

Challenging the Economic Bias among Skill Formation Research in the IT Industry

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CHALLENGING THE ECONOMIC BIAS AMONG SKILL FORMATION RESEARCH IN THE IT INDUSTRY

Completed Research Paper

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Abstract

This paper challenges the economic bias found in the literature on industry training by suggesting a different approach to doing skill formation research in the IT industry — one that takes into account the interaction over time of intentions, context, process, and action around accredited on-the-job training schemes. The literature on participation with work-place based training schemes, is reviewed. The review indicates a need for process research to complement existing research in the field. To demonstrate, the paper presents the findings of an empirical study into eight small and medium sized enterprise (SME's) experiences when deciding to participate with a formal and accredited on-the-job training scheme for the first time. The Grounded Theory generated from the empirical findings suggests that the intentions and actions of owner/managers, the processes they enact, as well as the social context into which they are implemented, critically influence what decisions are associated with on-the-job IT skilling.

Keywords: IS skills development, IT industry, small business, process-oriented research.

Introduction

This paper steps outside the conventional economic perspective framing information systems skills development by emphasising and employing terms such as process research, context, social change, organisational decision making and innovation to explain small employer participation with formal and accredited on-the-job training schemes in the IT industry. It will be argued in this paper that western government initiatives aimed at promoting formal on the job training within small firms remain poorly understood in terms of how owner/managers make the decision to participate. Until now the majority of research in this field has been influenced by a dominant economic perspective involving the quantitative and economic realms of human capital theory and labour market economics. While this perspective may identify some of the important factors, it does not examine the dynamic set of contextual elements that interact with one another over time leading to a skilling outcome. What needs to be researched, this paper argues, is the interplay of conditions and process by which owner managers come to be involved with on-the-job training for the first time. Process research and methods that track activities over time are needed to fill this gap.

This paper reports on a field based research investigation into the process of participation by small business with Australia's New Apprenticeship scheme from an owner/manager perspective. The form of New Apprenticeship of interest here is a twelve-month on-the-job traineeship targeted at the information technology industry. This form of apprenticeship is equivalent to the UK modern apprenticeship scheme; and in the USA, is similar to their formal school-to-work (STW) program. The aim of the paper is to explain how and why contextual conditions and processual elements interacted over time to influence owner/managers to adopt or reject apprenticeships for the first time. In particular, the focus is theory building and adopts an interpretive approach to the case method.

To provide context to the study, it is important to acknowledge the emphasis successive western governments worldwide have placed on promoting employment and training initiatives such as New Apprenticeships within small and medium sized enterprises (SMEs). Over the past two decades, western economies have experienced a pronounced trend towards the concentration of employment in smaller firms, and it has been observed that the quality of jobs (including skill content) and the conditions of employment (including wages and on-going skill development) have continued to be generally inferior in small firms (OECD, 1996). For these reasons, governments are now searching for ways of promoting employment opportunities and training within small firms as a policy means concerned with sustaining economic prosperity (Keogh et al, 2005).

The issue of re-skilling industry to compete in a global market economy and the intervention by governments to foster a training market borrows from the prevailing *theory in use* from economics - human capital theory. Human capital theory (Becker, 1993) contends that investments in education and training will pay-off in enhanced economic productivity and individual gains in lifetime wages and salaries. Within such theory, building skills in current and future workers will yield higher productivity, decrease competition among unskilled workers for low-skill jobs by increasing the pool of higher-skilled employees, etc. Educational and training policy makers, of course, have found this theory nicely tailored to their altruistic beliefs in the potency of continued schooling and their vested interest in expanding institutional education. Vocational education and training curricula that offered cognitive and social skill development anchored in authentic work environments, and programs that retained students were easily rationalised as both good for society and good for individual students (trainees). Given the world of vocational training policy makers and the implicit economic 'theory in use', the framing of the problem and the approaches to studying the problem are clearly evident in the literature as being from an economist's perspective.

Australian Federal government support for meeting the needs of enterprises through vocational education began in the mid 1980s with a succession of new entry-level training schemes. With the introduction of a New Apprenticeship system, the Australian federal government is attempting to reinvent what many still regard as a tried and tested format for youth training, but also reconstruct a work-based alternative for those young people who do not want to remain in full-time education. In terms of policy, it was envisaged that New Apprenticeships would appeal to small employers by invoking the notion of a return to a 'traditional' apprenticeship system. However, successive reviews of the literature have confirmed that small employers do not have a propensity to train, have limitations in terms of resources, and prefer the labour market as the most important source of skills (Field, 1997; Ritchie & Brindley, 2005; Keogh et al, 2005).

Accordingly, the small business sector continues to remain an enigma for successive governments in gaining their participation in formal training schemes. The uptake rate among SMEs in the IT industry requires a better understanding of how employers perceive traineeships and the demands it places on employers. Why has a strategy that seems so attractive to many policy-makers, educators, and students been slow to spread? Knowing what

encourages or discourages its take up and how the participation decision is arrived at, are two of the more challenging problems facing formal on-the-job training schemes.

The remainder of the paper explores the following related research questions: How do contextual conditions and factors interact to ensure participation? What are the processes SMEs go through when deciding to participate with formal on-the-job training for the first time? And, how can these decision processes be depicted in a model?

The review of literature will conclude that most of the literature had been written from an economic, labour-market, or human-capital perspective. Few studies had actually asked owners of small firms why they participated in New Apprenticeships and none had inquired as to how it occurred. In short, the review found we know more about what deters owner/managers, but not what motivates them, or how they arrived at their decision.

Accordingly, this paper takes the position that research on the uptake of on-the-job training as a means of IS skills development needs to be widened to examine the process of participation from the perspective of the owner/manager – the key decision-maker – within small firms. This paper calls for a redirection of research towards participation as an *organisational decision-making process*, thereby necessitating an emphasis on the qualitative dynamics of socio-technical change and the impact this has on individual decision-making.

In line with this call for a wider and re-directed focus on the participation issue, and factually – because formal and accredited on-the-job training is new to many firms in the IT industry – this paper views formal training on-the-job as a socio-technological innovation in the process of acquiring skills within a firm. This paper advances the view that on-the-job training schemes are an innovation, and innovations are at their core, a social process of change.

In framing the research, the paper also argues that formal on-the-job training schemes can be defined as a social technology. This socio-technical perspective challenges the economic bias found in much of the vocational education and training literature. The paper then calls for a broader study of the participation issue in terms of intention, process, and outcome at multiple levels – technical, individual, social, and economic.

