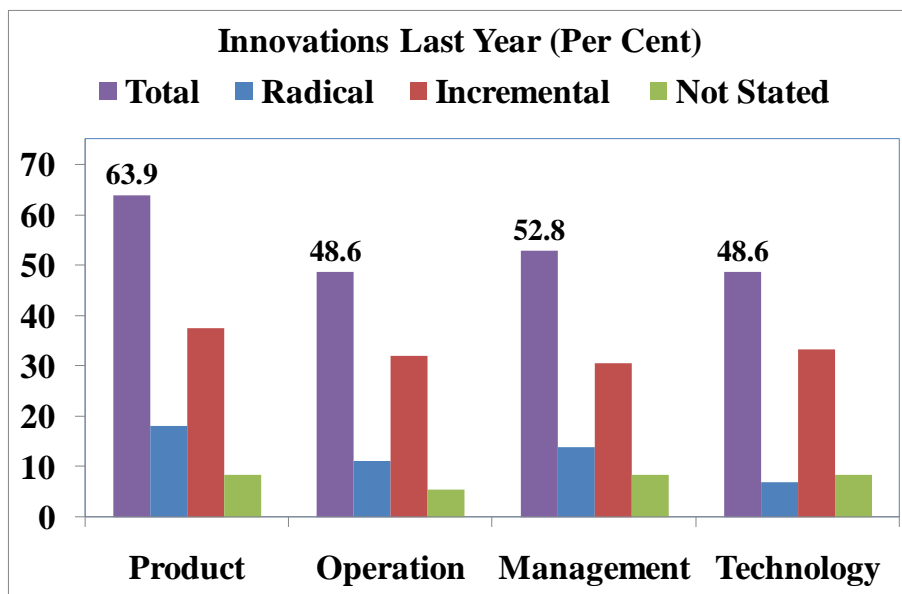
4 Analysis of Innovative Firms

The survey asked about innovation among the enterprises. Note that these results are likely to be affected by ‘non-response bias’ in the sample, since managers were more likely to have participated in this voluntary survey if they have an interest in its focus on training and innovation. The survey offered four areas of potential innovation, and asked participants if there had been any changes in the previous twelve months introducing:

- a new product/service (or a substantially changed product/service).
- a new way of producing an existing product/service (e.g. a new operational process).
- changes to the way the firm does things such as a new or substantially changed accounting system or human resource management system (e.g. a new management process).
- a new technology or equipment.

Where there had been a change, the survey also asked for an indication of whether the innovation had been incremental or radical. The results are presented in Figure 13. Of the respondents, 63.9 per cent reported that they had introduced a product innovation in the previous twelve months. This was the highest area of innovation. More than half (52.8 per cent) of the respondents reported an innovation in management, while the remaining two categories were reported by just under one-half (48.6 per cent in both cases).

Figure 13: Innovations in the Previous Year (Per Cent of Respondents)



Source: Dalziel (2010a), Figure 6, p. 21.

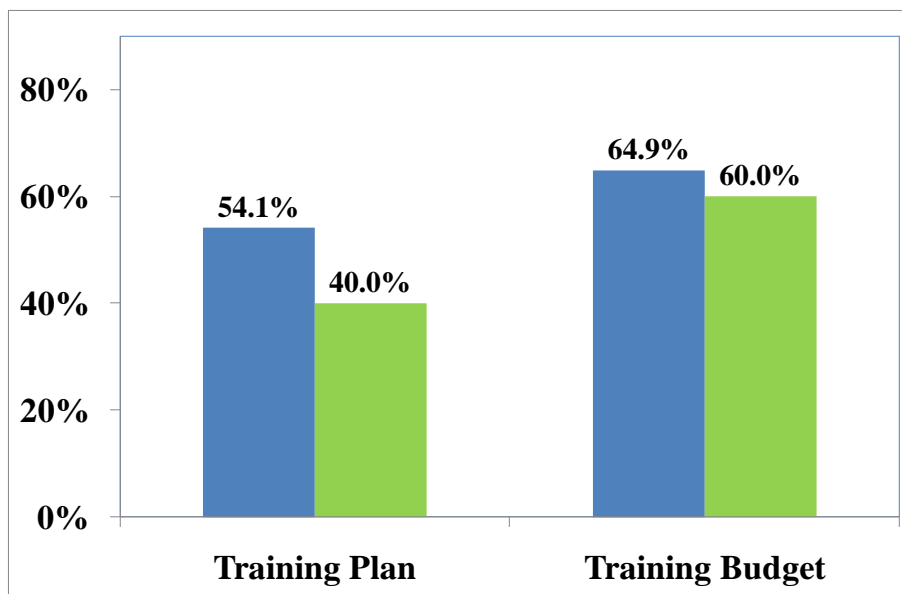
Following standard OECD definitions, the more highly innovative firms in the sample are those that made at least one *radical* innovation or made *serial* innovations in three or four of the four dimensions (product, process, management or technology) in the survey's innovation question. Using these definitions, the sample included 22 radical innovators and 32 serial innovators. There were 17 firms satisfying both criteria, so overall there were 37 highly innovative enterprises, one more than half the sample. The highly innovative enterprises in the sample tended to be older and in a mid-range size band:

- 76% of the highly innovative firms were 10 years or older, compared to 57% of the less innovative firms.
- 35% of the highly innovative firms had 10-19 employees, compared to 20% of the less innovative firms.

