

Exploring Skill Ecosystems in the Australian Meat Processing Industry: Unions, Employers and Institutional Change

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Abstract

This article discusses the concept of the skill ecosystem in the context of the network oriented literature on learning and skill acquisition. Three critical features of skill ecosystems are identified and then applied to an analysis of the abattoir sector of the Australian meat processing industry. The analysis highlights the important role of the employee union in the skill ecosystem, including maintaining a flow of new entrants into the sector. The article then examines the impact of major institutional change, through the deregulation of industrial relations, on the ecosystem. It concludes by discussing the applicability of the skill ecosystem concept to a mature, low-skill industry such as meat processing and then draws some conclusions about the limitations of the skill ecosystem concept itself.

Keywords

Industrial relations; meat processing industry; trade unions; workforce development.

Introduction

The connections between vocational skill development and the labour market are complex. The institutional frameworks for skill development vary in different countries, states and regions and exist alongside differing labour market structures in occupations and industries. Much of the research into vocational skill development seeks to understand the impact of institutional frameworks on labour market outcomes, but some recent work seeks to go beyond the study of institutions to examine the more informal social arrangements that underpin skill development (Crouch 2005).

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One recent development has involved the study of skill ecosystems in clusters of high technology firms. The focus here has been to study the conditions underpinning high skill development so that more appropriate policies for the development of high skills in new industries can be put in place. Such policies are important underpinnings of the development of new industries and provide support for the use of new technology to improve the competitiveness of firms, localities and regions (Finegold 1999).

The attractions of studying new and emerging industries as a source of renewed competitiveness are obvious, but equally the concept of a skill ecosystem should help to explain how the competitiveness of better established and more mature industries is supported or endangered, or can be promoted, through appropriate policy action. Recent work in Australia demonstrates that the concept of a skill ecosystem can indeed have a wider application, taking in mature as well as emergent industries and low technology industries as well as high technology ones. The utility of the concept is that it has a range of applications and has now been incorporated into the language of policy making and program delivery for vocational training in Australia (Hall and Lansbury 2006; Payne 2008).

This article applies the skill ecosystem concept to the meat processing industry in Australia to study the dynamics of change in skill development within the industry. The article firstly discusses the concept of a skill ecosystem and then the methodology of the study is given. The article then demonstrates how the concept of a skill ecosystem can be applied to a mature, low technology industry such as meat processing. The article outlines the way in which formal institutional change has disrupted the existing skill ecosystem in the industry and this leads into a discussion of the implications of these changes, both for the concept of a skill ecosystem and for skill development in the meat processing industry itself.

Defining Skill Ecosystems

The concept of a skill ecosystem is an emergent one, first created to characterise the mechanisms for skill development in clusters of high technology firms such as those found in Silicon Valley. The concept has drawn upon and contributed to a new body of work examining relationships between firms in regions and localities in the knowledge economy. Where other new concepts of inter-firm relationships in the new economy — concepts such as that of the local production system — examine a range of business inputs, the ecosystem notion focuses centrally upon skill development in its broadest sense. Skill ecosystems examine connections between the formal and informal organisation of learning and among learning, employability and employment. Notwithstanding its clear focus, the skill ecosystem concept shares much in common with other concepts of inter-firm relationships in the new economy. It shares the idea that institutions fulfil a structuring and enabling role rather than a defining role in skill development, the view that formal and informal networks of relationships are significant when examining skill development, and the conviction that location makes a difference to skill development, influencing interactions within networks

and between networks and institutions (Belussi 1996; Cooke and Morgan 2000; Crouch et al. 2001).