For the purpose of this paper, small firms in Australia are defined by the Bureau of Statistics (ABS, 1998) as those employing up to 20 staff if in non-manufacturing industry, or up to 100 if in manufacturing. The definition of medium sized firms is less standard. For the reason of consistency medium sized firms are defined as firms employing between 20 and 100 employees.

Literature Review

This section turns to the literature to help understand the uptake rate among small business, and the *process* by which owner/managers come to participate with apprenticeships for the first time.

In terms of *relevance*, most of the literature is based on skill formation practices in general, while in the field of IT there have been few studies of traineeships or work-place based training *per se*, with the noted exception of Hasluck et al's (2009) research within the UK apprenticeship system. In the USA literature, research on school-to-work (STW) programs as an active supply of potential employees for firms in the IT industry is almost non-existent. There is a subgroup of literature dealing exclusively with the compensation of IT professionals (Mithas & Krishnan, 2008), or the determinants of IT personnel turnover (Josefek & Kauffman, 2003).

A small number of overseas studies have reported on barriers to participation in formal school-to-work programs in the USA (Hughes & Thornton, 2004; Linnehan & DeCarolis, 2005), and Modern Apprenticeships in the UK (Fuller & Unwin, 2003; Maguire, 1998; Fuller & Unwin, 2009). Few studies in Australia have included the elements comprising the New Apprenticeship model – mentoring, competency based training (CBT), assessment, user choice, etc (Smith and Smith, 2009). As a consequence, little can be said with certainty about the demands this scheme places on small business, or the impact training organisations play in promoting participation. There is also very little research on the impact of third parties – training organisations and group training companies.

It appears that found employers' decisions to become involved in work-place training schemes are influenced by a myriad of potential benefits and disincentives. The main benefits appear to be wage subsidies, and a 'try and see' approach to recruitment 'to give a person a go' – philanthropic reasons. Opinions vary as to which is more important although previous participants tend to do so for financial rather than altruistic reasons. The main barriers to participation appear to be employer related characteristics: the employer's training costs, which include the trainees' wages; time and effort of supervisors and mentors; economic uncertainty due to slowdowns in the local economy, shorter and unpredictable contract cycles; and organisational resistance to work-based learning from owner-managers. The relative importance is also unknown.

There have been a number of studies undertaken and reports published providing solid data identifying key constructs and variables relating to training in small business (Keogh et al, 2005; Kerr & McDougal, 1999). For instance, enough is known about the following kinds of questions: What is the general attitude of small business to training reforms? What are the barriers or factors preventing small businesses from participating in on the job training. What factors and contextual elements influence the decision of SMEs to adopt trainees? What is the current level of knowledge in small business about formal workplace training procedures?

These predominantly ‘what’ type questions indicate, at the most basic level, that only one half of the problem has been examined. For instance, we do not know enough about the processes SMEs in the IT industry go through in making their decision. It is therefore argued that, given the descriptive and variance nature of most research so far, this paper recommends the need for the development of *process theory* to extend knowledge in this field, and that an open methodology will give a better understanding of the process involved. Until now questions of *process* have remained unasked. For instance we need to ask: How do contextual conditions and factors interact and work together to ensure participation? And, how are these factors and decision processes depicted in a model?

If we adopt a view of formal on-the-job training participation as the *process* of acquiring new vocational skills, it logically follows to consider the possibilities of research that emphasises process.

Process Theory

Process oriented research involving organisational innovation investigates the nature of the innovation process; how and why innovations emerge, develop, grow, and (perhaps) terminate. The unit of analysis of process theory research is the innovation adoption process itself. Process theory places a premium on the temporal sequence of activities in the development and implementation of innovations. According to Van de Ven and Huber (1990) data gathering methods in process theory research tend to be less removed and the data more qualitative than in variance research.

Wolfe (1994) differentiates two generations of process theory research. Earlier work called *stage model* research, conceptualised innovation as a series of stages that unfolded over time. The purpose of this early work was to determine whether the innovation process involved identifiable stages, and, if so, what they are and in what order. The *second generation* of process research involves in-depth, longitudinal, research conducted to fully describe the sequences of, and the conditions which determine, innovation processes. These studies tend to be inductive, in-depth, examinations of how innovations develop over time. Methods employed include historical analysis of archival data and published reports, interviews, questionnaires, and field observations. The form of process modelling adopted in this study is that of *Second Generation Process Theory*, where the objective is to provide a better understanding of how and why the “pieces of the puzzle” interact and work together to produce a participation decision.

To develop a more realistic model of on-the-job training participation, this study advocates the need for process oriented research. Accordingly, through a series of interpretive case studies, this research enters the world of the small business owner/manager, interprets their world from the inside, and provides an exploratory illustration of adopter/supplier factors through a grounded description of their influence on the New Apprenticeship participation (non-participation) process. Next, methods capable of developing theory from the decision maker’s interpretation of participation, are described. The method of analysis is Strauss and Corbin’s (1990) variant of grounded theorising.

Research Approach

According to Strauss and Corbin (1990), grounded theorising is well suited to capturing the interpretive experiences of owner/managers and developing theoretical propositions from them. The rationale for using a grounded theory approach is to generate a descriptive and explanatory theory of the participation processes rooted in the experiences of owner -managers. This approach has been effectively used in Information Systems research, while the three characteristics of grounded theory – inductive, contextual, and processual – fit with the primarily interpretive rather than positivist orientation of this research. The focus is on developing a context-based, process-oriented description and explanation of the phenomenon, rather than an objective, static description expressed strictly in terms of causality (Orlikowski and Baroudi, 1991). In the language of Markus and Robey (1988), the paper develops a process not a variance theory. Such a theory describes and explains the process of participation in terms of an interaction of contextual conditions, actions, and consequences, rather than explaining variance using independent and dependent variables.

Research Procedures

This section describes the participants, how they were selected, how the data were collected, managed, analysed, and displayed. The research used: purposeful sampling, in-depth semi-structured interviews, the conduct of a pilot study, the development of a coding scheme, the storage and retrieval of text using a computerised database, within-case and cross-case analysis using techniques such as displaying data in summary tables, the identification of critical incidents, and the development of a logical chain of evidence, and lastly the combining of the qualitative responses into narratives or decision 'stories'.

The population of interest were four owner/managers of SMEs in the IT industry in South East Queensland who had recently adopted a trainee for the first time, and four that had been approached to hire a trainee but declined. The focus therefore was a retrospective analysis of the decisions made. This involved 'snap shots' or slices of time being obtained from the eight cases. The cases were purposely selected based on the researcher's knowledge of the industry, and from discussions with industry figures with vast knowledge of local business.