Further analysis of the data reveals some differences in the approach to training adopted by the highly innovative firms compared to the other firms in the sample. First, there was a small difference in the likelihood of having a training budget, but the highly innovative firms were much more likely to have a formal training and career development plan. This is shown in Figure 14, which records that 54.1 per cent of the highly innovative firms reported they had a formal plan, while only 40.0 per cent of the remaining firms reported a formal training and career development plan.

Figures 15 and 16 show the percentage of firms who reported that their staff are involved in the different categories of capability building, analysed by formal training and by other informal training activities.

Figure 14: Training Arrangements for High and Low Innovation Firms



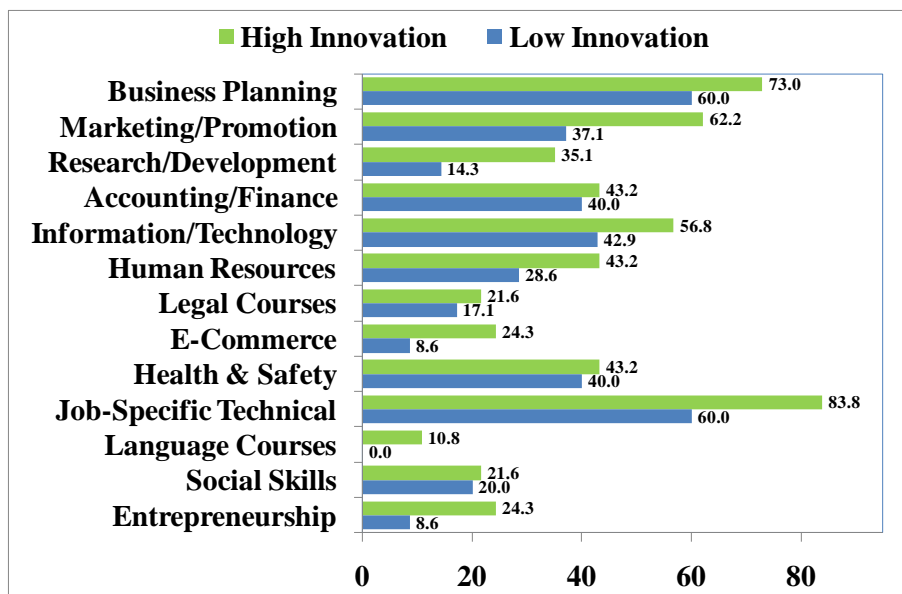
Source: Dalziel (2010a), Figure 33, p. 66.

The highly innovative firms were more likely than the low innovation firms to report in the survey that their staff are involved in training under almost every heading. There were three exceptions in informal capability building: a slightly greater percentage of the low innovation firms reported informal capability building in language courses and in social skills, and a greater difference in job-specific technical skills (62.9 per cent, compared to 59.5 per cent of the high innovation firms).

The last observation may be a reflection that in the area of job-specific technical skills the more innovative firms tend to put more weight on formal training than on informal capability building activities. 83.8 per cent of the highly innovative firms indicated that their staff are involved in formal training in job-specific technical skills, which is the highest value in the two figures. This was more than 20 percentage points higher than for the low innovation firms (60.0 per cent) and also more than 20 percentage points higher than the proportion of highly innovative firms reporting informal training in these skills (59.5 per cent).

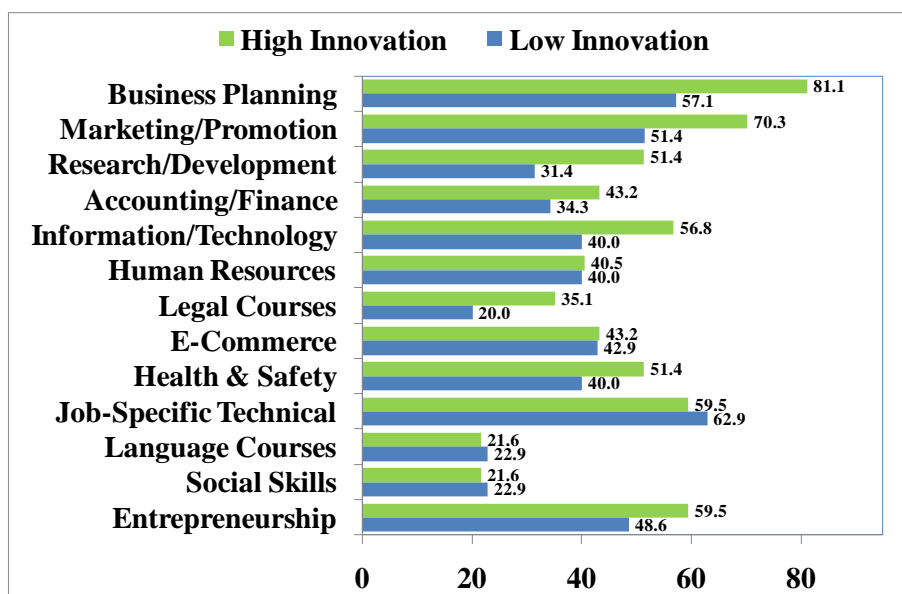
As might be expected, the highly innovative firms were much more likely than the others to report formal and informal training related to research and development. There is a very interesting comparison in the differences reported in training for marketing and promotion. Among the highly innovative firms, 62.2 per cent reported staff involvement in formal marketing and promotion training, compared to only 37.1 per cent among the low innovation firms. This was the biggest gap between the two groups of firms in the two figures. The gap was smaller for informal capability building activities associated with marketing and promotion, but still large (70.3 per cent of the high innovation firms and 51.4 per cent of the low innovation firms).