As an emergent concept with policy applications, the notion of skill ecosystem has been defined by its practice as well as its theory, and some differences emerge between the more abstract and theoretical and the more practical and applied definitions. Skill ecosystems in practice have been supported by governments to address the limitations of supply-side policies that have become evident in the past two decades (Phillimore 2000; Stuart and Cooney 2008). Through the funding of skill ecosystem projects, governments have sought to use publicly supported provision in order to link the supply of skills to the demand for skills in firms and industries. The more applied approaches to skill ecosystems seek to target provision to those industries where employer demand for skills to underpin competitiveness is linked to workforce development strategies offering career paths for employees. As Windsor and Alcorso (2008) note,

... skill ecosystem approaches are as much about business strategies and workplace culture as they are about training. ... the projects are not only concerned with how skills are developed, but also whether the skills are utilised and how they affect business and personal outcomes. (Windsor and Alcorso 2008: 11)

In keeping with this applied approach, practitioners seek to distinguish between high and low skill ecosystems. In high skill ecosystems there is a virtuous cycle between the firms need to develop high skills for competitive advantage in high value added production, the provision of education and training, and incentives — such as career paths for individuals — for employees to invest in skill development and training. These high skill ecosystems compare with the low skill systems where there is a vicious cycle whereby an employer strives to cut costs and remain competitive in low value added production, which then leads to little or no investment in training and skill development, as this is simply another cost.

In comparison with the more theoretical approaches, the applied approach has a somewhat narrower and more instrumental focus upon the interaction between business strategy, skill development and publicly supported training provision. In this conception, ecosystem agents can act to improve employer co-ordination and create multi-employer networks of like firms, that can share risk of training investment for high skills.

In this article we do not attempt to reconcile the differences between the applied and the theoretical but rather we attempt to develop the theory in the light of other recent work on networks and learning in the knowledge economy. We are not here reporting a case study of our practice in skill ecosystem formation, so much as we are reflecting upon the implications for theory of what we find in one particular case. For the purposes of this article we merely attempt to identify the points of commonality between the concept of the skill ecosystem and other concepts of learning in new economy firms. We find that the skill ecosystem concept shares three points in common with these other concepts:

that institutions play an enabling role; that networks are important phenomena, and; that location is important.

Institutional Frameworks

Institutions are seen to have an enabling role within skill ecosystems rather than a defining one. Institutions, whether those of the formal training system, of the labour market or of employment relations, enable certain kinds of relationships to develop rather than determining which kinds of relationships will develop. Skill ecosystems are seen to be self-sustaining within a particular institutional context. Institutions may be important in stimulating the creation of the system but they do not determine its final form and character. The latter is rather determined by the kinds of network arrangements that develop within the institutional context.

Networks for Skill Development

The existence of networks is a key aspect of the skill ecosystem concept. Networks are characterised by dense links among network members, leading to the development of trust and the sharing of knowledge. In the case of skill ecosystems, these links exist for the sharing of knowledge about new techniques, new technologies and the state of the labour market. Information about the kind of work being done, who is doing it and what skilled vacancies an employer has, is typically shared within the network, along with knowledge about technical innovations in work itself (Forrant and Flynn 1998; Keeble et al. 1999).

The sharing of such important knowledge requires the development of trust among network members, and it is for this reason that networks are usually characterised by the development of linkages between non-competing firms and individuals. Where strong competition exists, network agents have an incentive to hoard rather than share knowledge; they become concerned about problems of knowledge spill-over and this undermines the development of trust between network members (Provan and Human 1999).

The kind of strong links that are developed within the network may be formally organised through interest groups and associations or more informally organized through social networks and groups. The complex forms of network arrangements are what make different skill ecosystems distinctive (Erickson and Jacoby 2003; Huggins 1998).

The Influence of Locality

The development of networks is dependent upon close interaction between network agents and between networks and specific resources in a locality. Face to face interactions are important for the development of dense linkages and the fostering of trust. Interaction with critical local resources is also important for network development. In the case of Silicon Valley, for example, it was the interaction of network agents with universities and high technology research labs that was an important feature of the skill ecosystem (Florida 1995; Maskell and Malmberg 1999).

