Building Workforce Innovation Capacity in Australia: A Dynamic Economic Framework for Evaluating Two Strategies

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Abstract
Innovation in Australia has become the top national priority in strengthening competitiveness of firms and generating strong economic development. This paper investigates the building of workforce innovation capacity through human resource management (HRM) practices to foster innovation in Australia. Two HRM strategies are identified as having operated in Australia over 40 years. One is a ‘soft’ HRM strategy based on greater worker autonomy; a strategy which dominated in the 1970s and 1980s. The other is a ‘hard’ HRM strategy based on routine worker performance measurement which has increasingly become more relevant since the 1990s and into the 21st Century as the basis for stronger competitive advantage. A dynamic discrete choice model is developed to provide a method for capturing and explaining variations in the relationship between the two strategies and innovation.

This approach reframes the economics of innovation using a unique ‘containment of structure and contingency of agency’ spectrum to explain innovation-successful HRM practices which can account for both internal firm management policies and external-to-the-firm effects of government economic policies. For this reason, this study provides a historical understanding that links effective HRM strategy to building innovation capacity from both firm and government levels. Such experience can assist building a stronger Australian Innovation System so often demanded.

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1. **Introduction**

Innovation in Australia has become the top national economic priority in strengthening competitiveness of firms and generating strong economic development, as strongly argued in the Cutler (2008) report. This paper investigates the role of Human Resource Management (HRM) practices in fostering innovation in Australia by building workforce innovation capacity. More specifically, it examines corresponding HRM practices and industrial relations systems’ policies in promoting the capability of firms to innovate, based on previous work by Cavagnoli (2008; 2011). The crucial role of HRM in innovation has been recently identified by Smith et al. (2011). Their extensive review of the HRM research literature shows that building innovation capacity in the workforce is the crucial factor for successful innovative organisations. For this reason, the Gillard Labor Government announced a ten year innovation policy agenda called ‘Powering Ideas’ which identifies the role of the workforce in innovation by stating:

> Making innovation work requires a workforce with sophisticated skills of all kinds — including leadership and management skills. It also requires cooperative workplaces in which creativity is encouraged. Few organisations command all the skills needed to innovate successfully on their own. (Commonwealth of Australia, 2009, p. 17)

Thus, there is recognition that effective building innovation capacity in the workforce of Australian organisations is crucial for economic development and growth.

In particular, this paper investigates the impact of two distinctly different HRM policies implemented in Australia on the ability of firms to be innovative. This is organisational innovation through HRM strategy. In this context, organisational innovation has been consistently defined as the adoption of an idea or behaviour that is new to the operation of the
business (Daft and Becker, 1978; Damanpour, 1991; Hage, 1999; Wood, 1998). Two questions are asked. What are the two different HRM policies adopted in the recent past in Australia’s businesses and how do they foster innovation? How can this organisational innovation policy experience be used to reframe the economics of innovation by developing a unique dynamic theoretical model to explain innovation-successful HRM practice?

The investigation adopts a HRM-Innovation conceptual framework developed by Cavagnoli (2011) to appreciate successful HRM practices and recognise failures as well. This framework is based on a ‘containment of structure and contingency of agency’ spectrum that enables the investigators to distinguish between what are described as ‘soft’ persuasive HRM policies and ‘hard’ managerialist HRM policies, in the context of how they support innovation in Australia.

Recent research has found a positive relationship between HRM policies, organisational innovation, innovations and business performance (Ceylan, 2013; Perdomo-Ortiza et al., 2009; Jiménez-Jiménez and Sanz-Valle, 2008). While this study finds that this was true in the 1980s and 1990s, it was not so in the early 2000s. It is argued that there is a positive relationship between HRM policies and organisational innovation only if the ‘soft’ approach is applied to HRM policies. The problem in Australia emerges when the ‘hard standardise practices’ approach dominates the business scene. These findings are then modelled in an exploratory dynamic economic approach which allows in future studies to conduct empirical estimations to validate the theoretical model.

Insights from this study provide a framework that can be used to develop guidelines for future private and public organisational innovation policies. Such insights emerge from the
experience of Australia in building innovation capacity. A systematic approach based on the framework developed in this paper would assist in recognising and sustaining the expected benefits from the firms’ investment in both R&D (Research and Development) and commercialisation of innovations into the long term by implementing appropriate organisational innovation strategies. Thus, the framework developed here provides for a better ‘alignment’ of organisational innovation policies to the expected benefits from innovation.