Figure 15: Types of Formal Training in High and Low Innovation Firms (Per Cent)



Source: Dalziel (2010a), Figure 35, p. 67.

Figure 16: Types of Informal Training in High and Low Innovation Firms (Per Cent)

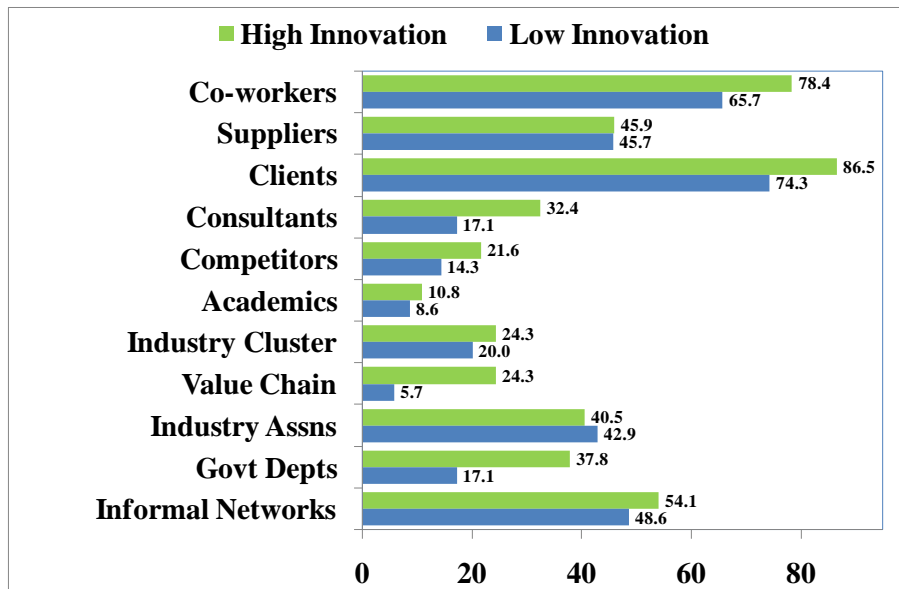


Source: Dalziel (2010a), Figure 36, p. 67.

This comparison suggests that a feature of the highly innovative firms may be that they are more driven by the search for new market opportunities (hence a greater need for staff training in marketing and promotion) than the low innovation firms. This might also explain why the highly innovative firms are more likely to be involved in formal or informal training for business planning.

Further evidence is offered in Figure 17, which compares the sources of informal training in the two groups of firms. Both groups indicated that clients were the most important sources, but the proportion of highly innovative firms giving this indication was 86.5 per cent, compared to 74.3 per cent of the low innovation firms.

Figure 17: Sources of Informal Training in High and Low Innovation Firms (Per Cent)



Source: Dalziel (2010a), Figure 37, p. 68.

5 Conclusion

The research in this project included new areas of enquiry in New Zealand, particularly in those parts of the research that sought to better understand informal training issues faced by SMEs. It provided new data illuminating ways in which firms draw together opportunities for skill development to build a more diverse set of learning opportunities than that which formal training for qualifications can provide. For some this is more of a conscious choice than for others, but for all there are transaction costs.

At the most general level, the research presented in this paper supports the hypothesis that small and medium-sized enterprises undertake skills development using a variety of formal and informal training sources. It records that skills developed through these diverse sources are viewed by firm managers as being an important contributor to productivity and competitiveness, at least for individual enterprises (there was less support for contributions at the industry or regional levels). These findings point to the potential benefit for firms from greater facilitation in accessing learning opportunities. In particular, Dalziel (2010a, p. 77) recommended that more research could explore the nature of the relationship between pre-existing levels of innovation in a firm, and levels of investment in both formal and informal training. A focus of this research might address the links between innovation and training for small firms in New Zealand that are growing through the range from 10 to 20 employees.

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