Within the eight IT businesses, a sub-group were classified as highly specialist providers of software and services, with identified narrow niche markets. Another distinctive sub-grouping consisted of firms whose main activity is in supplying proprietary business IT and software, together with necessary implementation and maintenance services. This group could be described as retailing organisations dealing in computer products and services. What was common amongst all firms was that the business environment was highly volatile and competitive. As one owner/manager retorted, 'the bubble in the IT industry has burst, and times are tough'. In the geographic area covering Brisbane suburbs and the Gold Coast competition was rife. There were many firms providing similar services and products, and profit margins were small. Especially in personal computer retailing, many businesses do not survive and most firms in this grouping are classified as being in start-up mode, having operated for less than five years. A key business challenge among all SMEs, at the time of interviews in 1998, was keeping up to date with technology as the pace of change in products and services offered by other firms was changing rapidly. Many of the participating firms viewed traineeships as a vehicle for staying abreast of technology and for up-skilling their workforce.

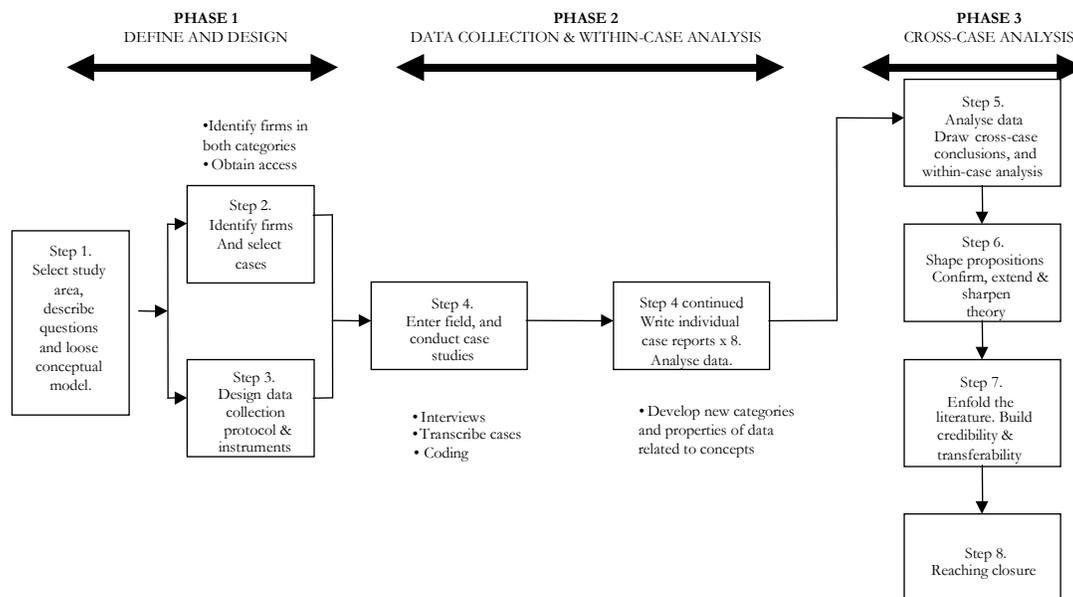


Figure 1. The specific research plan, adapted from Yin (1994) & Eisenhardt (1989)

Inspired by the work of Miles and Huberman (1994) for data presentation, Strauss and Corbin (1990) for an application of grounded theory, and Eisenhardt (1989) for a road-map for building theory from multiple case studies, the research design is illustrated in detail in Figure 1. Figure 1 is an adaptation from Yin (1994) and follows Eisenhardt's (1989) replication approach to multiple case studies. The approach to data analysis included three steps: early steps in data analysis, within case analysis and cross case analysis. The early steps in analysis include use of

the contact summary form for reviewing the interview, the development of a computerised database for storage and easy retrieval of text, the arranging and displaying of data in tables, and the development of a coding scheme to organise the text. Within case steps involved detailed write-ups for each case assisted by the identification of critical incidents, a time line displaying stages of the participation process, the development of a logical chain of evidence, and the writing of a narrative story. Cross case analysis involved the search for cross-case patterns by combining information from several cases into a single table. From that, a new set of process oriented codes were developed, using a form of content analysis known as 'open coding' and 'axial coding' (Strauss & Corbin, 1990) making connections between sub-categories of text into a more comprehensive set of concepts.

Analysis & Findings

The Participation Process

This section documents and builds a grounded process model of on-the-job training participation that emerged from the analysis of the text. The interviews asked respondents to describe the sequence of events that took place up to the point of signing the registration forms for the traineeship and to name the critical incidents. The assumption was that this would reveal a 'process of participation'. The responses to this request regarding 'events' tended to elicit descriptions of 'later processes' such as negotiations with training providers, or attempted dealings with government departments. They did not throw much light on matters such as their initial reasons for considering on-the-job training as a means for up-skilling the firm's employees, so as to illustrate what commenced participation. It seemed that in these firms, the early commitment decision was a rather informal process where owner/manager's were themselves not able to easily identify the moment of 'commitment'. In fact, the true nature of the 'decision' to participate was difficult to identify in practice, although there seemed to be a combination of facilitating factors intertwined over time that lead to a decision to participate.

At the same time, when questioning owner/managers in all eight firms, it became obvious that a number of different phases occur. Commitment to the scheme had often occurred before any real discussion about on-the-job training had taken place. In fact, all the participant owner/managers expressed prior personal commitment to training young people even though they had not recruited a trainee before. Similarly, non-participants had formed some negative associations related to training schemes (young people, poor work attitudes etc), and never really entered the decision-making process. As a result, the line of questioning pursuing a 'sequence of events' concept led the author to two key emergent understandings concerning the structure of on-the-job training participation processes in smaller firms.

The first emergent understanding is that participation involves several interacting sub-processes, different in nature, that need to be distinguished from one another. The use of the notion of a simple 'sequence' to encompass all of the decisions in a single sequential process, as assumed in some of the literature (Rogers, 1995), is confusing. In fact, between them, the following quotations refer to three different types of 'decisions' that occurred both in sequence and in parallel. Firstly, a psychological 'decision' to develop a favourable disposition towards new apprentices is apparent from a comment from a participating owner/manager who said:

We like to get young people who are keen to learn. Trainees are keen to learn.