This paper is divided in the following sections. Section 2 reviews the organisational innovation literature with respect to firm performance. This provides the theoretical justification of the study. Section 3 places this study within the Australian innovation and the two dominant (soft and hard) HRM strategies on the cusp of economic and political change through the late 20th Century and into the early 21st Century, prior to the 2007-2009 Global Financial Crisis (GFC). A statistical analysis follows in Section 4 on the types of innovations introduced by Australian businesses. In Section 5, the two distinct HRM strategies are statistically related to organisational innovation and productivity. The shift from soft to hard HRM practices is discussed in Section 6 in relation to whether it has increased or decreased innovation capacity. Then, the dynamic theoretical model is developed from the above analysis in Section 7, followed by a conclusion outlining the implications for innovation policies in Australian firms and for public policy support.

2. HRM practices and firm performance – an organisational innovation approach

In a review of the research literature on organisational innovation policies (and implementation practices) with firm performance outcomes, Wood (1999) shows that implementing such policies through recognisable HRM practices enhances firm
competitiveness. It is quite clear in the literature that individual HRM practices, as Barney (1995, p. 56) says, ‘…have limited ability to generate competitive advantage in isolation’. Thus, the emphasis in practice is around HRM systems implemented via a coherent policy setting. The question then becomes one in which the form that this systematic approach to HRM policies takes within the organisation is crucial in order for the firm to be competitive.

Since the 1980s there has been a move towards a systematic approach to induce organisational innovation. The approach aims to manage workplaces in their entirety, and with a clear function of management. This systematic approach devolved to all functions and levels of management, including HRM (Hendry and Pettigrew, 1986). A clear ‘business strategy’ is the element that ties the function of HRM in theoretical and practical terms with other ‘business strategies’ that help to ensure the success of business; especially when considering the increasingly competitive market that firms have had to deal with (Dowling and Shuler, 1990; Lundy and Cowling, 1996). Thus, HRM policies are focused on increasing organisational performance and commitment for stronger firm competitiveness (Spreitzer, 1995; Piore and Sabel, 1984; Walton, 1985; Mathews, 1989; Burgess and Macdonald, 1990; Fieldes and Bramble, 1992; Campbell, 1993; Atkinson and Gregory, 1986; Bray et al., 2005). The aim is to connect workplace practices with other functions, such as finance, production and marketing. In this way HRM practices support increase sales, profitability, stakeholders’ satisfaction, reputation, market share, strategic partnerships, customer satisfaction, and leadership in domestic markets and abroad.

Within this systematic approach, two HRM models of practice have emerged in the literature. One model highlights the importance of careful selection and recruitment, performance management, rewards and training, so as to secure employee commitment to the firm, and
thus better business outcomes (Beer et al., 1984; Walton, 1985; Rainbird, 1994). HRM practices framed around such a model are known as ‘soft’, as they emphasise universal and prescriptive ways of managing employees to yield the desired outcomes for enterprises. In the industrial relations literature this approach is known as ‘pluralist’, in that HRM focuses more on persuasion and coordination, with conflict being legitimate but resolved through collective bargaining (Guest, 1999).

The other model links HRM practices directly contingent on business strategy with the commercial circumstances that require a best ‘fit’ (Fombrun et al., 1984; Legge, 1995). These models are known as ‘hard’, as they emphasise strategic intent in managing employees. Industrial relations recognises this as ‘unitarist’, in that HRM focuses more on developing work systems with employees that share with management common strategic objectives of the firm (Guest, 1999). This hard approach led to the development of high performance work systems such as total quality management, formal team working, job rotation, and employee involvement programs (Colombo et al., 2007) as epitomised by the Japanese ‘lean production’ system (Smith et al., 2011, p. 14).

To understand how HRM policies can induce organisations to be innovative, the above HRM models need to be examined in the light of management studies on implementing organisational innovation. Such studies show that senior executives influence the building of innovation capacity by creating a favourable climate towards creativity and innovative activity (Damanpour, 1991; Dewar and Dutton; 1986; Daft, 2001; Elenkov et al., 2005). Top executives’ favourable attitude toward innovation facilitates the initiation of new ideas (Mumford, 2000), while ‘transformational’ leadership skills (Bordin et al., 2007; Bartram and Casimir, 2007) provide the mechanism to empower employees and promote constant
interaction within the business organisation (Hambrick, 1994). This executive leadership via HRM enables employees with innovative oriented skills to increase job satisfaction and decrease work-related stress (Bunce and West, 1996). For example, job design is the HRM policy type where companies allow employees to have spare time (or thinking space) for developing new ideas; this includes working with tolerance, flexibility in job definition, autonomy, employee participation, and ‘fluency’ in communication (Kanter, 1983; Kydd and Oppenheim, 1990, Axtell et al., 2000). Such research implies that the soft/pluralist HRM strategy offers the organisation a wider set of creative options vis-à-vis the strategically focused hard/unitarist HRM strategy.