Methodology of the Study

This article is based upon the analysis of secondary sources to conceptualise skill ecosystems and examine the implementation of policy and programs in Australia based upon the concept. It is also based upon case study research of the Australian Meat Industry Employees' Union (AMIEU). The case study was supported by interviews with representatives of the participating organisations in the trial South Australian meat industry partnership from 2006. This partnership was put together at the behest of the South Australian Secretary of the AMIEU after he had engaged a consultant to undertake a survey of what could be done in terms of promoting skill development in the South Australian meat processing industry to guarantee an appropriate source of skilled and semi-skilled workers for the future (Smith 2006).

The initial interviews which shaped the research project were with the AMIEU South Australian Secretary, the Project Manager for the Meat Industry Attraction and Retention Project and representatives from the Food, Tourism and Hospitality (FTH) Skills Council South Australia. Included from the partner organisations were representatives from the peak meat processing and meat producer employer body, Meat and Livestock Australia (MLA), some of its member firms, including Teys Bros, and the steering committee of the Food and Beverage Development Fund of South Australia which included representation from industry and trade unions.

The AMIEU was then chosen as the focus of this study because of its role as a labour market intermediary in the meat processing industry. While it is acknowledged that this approach gives only a partial view of the industry, including the structure of its labour markets and occupational training regime, the AMIEU, unlike other labour market intermediaries, does have nation-wide coverage and it is also knowledgeable about the provision of training through its industrial agreements with employers. While the union perspective enables us to gain a big picture view of the industry, one through which to analyse the applicability of skill ecosystem concepts, the inclusion of other sources of information representing employer and government perspectives allowed for triangulation of the AMIEU data, thereby potentially enhancing the reliability and validity of the findings (Creswell 1994).

The union case was researched through a multi-method approach. Semi-structured interviews were initially conducted with AMIEU national and state officers, regional organisers and industrial officers. An interview schedule was developed and employed during the interview process. The interviews were supplemented through an analysis of relevant union policy documents and papers from Meat and Livestock Australia and the FTH Skills Council. Interviews were chosen as a research tool because of the need to have data derived from the participants' perspective and for the need to be flexible during the data collection process in order to match the immediate research situation with the data collection method (Lee et al. 1999; Denzin 1989; Morgan and Smircich 1980). This research design is similar to that utilized by O'Leary and Sheldon (2008) in their research on the Victorian meat processing industry from 1986–1993.

Analysis of the interview material along with the analysis of the literature on skill ecosystems was an iterative process, leading to a strategy of emergent research (Denzin 1989). Key concepts were clarified through an analysis of their application in the meat industry, and this analysis raised further questions about the concept of the skill ecosystem. This strategy is warranted where conceptual development is based on intimate connection with the detail of a particular case (Glaser 1998; Mintzberg 1979; Eisenhardt 1989).

The Skill Ecosystem in the Australian Meat Industry

The Australian meat processing industry involves firms that process animal carcasses and the fresh meat products derived from them. The industry covers the whole of the supply chain from farm gate, through slaughter and processing to wholesale and retail trade. The focus of this article is on the abattoir sector of the industry. This sector covers the initial slaughter of the animal and the preparation of fresh meat products from the carcass.

The sector exists in several regional clusters of Australia that are contiguous with major pastoral districts. The major districts by employment are those found in the adjacent mainland states of New South Wales (35 per cent of abattoir employees) and Queensland (33 per cent of abattoir employees). These districts typically contain growers, live cattle markets, abattoirs and meat processing plants (Agri-food Industry Skills Council 2008; DEEW 2009).

There are several key features of the abattoir sector and its skill ecosystem that give rise to its distinct identity, and these characteristics provided the AMIEU with a distinctive role in the skill ecosystem of the sector. First, the sector remains defined by demand cycles and supply seasonality with regard to animal reproduction. Such seasonality is particularly obvious in relation to lambs, although changes in livestock breeding techniques and patterns have modified this pattern somewhat (Notter 2002; Vere and Griffith 1995). For example, producers selection breeds to reduce seasonality by extending the lambing season (Jerrard et al. 2008). Climate issues can also affect supply; for example drought and floods reduce livestock availability in affected localities. Furthermore, meat supply is cyclical in terms of changes in consumer demand, which has recently been influenced by factors as diverse as strong economic growth in emerging countries, leading to increased demand for meat (Batista 2010), Global Financial Crisis and recovery (De Garis 2010; Kay 2010), and consumption habits influenced by issues such human health concerns and animal welfare (Harper and Aikaterini 2002; Jerrard 2007; Ransom 2007; Schröder and McEachern 2004).