Conversely, a response from a non-participant owner/manager was as follows:

It's hard to find young people with a work attitude. Many also don't have people skills. I get sent resumes everyday, but they're not happy people and don't want to work.

Secondly, a financial justification 'decision' involved in 'justifying it' is illustrated in a comment from a participant who said:

Look I never thought initially of traineeships, but now I'm thinking of saving money; and I'm thinking in terms of next year's staffing - it's a way of reducing the number of casual staff.

And thirdly, an operational 'decision' concerning the choices involved in implementation of on-the-job training, vis a vis selecting a training provider and trainee is shown in a comment from a participant who said:

The training provider was very helpful and answered all our questions. Their

mode of delivery also suited us, and as a result we formed a relationship with them.

Conversely, a response from a non-participant owner/manager was as follows:

It's an anxiety problem for me. The training providers don't have the experience in or knowledge of the industry.

Although it was tempting conceptually to define the processes associated with these 'decisions' as sequential stages, evidence suggests that a better representation of the overall process is as a set of three parallel, partially iterative, and interlocking processes. While different in nature they culminate in a decision to participate. To avoid the confusion associated with the word 'decision', the cross-case analysis phase labelled these three sub-processes as 'psychological commitment' (early), 'financial justification' (middle), and 'operational choice' (later) respectively. The sub-processes are iterative because the financial justification and operational choice processes are temporally embedded within the psychological commitment process. Financial justification and operational choice are also parallel rather than strictly sequential because they take place, at least partly simultaneously. Figure 2 provides a simplified representation of the three sub-processes.

The second emerging understanding concerning on-the-job training participation is that viewing the process as a 'decision' tends to over-emphasise the role of managerial deliberation. The findings suggest that taking on a new apprentice is not an objective decision made by a single manager evaluating the individual merits of the scheme in terms of its characteristics. The full understanding of participation processes requires placing them in their organisational and environmental context. In other words, we need to look beyond specific functional activities to a variety of dynamic contextual factors and conditions affecting participation. As illustrated in Figure 2, contextual elements influence the three inter-locking 'decision' processes in several different ways, and include events outside the direct control of the firm. These events include: a change in government funding, recruitment decisions by the owner/managers in other areas, and interactions with registered training organisations (RTOs) and potential trainees. The remainder of this section will be devoted to a detailed presentation of the components of this model.

Psychological Commitment Process

Psychological commitment refers to the process by which managers develop a commitment to one or more facets of New Apprenticeships. It is a process of developing a favourable disposition based on attitudes towards young people, willingness to deal with government departments and perhaps a registered training provider, etc. It is also a process of gaining knowledge. Knowledge about traineeships can be influenced by prior experiences with government training schemes or hiring a young worker, and is influenced considerably by suppliers of training and potential trainees seeking employment, as the following two excerpts illustrate.

A participant commenting on why he became involved said:

I have taken on young people before. Young people are enthusiastic. If you train them up from scratch, you get loyalty.

Conversely, the owner of an IT firm put it like this when describing why she didn't participate:

I've had plenty of work experience kids here. I know what it's like dealing with young kids - I could have done it myself.

Although this psychological sub-process is the first and most crucial step in influencing whether an owner/manager will, or will not adopt a trainee, it was also the most difficult of the three sub-processes to document. This is because it is largely an informal 'incubation' process in the manager's mind that has no clearly identified beginning or end. To illustrate this, the process is represented in Figure 2 'beginning' with an initial idea, and continues through a loop prior to the starting of the 'financial justification' process, but may continue to evolve even after this.

Four types of contextual categories assisted in explaining how owner/managers come to develop sufficient psychological commitment enabling their openness to New Apprenticeship options. The four categories are:

(a) Information elements: Among the participants, and many of the non-participants, owners were presented with ample information bringing the concept of New Apprenticeships to their attention. Such information came from a variety of sources including potential trainees, training providers, government agencies, and business consultants. This information provided new knowledge to owner/managers and/or supplemented an existing knowledge bank

about traineeships and on-the-job training schemes. In many of the non-participating cases there existed a lack of information, or mis-information, that resulted in a response terminating the process.

(b) Sensitising elements: In parallel with the accumulation of knowledge and information, various attitudes towards young people in general, and training on the job (rather than hiring people already trained), served to sensitise owner/managers to the idea of new apprenticeships. These attitudes were often not sufficient in themselves to produce a participation decision. However they increased the potential for an eventual positive response. In addition to a positive attitude towards young people, the firm had to be prepared and willing to train on the job, which quite often was boosted by a number of impetus elements described below.

(c) Impetus elements: In order for semi-formal consideration of New Apprenticeship participation to begin, some kind of impetus was often necessary. Again, the precise nature varied from firm to firm, and with several such elements accumulating over time, increased the potential for an eventual positive response. Two owner/managers reported that without trained staff, they could not compete. In the IT industry, constant, on-going training was required. For one, a key impetus was the need to obtain formal qualifications for the staff. The owner perceived the need for qualified staff to enable them to diversify into local area networking.

(d) Inhibiting elements: Finally, the positive impact of impetus elements was often negated by inhibiting elements, leaving participation in a state of 'limbo'. Such inhibiting elements were frequently related to issues of government bureaucracy or a lack of knowledge about how to sign-up and register the trainee.

The process of interaction between the four types of elements represents the author's description of how sufficient psychological commitment was developed to facilitate the more visible activities of semi-formal investigation of new apprenticeships that compose the next stages of the participation process.

Financial Justification Process

Financial justification refers to the process where concrete activities and decisions dealing directly with cost and financial justification are made. This process was initiated through impetus elements described above that lead eventually to concrete activities and decisions. These financial activities originated, at least in part, from an external source (e.g. discussions with a training provider or government agency about training wage arrangements, government subsidies, etc). Activities included the calculation of a salaries budget, and other negotiations involving officers from government departments or training providers. In all participation cases, considerations of recruitment and financial aspects relating to subsidy and training wage arrangements preceded the working out of technical details such as choice of training partner and trainee. This was necessary because the cost of recruitment had to be justified in financial terms, as the following excerpt illustrates:

In this industry we need trained people. To me traineeships are a cost-effective way to train. The subsidy was the cream on the cake. If there was no subsidy, I wouldn't have done it.

All cases followed slightly different paths, but the activities can be classified according to two different but related themes, with some cases falling into both themes. These themes are:

(a) Diagnostic activities: defining/confirming costs: Several firms began the financial justification process by seeking out costs involved and the amount of government subsidy available. Cost and potential savings played a major part in the process towards participation. As the following extracts demonstrate, the cost of hiring a trainee was not an issue for participants. Rather, the predicted cost-savings were seen as more important. In fact, the cost-saving came in two forms: the training wage (which is less than an adult wage), and the government incentive in the form of a subsidy at commencement and the end of the twelve-month apprenticeship program. Once owner/managers were aware of the significant cost savings available, they were keen to progress further. However, the subsidy wasn't the major influencing factor – it was important and helped – but for many participants it wasn't the sole influencing factor as an owner/manager describes:

I was attracted by the salary (but it wasn't the prime mover), but it helped. It compensated for having to train and the irregular hours the trainee did off the job concurrently. So he wasn't always around. If there were no subsidies, I might not have done it.

(b) Feasibility studies: The second theme involved the consideration of feasibility and the influence of an apprentice on the firm. Financial considerations generally dominated this exercise, although other resources, such as time

available and how apprentices might fit into current operations, were considered. Having the resources to train – defined for non-participants in terms of time – was a major factor in their decision not to participate, as the following extract from a non-participant in the IT industry illustrates:

Look, the time factor is our biggest hurdle to overcome. To take time out for introducing someone else is a liability at this stage. I would envisage spending a lot of time on showing them how to do things and bringing them up to speed.

However, for participants, participation can and was justified through an informal feasibility process, albeit nothing more than weighing up a few factors in its favor. Apart from: “it was a source of cheap labour” other non-financial factors that influenced participation included: the trainee can be trained up specifically for the job and the concept of new apprentices fitted in with business operations, given that these firms were accustomed to training on the job. In summary, Financial Justification is semi-formal, based on business objectives and is profit seeking. It is also heavily influenced by government incentives.

Operational Choice Process

Finally, given that all of the firms approached had not participated with a new apprentice before, the operational activities required for involvement were considerable. Consequently, a third process involved (i) finding out about how the scheme worked, and (ii) the selection of the apprentice and the training partner. Unlike the process of psychological commitment, operational processes were usually explicit, purposeful, and formal (they left concrete traces in the form of documents).

In order to begin the operational choice process, managers had to have reached a certain level of commitment. They had to be fairly sure that this was the direction they wanted to pursue. Yet for many firms with no prior experience and little knowledge of new apprenticeships, it was difficult to progress forward. For many SMEs, this was a stumbling block. This situation was confirmed by an owner, who explained:

In the first instance, there was a lack of information. There was no information at all. It was difficult to become involved. There was a lack of cohesion among the [training] bodies.

Because of the frustrations experienced, the focus for many owner/managers moved from one of information, understanding and choice to forming relationships with training providers. The focus moved away from ‘financial elements’ concerned with justification in financial terms, to ‘interpersonal components’ related to the personal credibility and mobilisation of support around the project by a training provider. This study found the role of the training provider to be crucial in the overall participation process. Training providers answered questions that greatly aided participation. This sub-process provided the first instance on which a positive ‘rational’ decision on participation could be based.

Informal contacts with individual training providers or group training companies generally continued throughout the participation process, as training providers were a key source of information. During this process, contacts with providers naturally intensified and became less passive, culminating in participation. What was common, was that the firm could not undertake the training themselves in-house. For example, an owner admitted:

I was worried about us all being self-taught and perceived the need for training. I need qualified people. I'm getting networking and administration skills which enhances the business. Also, we need a combination of on- and off-the-job training. I can't teach high-end networking here because of technical and resource limitations.

Operational choice involved two themes:

(a) Facilitating elements: These were similar to the sensitising elements noted earlier in that they exerted a positive influence on the ongoing process. However, their effect was to facilitate supplier and apprentice choice. This meant that the operational choice process became easier to make for some firms, of for instance, when employees with appropriate expertise existed within the firm, or more commonly, training providers sometimes stepped in and provided information and service to meet the needs of the firm. Alternatively, the process may have been accelerated through the positive impression generated by initial contact with potential apprentices looking for placement.

(b) Interrupting or slowing elements: Certain factors can also interrupt or slow down operational choice processes. There may be difficulty in finding a suitable training provider; the preferred training provider may withdraw from the approved provider list, or a private training provider is deceptive about the program and costs. Such events had multiple ramifications for participation: they distracted management attention, often delayed participation directly, and sometimes reduced the organisation’s commitment to participation. In summary, operational choice was a process heavily influenced by suppliers of training seeking to initiate a business transaction and job seekers providing a source of knowledge while actively seeking employment.

In sum, the paper has examined the nature of New Apprenticeship participation processes in small firms in the information technology industry. It developed a conception of New Apprenticeship participation as a set of sub-processes, intertwined with other decision processes in the firm, and influenced by a dynamic set of contextual elements. The model depicted in Figure 2 provides a simplified representation of the three sub-processes.

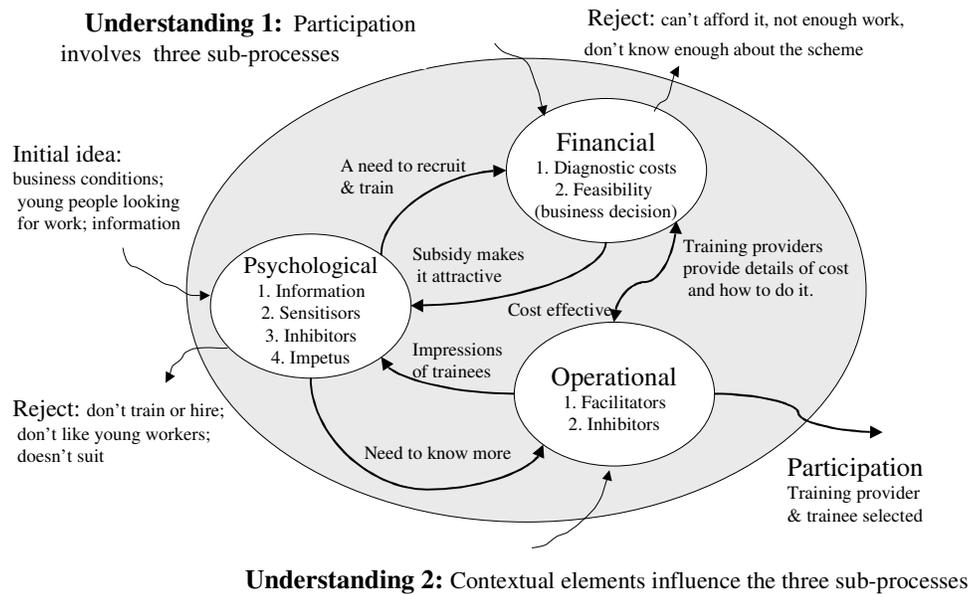


Figure 2. The participation process - a set of three interconnecting sub-processes

The model suggests there is no distinct participation decision, or sequential decision making process. New Apprenticeship participation involved three interacting sub-processes. The model also suggests a psychological commitment to hiring young workers and predisposition towards training is essential and precedes participation. Otherwise the process terminates. Knowledge (or lack of knowledge) about New Apprenticeships are facilitators (or inhibiting elements) in the process. Business factors such as profit seeking and government financial incentives are highly influential. The role of training providers is crucial to facilitate the process to a successful participation outcome.