There is a strong interdependency between the meat producers and meat processors despite some vertical integration within the industry by large retailers such as Woolworths and Coles (Batista 2010). The continued cyclical nature of demand, combined with the seasonality of processing, means that employment is also cyclical and seasonal (Kilpatrick and Bound 2005). Many employees are highly mobile, moving from region to region within Australia and even to New Zealand as the demand for meat processing moves. Those who are not mobile between regions tend to be mobile across occupations within a region, moving from meat processing work to other kinds of agricultural work depending upon

seasonal availability (AMIEU 2005; Kilpatrick and Bound 2005). There are variations, both in the overall availability of work, and in the kind of work that is available in a district. Changing regulations for exported meat, for example, may lead to significant changes in work practices and hence it is important to know when a processing facility may be processing for the export market and when it is processing for the domestic market alone. The key skill differences are found in slaughtering methods and handling of meat for *halal* countries and in *E. coli* testing for abattoirs exporting beef to the United States (Kay 2010).

This mobility of employees and the variability of the work means that gaining current labour market knowledge is critical. Identifying where the work is, who is hiring, what kind of work is being done and what kinds of new techniques and new technologies are being introduced at particular meat processing facilities is critical knowledge for employees in the industry, and here the AMIEU was found to play a central role in the creation of networks to disseminate such knowledge. The union gathered labour market information from employers and members and facilitated contacts between members to disseminate this labour market information. The union was thus a key actor in the skill ecosystem along with other labour market intermediaries, such as labour hire companies and recruitment agencies. Unlike these labour market intermediaries that tended to be regionally based, the AMIEU provided more comprehensive labour market information covering both Australia and New Zealand — through its links with the NZ Meatworkers' Union — and gave more detail about the kind of work on offer. Union networks in plants and regions also facilitated the movement of members between jobs, helping them find accommodation and meet their daily living needs.

A second feature of the skill ecosystem in the abattoir sector of the meat processing industry is that employment is age-related. The majority of employees (56 per cent) in the sector are under the age of thirty-five years. Younger employees are sought by industry employers because of the physically demanding nature of the work (Smith 2006; Jerrard et al. 2008). The effect on skill development is that there is a continuing high demand for training in the industry owing to large numbers of new entrants, despite plant closures that have seen abattoir numbers reduced by at least 50 per cent since the 1980s. The turnover rate in the industry is very high at 19 per cent per annum and this replacement need, along with the demand for skill upgrading to take on work in new locations, means that there is a continual need for training. This training is not primarily formal training leading to recognised qualifications; rather, it consists of more informal, on-the-job learning. Only 15 per cent of employees in the abattoir sector have a vocational certificate and 81 per cent have no formal post-school qualification at all (DEEWR 2009).

Each meat processing facility has its own training needs and these are typically dealt with in the course of workplace socialisation; inducting new entrants into the working culture of the meat industry and of the particular plant. Here again the AMIEU was found to play a central role in skill development, facilitating the development of familial and social networks that effectively inducted young people into the industry and new employees into plants. The union both

informally and formally organised this induction, workplace socialisation and on-the-job learning by new entrants (Jerrard 2000).