Discussion

This section builds on the model of participation generated in Findings section by proposing a set of six theoretical propositions portraying the dynamic nature of the process. For each proposition, the paper indicates the extent to which it is supported by theory and the extent to which the paper has added some new perspective or idea when thinking about the process of skill formation in the IT industry.

As stressed by Whetton (1989), a meaningful process study must be guided by theory that helps to tell how and why events unfold as they do. As already stated in the Introduction, a lack of established grounded theory about on-the-job skills development necessitated the generation of a number of new perspectives and empirical insights adding to the existing body of knowledge in this arena. Indeed, the theoretical propositions developed in this study and summarised in Table 1 define a preliminary set of statements of interaction among issues and participation outcomes, and help to explain and understand the model expressed and depicted in Figure 2.

Table 1. Theoretical propositions

1	The CONSTRUCTED nature of participation. A social constructionist perspective suggests that to understand the participation issue, it is necessary to examine the intentions and actions of key players, the social context into which training schemes are being adopted, as well as the innovative processes enacted as a result.
2	EMBEDDEDNESS of decision making. There is no distinct identifiable participation 'decision', but rather participation occurs in a social and organisational context that shapes what happens when training schemes are being considered.
3	Participation is a complex ITERATIVE process. Participation does not follow a strictly sequential decision making process, but rather several interacting sub-processes, different in nature.
4	Participation is KNOWLEDGE based. Knowledge or lack of understanding about training schemes is a key facilitating or inhibiting element in the process.
5	Participation is MEDIATED by training agencies. Involvement in a successful participation outcome is more likely if supported and facilitated by suppliers of training.
6	Participation can be RESOURCED . Financial considerations such as profit seeking and government financial incentives are highly influential, but not sufficient.

How do these findings compare with studies in the literature? In the following sections, the paper returns to the literature to note consistencies with and departures from findings of earlier research. An essential feature of theory building is comparison of the emergent themes, categories, or propositions with the extant literature (Eisenhardt, 1989). This involves asking what it is similar to, what it contradicts, and why. In pursuit of this objective, for each proposition, the discussion indicates the extent to which it was supported by previous research and the extent to which the paper has added some new perspective or idea when thinking about the process of on-the-job skill development in the IT industry.

Proposition 1 (The CONSTRUCTED nature of participation)

Proposition One (The **CONSTRUCTED** nature of participation) posits that to understand the participation issue, it is necessary to examine the intentions and actions of key players, the social context into which training schemes are being adopted, as well as the innovative processes enacted as a result.

The social constructionist view of the world takes as the analytic unit the individual embedded in a social context (e.g.) the owner/manager of a small firm. This proposition is built up from the following elements: that the New Apprenticeship scheme represents (for many firms) an innovation in the process of employee skill acquisition; that New Apprenticeships can be viewed as a predominantly social technology; that technological artefacts such as New Apprenticeships are open to sociological analysis; and that an owner/manager's decision to adopt a trainee is influenced by their interpretations of the on-the-job training scheme. In line with this theoretical perspective, the participation process involving on-the-job training within small firms is represented as a dynamic process where owner/managers socially construct a positive attitude toward apprentices, anticipate and overcome the challenges ahead, and recognise the presence of and capitalise on business opportunities.

The above argument is both central and fundamental to Proposition One: the adoption of apprenticeships is subject to the owner/managers' perception of what trainees mean to them and their impact on the firm, including that of government training initiatives. These perceptions reflect more or less imperfectly the realities of the external environment. Furthermore, these perceptions have a moderating effect on the psychological commitment process - the first and most crucial stage in determining whether owner/managers will or will not participate.

The key point is that while material properties of New Apprenticeships cannot be ignored, e.g. on-the-job training and paying a trainee a wage, it is the social meanings according to a social constructionist approach that are likely to affect the degree of success or failure attained by any particular technology in an organisational setting. Because the social meanings of a technology help to constitute behaviour during the decision-making process, those meanings according to Orlikowski & Gash (1994), may be strongly associated with behaviour. An important aspect therefore of adopting *training process technology* thus becomes the frames of meaning of different individuals as they encounter the technology.

The findings confirm that owner/manager's beliefs concerning on-the-job training and ultimately the course of action pursued were influenced by events that had taken place previously. As a first indication of this phenomenon, the decision to participate was influenced by the 'enthusiasm shown by the young people'. This also suggests that we need to give young people some credit as agents in the participatory process. Conversely, the process leading to rejecting a trainee was strongly influenced by the negative experiences of a trainee in previous employment.

Proposition One implies that skill formation research can successfully adopt a different approach or strategy to studying the participation issue. Rather than focussing on the characteristics of the firm, the cost and benefit in economic terms, or the material aspects of traineeships, more effort should be devoted to understanding the social nature of the participation phenomenon by identifying individual frames of meaning as owner/managers encounter the scheme for the first time.

Proposition 2 (EMBEDDEDNESS of decision making)

A second proposition is that taking on a trainee is not an objective, independent decision, but rather participation with on-the-job training represents an embedded decision-making process (Proposition 2).

Embeddedness implies that participation occurs in a social and organisational context that shapes what happens when New Apprenticeships are being considered (*c.f.* Proposition One). For example, taking on a trainee for the first time is not a simple decision made by a single person evaluating the individual merits of the scheme. It is rather the outcome of processes occurring in an organisational and environmental context (embeddedness), including influences outside the control of the firm. The owner/managers' decisions and actions are therefore influenced by the contextual conditions (including organisational practices) which surround a given case. In other words, participation does not take place in a vacuum. There is a dynamic mix of events and consequences in a social and organisational context that shapes what happens when New Apprenticeships are being considered and introduced.