Few companies in the meat industry had comprehensive workforce development policies and programs in place, the exceptions being G. and K. O'Connor in Pakenham, Victoria (Agri-food Industry Skills Council 2006) and Radford Abattoirs, also in Victoria. The latter had developed its policy in conjunction with the AMIEU (Vic). In other companies where training programs did exist, they were primarily driven by the compliance needs of the company. Compliance with government regulation in areas such as Occupational Health and Safety and compliance with externally audited standards such as those for product quality, were most often the drivers of a company training effort, although in the case of G. and K. O'Connor, the training program was aimed specifically at migrant workers whom the company was recruiting as part of a wider de-unionisation strategy (*Sunday* 2001). In most companies the development of key work skills and job-related competencies was done more informally through on-the-job mentoring of new employees by more experienced employees. This was, and continues to be true, where the work is less skilled, such as that on the slaughter floor, in boning and rendering plants. The finding also holds for more specialised lower skilled work, such as that of skin and hide processors, offal processors, chiller and freezer operators, trimmers and packers. In occupations at the intermediate skill level — such as slaughterers and solo butchers — some induction training might be given in recognition of their importance in the slaughtering process, but even here informal and on-the-job training continued to be important. The limited numbers of trades and maintenance workers recruited by abattoirs tended to experience a more formal induction process but to have limited contact with the AMIEU, with union membership more commonly of the Communication, Electrical and Plumbing Union (CEPU) or the Australian Workers' Union (AWU).

Finally, the institutions of the industrial relations system provide an important structuring context in the abattoir sector. They not only determine the conditions of work and benefits that employees receive but they also regulate the relationship between employers and the union. The extent of managerial prerogative in relation to work organisation and skill development, for example, is strongly influenced by the institutions of the industrial relations system and employees in key abattoirs such as Radfords (Victoria), Teys Bros (Queensland and South Australia), Nippon Meat Packers Australia (Queensland and New South Wales) and JBS Swift Australia (Queensland) still have significant levels of unionisation. These firms dominate the Australian red meat processing and export markets and so the influence of the formal institutions of industrial relations is significant in the industry.

Our consideration of the features of the skill ecosystem in meat processing enabled us to identify its critical features. First, locality was found to be important. Employees worked in regional pastoral districts and the skill ecosystem facilitated links among these districts to deal with both the seasonal and cyclical nature of work. Employees in the abattoir sector did not move between regions and cities where work in other sectors of the industry — for example, small goods

manufacturing — was available. Rather, work connected them to multiple locations within the abattoir sector. In this sense, the sector was organised around similar sets of resources in multiple regions and one of the key resources was the AMIEU. Secondly, we established the importance of formal but especially informal networks for skill development and employment. Critical knowledge of labour markets and work skills was disseminated through formal and informal networks and once again the AMIEU played a key role as an intermediary. For most categories of employees in abattoir work, the significance of informal networks in recruiting, training and socialising new entrants to the plant or the industry cannot be underestimated and these networks often involved the union as an intermediary.

The abattoir sector of the meat processing industry demonstrates a skill ecosystem that broadly fits within our definition. Our study of the sector confirms our postulate that this concept can be applied to mature, low technology industries. In our discussion of the skill ecosystem, however, we have given relatively little attention to the structuring and enabling role of institutions, and it is the changes to this institutional context to which we now turn our attention. Major institutional change in the Australian industrial relations system was a factor in the disruption of the skill ecosystem in the abattoir sector of meat processing, creating substantial recruitment problems for employers.

Disrupting the Skill Ecosystem

Skill ecosystems are, as we have seen, self-sustaining arrangements based upon locality and formal and informal networks. The skill ecosystem of the meat industry and the abattoir sector in particular, was disrupted during the 2000s by changes to the labour markets in regional centres and institutional change in the industrial relations system.

This institutional change flowed from the deregulation of industrial relations in Australia following changes to federal legislation and the federal industrial relations system between the late 1990s and the mid-2000s. These changes limited the authority of the federal industrial courts, stripped back the provisions of award conditions in the industry to a minimum and enhanced management prerogative in the setting of employment conditions. Employers were able to end the tally system in abattoirs, for example, thus removing union job control (Stewart 2002). They were able to end closed union shops and exclude unions from their work sites. They were able to offer individual contracts as an alternative to collectively bargained workplace agreements (*Sunday* 2001). Employers used the changes in the industrial relations system to improve their competitive position by cutting wages and hence costs (*Sunday* 2001). Over-award payments in the industry were reduced as employers fought their incorporation into new collective agreements and award conditions were stripped back through the reform process and the use of individual contracts (Jerrard 2000; Stewart 2002). These institutional changes saw a rupture in relations between employers and the meat employees' union (O'Leary and Sheldon 2008). Employers sought to take advantage of the winding back of industrial awards that specified conditions of work and they sought to exploit their new powers under the new legislation

to limit union influence and individualise employment relations (Hawke and Wooden 1998; Jerrard 2006; O'Leary and Sheldon 2008; Stewart 2002; *Work Choices Act 2005*).

Efforts by employers to exclude the union from workplaces and to enforce non-union individual contracts affected the ability of the union to organise the informal networks of members that supported workplace socialisation and informal training and this was compounded by the deteriorating relationship with employers that limited the ability of the union to collect and disseminate knowledge about the labour market. The union role in the skill ecosystem of the industry was severely compromised and this was a significant source of disruption. The informal pathways into abattoir work and the pathways into work across regions were disrupted leading to recruitment problems for employers.

At the same time, as employers were changing the terms of employment in abattoir work and reducing conditions, regional labour markets began to tighten due to competition from the mining industry for labour. The industry was experiencing boom times in Australia with expanding demand from China and rising prices for minerals. While much of the demand for labour in mining was for skilled trades, opportunities did arise for more semi-skilled work that presented an attractive alternative for new entrants to the labour market. Employment in mining offered much more attractive pay and conditions than did that in abattoirs. The effect of these developments was to create recruitment problems for employers across all categories of employees. It became increasingly difficult to source unskilled labour for the meat industry as the conditions of employment declined and the existing, informal pathways into abattoir work were disrupted. Even skilled slaughterers and butchers were attracted by the high pay of lower skilled workers in the mining industry. Furthermore, meatworkers, already used to engaging in 'dirty work' and work that was relatively dangerous, were not deterred by conditions in the mining industry (Jerrard et al. 2008).

The response to the disruption of the skill ecosystem in the abattoir sector was state intervention. The federal government intervened in the industry at the behest of employers to allow the use of guest workers for the first time. Workers were brought to Australia on temporary work visas — subclass 457 visas — for abattoir work. In 2005, for example, around 2000 such visas were issued for slaughterers alone, this from a total abattoir workforce of around 15,000 meat boners, meat slicers and slaughterers. Employers were recreating the skill ecosystem on their own terms by sourcing new entrants to the meat processing industry from outside Australia (Agri-food Industry Skills Council 2008; DEEWR 2009; Grattan 2006).

The importation of guest workers was the strongest response to the destabilisation of the skill ecosystem in abattoir work but an attempt to implement a workforce development strategy was also made in the mainland Australian state of South Australia. Following the intervention of the AMIEU and the employer body MLA, the state government supported a proposal to develop a quality training system for the abattoir sector and improve wages and conditions through the development of formal career paths based upon formal qualifications. This resulted in the development of a school-based new apprenticeship

scheme in some regional areas that brought limited numbers of school leavers into the industry — eleven in the initial intake. This response was a comparatively small program oriented at long-term career development in the abattoir sector and so had little immediate effect on employers' recruitment problems (Jerrard et al. 2008).

The strength of the response to the disruption of the skill ecosystem highlights the extent of employers' recruitment problems. Rather than seek to improve wages and conditions in abattoir work to address these problems, however, employers were able to maintain reduced conditions whilst creating a new pathway into the industry — employer sponsorship of guest workers. Only in one small part of the industry — the regions in South Australia — did the employers as a group attempt to address recruitment problems by addressing job prospects for employees.

Discussion

The concept of a skill ecosystem originated with the study of firms in knowledge intensive industries. The conditions underpinning the development of high skills in emergent high technology industries were its focus. This concept has, however, now been applied beyond such industries and has been found to have applications in established, low technology industries as well as emergent high technology ones.