Proposition 3 (Participation is a complex ITERATIVE process)

A related proposition to Proposition Two, is that participation is not a sequential decision making process as implied in some of the literature. Rather, participation involves several interacting sub-processes (Proposition 3) that are different in nature and need to be distinguished from each other. These processes are themselves intertwined with other considerations of the firm, and are influenced by a dynamic set of contextual elements that interact with one another over time.

A better representation of the process is as a set of three parallel, partially iterative, and interlocking processes; and that owner/manager's decisions and actions are not independent of each other and hence their order matters little in producing a participation outcome. The data suggests that there is no underlying logic that regulates the process of participation and moves it from one given point to another. There are not stages of 'decision making' that can arrange events in a strict sequential manner such as conceived in stage models.

One such stage model offering an explanation to new technology adoption is that contained within diffusion of innovation theory (Rogers, 1995). As a leading theory about how and why innovations are adopted, diffusion of innovation (DOI) theory might be expected to apply to this research. Proposition 3 (and the following Propositions 4 and 5) explore the applicability of the diffusion of innovation (DOI) model to on-the-job training participation, with special emphasis placed on the nature of on-the-job training schemes in the IT industry as a form of innovation. However, before subjecting DOI to scrutiny, we need to review its essential core.

Roger's (1995) innovation-decision process comes into play as the decision maker considers whether or not to adopt a given innovation, seeking and processing information and attempting to reduce the level of uncertainty about advantages and disadvantages of adoption. Rogers portrays the decision-making process as an idealised sequential model. The five stages are portrayed as a linear and quite rational process that occurs over time. According to Rogers, an adoption decision unfolds as a series of five stages, flowing from knowledge of the innovation through

persuasion, followed by decision, implementation and confirmation. At the knowledge stage, the potential adopter becomes aware of an innovation's existence and has some understanding of how it functions. In the persuasion stage, the potential adopter forms a favourable or unfavourable attitude toward the innovation. The first two stages involve information gathering and attitude formation, and are antecedent to the adoption decision. The decision-maker chooses to adopt or reject the innovation during the decision stage and the adopter puts an innovation into use in the implementation stage. Finally, in the confirmation stage, the decision-maker seeks reinforcement of the adoption or rejection decision already made and either affirms or reverses the earlier decision.

A comparison between Rogers' model and the participation model proposed in Figure 2 shows some similarities, although the main contradiction involves a linear versus a cyclical process. What is common are Rogers' phases of 'knowledge' and 'persuasion' sharing many similarities with Figure 2 which emphasises attitude formation and information gathering. Furthermore, the contentions of Propositions One and Two in this paper are supported by Rogers who takes into account situational factors that influence behaviour and social factors that shape perceptions of the innovation. What also is in common between the two models is that external influences or the perceptions of owner/managers may override the relative merits of the innovation's characteristics. Consequently, Propositions One and Two, suggesting that any study of on-the-job training participation should consider the characteristics of the immediate social system and the interaction with other social systems, is supported by Rogers' DOI theory.

However, the models differ significantly in structure. The findings as expressed in Proposition Two suggest that owner/managers do not rationally evaluate the technology on the basis of five persuasion characteristics. Secondly, the participation process is depicted as parallel, partially iterative, and not linear. Proposition 3 posits that it is not the training scheme alone that determines the reaction of owner/managers according to the five innovation attributes. Rather, three sets of attributes — psychological, financial, and operational — dynamically working together over time, appear to influence owner/managers' response to formal and accredited, on-the-job training schemes.

Proposition 4 (Participation is KNOWLEDGE based)

Proposition Four posits that successful participation projects are likely to be those where knowledge about New Apprenticeships is a key facilitator, or conversely lack of information about the scheme is an inhibiting element in the process (Proposition 4).

Defined as an organisational innovation in the Introduction, formal training schemes with an on-the-job training and assessment component require some measure of organisational learning if they are to be adopted. For participation to occur, the employer must absorb a daunting changing lexicon, new training techniques and on-the-job assessment procedures. Proposition Four posits that the perceived complexity of obtaining technical know-how in these areas represents a significant knowledge barrier to achieving an overall understanding of the benefits of participation.

To support this proposition, the Findings have identified 'capacity to train' and 'a lack of knowledge' about traineeships and what to do, as fundamental issues impacting on the success of on-the-job training schemes among small business in IT. Previous discussion highlighted the situation that many owner/managers of small businesses perceive the requirement to train and assess competency on-the-job to be beyond their capability. Proposition Four restates this situation as a knowledge barrier problem. At any given point of time, owner/managers may face one or more knowledge barriers actually preventing them from adopting, implementing or applying this training technology.

By way of further explanation from the literature, Attewell (1992) offers an alternative model to Rogers (1995) which suggests that lack of technical know-how and organisational learning may act as knowledge barriers, impeding and even preventing the adoption of innovations. He bases his work in part on the ideas of Eveland and Tornatzky (1990), who suggest that the basic assumptions of diffusion models are not met when the innovations of interest are complex technologies. In this situation, it is not enough for government departments, training centres or RTOs to simply make potential participants aware of their existence and potential benefits — the process of signalling. The technical knowledge needed for the successful adoption, implementation, and operation of the new technologies must be learned experientially by the participants. Both individual and organisational learning is required. The Attewell model retains the general sequence of stages seen previously in the Rogers (1995) model but it adds the influences of technical know-how, organisational learning, and mediating institutions to the adoption decision.

Attewell argues that organisational innovations require some measure of organisational learning if they are to be adopted. However, some innovations - what Attewell has termed complex organisational technologies - fall on the extreme end of the spectrum in terms of the burdens they place on would-be participants in obtaining the knowledge

needed to understand and assimilate them. Attewell suggests this is true of technologies that, when first introduced have an abstract and demanding technological base, and must acquire broad tacit knowledge and procedural know-how to use it effectively (Attewell, 1992). These characteristics, it is argued, describe training process technologies such as formal on-the-job training schemes. In fact, training schemes appear to be exemplars of the kinds of complex organisational technologies Attewell had in mind, (although his study focused on business computing in general).

Attewell argues that when innovations initially impose a heavy knowledge burden, adoption is better conceptualized as a process driven by lowering knowledge barriers over time than as a process of communication and social influence (as per classical DOI theory)

Proposition 5 (Participation is MEDIATED by training agencies)

Evidence from the cases support a related proposition that overcoming the knowledge burden on would be participants leading to a successful participation outcome is more likely if supported and facilitated by mediating institutions such as suppliers of training or group training companies (Proposition 5).