One of the attractions of the skill ecosystem concept was that it moved discussion of skill development beyond the study of institutions, formal learning and formal qualifications, into the study of networks, formal and informal linkages and formal and informal learning. The concept also sought to bring together the study of training market institutions and networks with that of labour market institutions and networks, so that both the supply side of skill development and the demand side of skill usage could be understood.

Whilst the concept of the skill ecosystem has moved the theory and practice of skill development beyond the study of institutions, this case study serves to remind us of the continuing importance of institutions. The important structuring and enabling role of institutions can be somewhat taken for granted in periods of normalcy when we focus upon the more informal aspects of social organisation, but it is thrown into sharp relief in periods of major institutional crisis or of major institutional change, such as that described here. The ability of skill ecosystems to be self-sustaining is contingent upon a stable institutional context and it would seem that when that context is destabilised, then the skill ecosystem experiences major disruptions.

In the case of the abattoir sector of the meat processing industry, that disruption has led to state intervention to stabilise the ecosystem. The federal government had to intervene through migration policy to ensure a supply of new entrants to the industry and the South Australian state government intervened, through training policy in its jurisdiction, to try and reconstruct a domestic supply of new entrants. State intervention has been critical to the continued functioning of the skill ecosystem in the abattoir sector of the meat processing industry and yet the skill ecosystem concept often gives scant regard to the

important role of the state. The state, through its legislative functions, sets the institutional context within which skill ecosystems develop and it influences the form of the ecosystem through its direct administrative functions. In this case the state intervened in the skill ecosystem through changing the regulations for temporary work visas into Australia and through changing the allocation of public funding for vocational training. The state played a key role in reconstructing the skill ecosystem in abattoir work as employers were unable or unwilling to address the serious problems of skill shortages in their industry.

The case presented here highlights not only the important role of the state, but also that of employee unions. The union role in the abattoir skill ecosystem was based upon its ability to supply information about the demand for labour and skill and its ability to facilitate informal learning and skill development. The union was a trusted intermediary in the skill ecosystem and played an important role in its operation. This role of unions in informal networks that transcend individual workplaces, is slowly becoming evident. Unions have been found to be trusted intermediaries in labour markets and training markets. In the United Kingdom, for example, the former Labour government turned to unions to implement its programs designed to help those with limited formal education into training to develop basic skills. The government funded workplace training to supply skills training but also funded unions to stimulate demand from their members and other employees. The UK Union Learning Representatives (ULRs) played a key role in helping members and non-members into training. The unions were seen as trusted intermediaries who would organise training to meet the needs of individuals and not just those of the company, and they were seen as a source of reliable advice about quality training providers (Clough 2007; Davies 2008; Stuart et al. 2010).

The case of abattoir work in the meat industry thus highlights the unanticipated and unintended consequences of institutional change on skill ecosystems. Employers saw institutional change as an opportunity to cut costs and improve labour efficiency. What they did not see was that whilst trade unions formally represent employees in bargaining over wages and conditions. In this case the union also had an important informal role in the skill ecosystem, providing a clearing house of information about where pastoral seasons had been good and where employment was available. Once the relationship with the union was thrown into question then the networks that sustained the skill ecosystem were also disrupted. It seems that skill ecosystems are fragile in times of major institutional change and that certain institutional contexts may preclude certain kinds of network development.

The case of the meat industry has some implications for the theory of skill ecosystems but also some important implications for practice. Practitioners claim that the skill ecosystem concept represents the development of a third way between market-based approaches and social partnership approaches to skill development. They see the skill ecosystem concept as providing an alternative to the antinomian constructs of liberal market systems and coordinated market systems. These claims rest on the belief that coordination agents in the skill ecosystem can address the externalities endemic to liberal market systems. By

working with all stakeholders in the system, to identify key local resources and develop a plan for the ecosystem, it is felt that coordination agents can improve the training offer in the ecosystem and address externalities such as free riding and poaching. In addition it is seen that such agents can improve the derived demand for skills by employers by influencing the development of more high skilled work designs.