It has already been mentioned that participation success is influenced by know how (Proposition 4). Proposition Five (participation is mediated by training agencies) pushes our understanding further, since it posits that a successful participation outcome is more likely if supported and facilitated by mediating institutions such as registered training organisations or group training companies. As an indication of this phenomenon, the efforts of training providers in being able to step-in and provide information and demonstrate know how about the scheme were significant factors in the formation of a simple but effective training partnership with each participating small firm.

From the perspective of the literature, Gatignon and Robertson (1989) offer an enhanced view of diffusion theory designed to be more relevant to studies of consumer behaviour. They note that the impact of marketing activities and the role of competitive actions are almost completely ignored in the classical diffusion of innovation theory. Gatignon and Robertson's enhancements have relevance for this research since the adoption of a trainee involved a joint arrangement between a firm and a RTO operating in a *user choice* environment.

Proposition Five posits that business activities pursued by RTOs and the support provided can be considered to have a positive mediating influence on on-the-job training participation, since these activities are to some extent aimed at influencing owner/manager behaviour. The cases provide evidence of support and consistency with the literature Frambach *et al* (1998), for the influence of mediating activities pursued by suppliers of training, thereby increasing the face validity of Proposition Five.

Proposition 6 (Participation can be RESOURCED)

Financial considerations such as profit seeking and government financial incentives are highly influential (Proposition 6) but this is not sufficient always since other issues can inhibit. The paper acknowledges that cost and benefit are important factors, but not the sole factors that come into play in the decision making process.

The literature review reported the effect of subsidies to be inconsequential, and concluded that while financial incentives may be a factor, they are only important in combination with other factors. This finding was supported by the data where a number of participating cases affirmed that subsidies played a role in the overall decision-making process.

This ends the discussion of the six propositions. At this stage of theory development, the schematic model of Figure 2 and the set of research propositions reflecting the complex nature of on-the-job training participation in the IT industry have been induced from the case data. Overall, these six propositions define a preliminary set of statements of interaction characterising the dynamic nature of the apprenticeship participation process. As presently constituted, these propositions are at least a step short of theory formulation. At minimum, they are empirical generalisations; that is, they summarise observed uniformities of relationships between events and outcomes. At best, they suggest a rudimentary model of an on-the-job training participation process. However, as suggested by Eisenhardt (1989), tying the emergent theoretical propositions to the existing literature enhances the credibility (internal validity) and generalisability of theory building from case research.

Interpretation and Implications

This research provides valuable feedback and insight on both the demand and supply side for skilling the IT workforce in Australia. According to the Australian Information Industry Association (AIIA, 2010) skilled people are the most important component of the information and communications industry because they provide the origin,

implementation, and support for the technologies delivered by that industry. However, Australia is still facing a widening gap between the demand for IT skills and the supply of qualified IT workers. This skill shortage means that the continued productivity dividend delivered by information technology to the Australian economy could be jeopardised if the nation does not have sufficient people with IT skills joining the Australian workforce.

The issue of how to skill an IT workforce and to bridge the gap between supply and demand remains the same in 2010 as it did at the time of data collection. For SMEs in the Australian IT industry a main issue is: will it be able to recruit sufficient employees with the appropriate IT qualifications, training, and skills in the short and long term? Figure 2 illustrates how workplace-based training schemes can address the issue of skill supply and skill demand within SMEs. On the supply side, the model shows one channel of supply that delivers people to IT jobs. This channel is represented by on-the-job training schemes conducted by the employer in partnership with a training provider. This research details how SMEs perceive this particular variant of supply - young workers as trainees, on-the-job training and their reaction to government sponsored training schemes. The model also indicates that demand for this variant of skill supply is influenced by business conditions, young people looking for work, and information about wage subsidies, etc.

The research also faced a number of conceptual and methodological problems in developing process knowledge in this field of study. The main issue was *conceptualising* and reconciling participation as an economic issue primarily and in offering an *alternative* perspective.

A conceptual difficulty on which this paper sheds light is establishing an accepted understanding of The Problem itself. As discussed in the Introduction, there is a bias on how the problem is defined and conceptualised. Cuban (1997) raised the issue of how policy problems are defined and who does the framing because in this instance, we have an example of a government initiated program – on-the-job training in the IT industry – being promoted as a reform (or solution) to a problem defined by policy makers and experts. In most of the literature on vocational training, each has a ‘way of seeing’ embedded within it. What is meant by ‘way of seeing’ is an implicit or explicit explanation of phenomena. For social scientists their ways of seeing are often anchored in disciplinary based theories drawn from one or more academic disciplines. The Introduction commented on the dominant economic position taken by researchers studying the problem of re-skilling industry and conducting skill formation research in the IT industry. Rather than dwell on how the problem has been framed and which institutions do the defining, this paper argues that there are other key perspectives, or ‘ways of seeing’ that have been absent from the examination of skilling in the IT industry so far.

Two alternate perspectives were offered in this paper. The first relates to epistemology, and how the problem was framed. The second relates to methodology, and how the research was conducted.

In terms of epistemology, this paper supports a multi-dimensional framing of formal on-the-job training participation where both antecedents (such as the environment, supplier factors, organisational characteristics, individual owner/manager attitudes, and perceived characteristics of the training technology); and process issues such as intention, context, a time dimension, innovation and overcoming knowledge barriers, are considered. Distinctively, this paper supports the consideration of multiple issues and theoretical plurality.

The second alternate perspective is methodology. The findings of the literature review suggest that differences in intentions, processes, and contexts around participation with on-the-job training have been largely overlooked by research that tends to focus on inputs or outputs but not process. The approach taken in this paper is different from existing frameworks on apprenticeship participation research (Dockery *et al*, 1997) or school to work transition research (Linnehan and De Carolis, 2005) which tend to share three characteristics. Firstly, these models are deterministic and assume that objective factors outside human intention are responsible for adoption. Secondly, they are variance models (Markus and Robey, 1988), and hence do not adequately capture the contextual and processual issues that are fundamental to examining organisational change. Thirdly, they focus primarily on factors of economic cost and benefit, and hence do not examine, over time, the dynamics and interplay of social influences, business context, and individual owner/manager action.

Lastly, in this particular study, it was made clear that an organisational innovative perspective approaching participation as a multi-dimensional construct locally defined by the owner/managers taking into account social issues represents a more realistic approach than more common attempts to find objective criteria such as training expenditure or economic benefits. In short, this research studied the process of participation from the viewpoint of the owner/manager and how they defined their situation locally.

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