These are substantial claims but ones that rely heavily upon the activity of network coordination agents and overlook the significance of the institutional context or of state intervention. In the absence of institutional support for the engagement of stakeholders in a more voluntarist and liberal market system, it is questionable how effective coordination agents can be. The development of trust is fragile without institutional support and there are no mechanisms to control externalities except mutual good will.

The examples of successful skill ecosystem demonstration projects conducted to date provide little evidence of the long term ability of coordination agents to deal effectively with these problems endemic in liberal market systems. Many of the demonstration projects have been in the public sector where the project funder is also the main employer or they have taken place in small specialised industries and new and emerging industries, such as luxury boat building, where employers have an incentive to cooperate because their skill development needs are currently not catered for through public or private institutions. Where there is effectively a common employer, as in the public sector, or where the training on offer in the training market is limited and employers have an incentive to cooperate, it is not surprising that coordination agents can be effective. Where these conditions do not hold, however, the ability of coordination agents to deal with externalities and to create derived demand for skills remains questionable (Anderson 2010; Windsor 2006; Windsor and Alcorso 2008).

Rather than positing the emergence of a third way in skill development it may be more useful to conceptualise coordination agents in skill ecosystems as a new kind of market intermediary. What is new and unique about their role is the attempt to engage multiple stakeholders and the attempt to understand both the training market and the labour market implications of policy in a particular skill ecosystem. Such agents may play a valuable role mapping skill ecosystems to develop a shared understanding about skill development among stakeholders. They may also play a valuable role in identifying critical ecosystem resources and help develop the training offer in specific ecosystems. However, in the absence of institutional support it is questionable whether they will be any more successful at stimulating derived demand from employers in a voluntarist training system that is allied to a deregulated industrial relations system.

Conclusion

This article has shown that the concept of the skill ecosystem has added to our understanding of the links among training systems, labour markets and employment systems. The concept can be applied to a range of mature and emerging industries, to high and low skill industries. The focus of the concept on the informal as well as the formal linkages between the demand for skill in the labour

market and the supply of skill through training, has enabled the development of new understandings about such linkages. In particular, employee unions emerge as trusted intermediaries in the low skill occupational labour market described here. Unions have important formal and informal roles in the development of skill ecosystems within industries and regions, and this case provides a clear example of this. This role, and especially the more informal network aspects of it, is a subject worthy of further study. Much debate has surrounded the union role in skill development and learning and the significance of this for union renewal, but less attention has been paid to the union role in regional and community renewal through the development of skilled labour pools and the facilitation of pathways into employment.

Despite its evident strengths, the skill ecosystem concept is not without its limitations. One of the limitations is that ecosystem development is dependent upon a relatively stable institutional context. Rather than moving beyond institutions, skill ecosystems are indirectly dependent upon them and are likely to be destabilised by changes in the institutional context. This fragility of skill ecosystems needs to be acknowledged in theory and practice, lest the benefits of ecosystem development become too overstated. Skill ecosystems are contingent constructs and are not necessarily a panacea in all situations. Ecosystems can be destroyed as quickly as they are developed.

The concept of the skill ecosystem also tends to underplay the important role of the state in their creation. The state is important both through its legislative action in setting the institutional context but also in influencing the form of the ecosystem through policy decisions and administrative action. State influence may be direct — through program funding — or indirect — through legislative change. A full understanding of the role of the state is then needed where the direct and indirect influences of the state are seen together

Finally, the development of skill ecosystems relies on the ability of network coordination agents to overcome the limitations to training endemic to more liberal market systems. The engagement of employers can be problematic in more voluntarist liberal market systems and it cannot be assumed that network coordination agents will be effective in all contexts. These agents may, indeed, only be effective under a limited set of conditions and hence the ability of participants to define and develop a skill ecosystem in a particular industry or region may be limited.

The concept of the skill ecosystem can enhance our understanding of the way in which skill development is linked to the demand for skills, but further work is needed to understand the conditions in which it can be deployed successfully.

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