HRM practices are not aimed at specifically and directly promoting innovation. They are aimed at improving firm performance at every level of the organisation, with innovation being the emphasis on new creative and technical superior products and processes. Improving performance has always been on the business agenda. However, it has only been since the 1960s that notions of corporate strategy emerged as a form of planning for improved firm performance (Tidd and Bessant, 2009, p. 165). Planning meant introducing strategies for achieving specified outcomes, within specified timelines and with specified resources. In this context, HRM practices have varied over time according to the style of strategic management and the organisational structure of the firm that materialised as a result. Innovation outcomes merely reflected this wider strategic focus of the organisation. For example, in the 1980s and 1990s innovations included flexible manufacturing robotics, automated handling of materials, computer numerically controlled machines, and ship automation (Allen and Cohen, 1969; Collins et al., 1987; Teece, 1987; Walton 1987).
Innovations were ‘radical’ and most typically in terms of advanced manufacturing technologies. In the 1990s some of the most interesting radical innovations were occurring in the components of assembled products. To take cars as one example, there was the introduction of air bags, anti-lock disk brakes, geographical positioning systems, and fuel efficient engines. In the same two decades, radical innovations were also found in what are called large-scale technical systems such as electrical, railroad, and telephone systems. Other innovations include nuclear energy, high-speed trains, and coaxial cables, satellite television and internet.

Final element in the firm’s performance and innovation has to do with the external environment faced. Studies in the 1980s and 1990s show that the adoption of innovations is problematic because to be successful the business has to also deal with external changes. The market or sector within which the organisation operates is found to be critical to its ability to innovate (Tornatzky and Fleischer, 1990). The cultural, societal, political or geographical conditions affect opportunities and the exchange of information with the environment necessary to improve knowledge of events and trends (Wejnert, 2002), as well as to initiate change and propose new ideas for adoption. The adoption of innovations has to deal directly, for example, with the issue of unemployment and national standards of living.

In sum, HRM policies and their implementation practices change over time depending on the firm’s wider business strategy and their implications for organisational innovation which can vary from hard/unitarist to soft/pluralist. As well, the political, social and cultural external environment matters in how this affects the willingness and ability to innovate. Given that the link between innovation and HRM is mediated by the both firm strategy and the external environment, it is not possible to develop a strong positivist structural model that can directly
correlate the two. Instead, the approach taken in this study is to compare (using available secondary data) HRM practices and their success on a variety of levels (notably innovation outcomes, productivity and low unemployment) to identify patterns that relate to pluralist/unitarist internal strategies and their links to the external environment. Specifically, this study examines the internal strategies in the context of the national Australian economic environment.

3. Two strategies in the Australian HRM policy environment

The mainstream approach to HRM policies, based on the neoclassical economic model, argues that firm competitiveness requires deregulation of the workplace (Michie, 2010). Successive Australian governments accepted this approach, with workplace flexibility and deregulation slowly developing as the long-standing regulated award structure began to be restructured from the late 1980s. This process of award restructuring was revamped and further deregulated by the newly installed Howard Coalition Government in 1996. Finally in 2005, *WorkChoices* was introduced with a strong emphasis on flexibility at work (Fetter and Mitchell, 2004; Burgess and Campbell, 1998; Campbell, 2002; Peetz et al., 2003; Alexander et al., 2008). The process of labour market and workplace deregulation aims to bring about increased employees’ work participation, challenging tasks, and a more flexible division of labour.

The push for competitive environments has been the key role for flexibility and deregulation in HRM practices. This has been argued to be a more ‘understanding’ approach to management policies with less routine, more training, greater career opportunities, and rewards according to labour skills and productivity. As a result, in Australia the trade protected mass manufacturing production secondary sector built up in the immediate post-
World War II by employing primarily semi-skilled migrant workers was progressively dismantled. Instead, adoption of the neoliberal agenda of free trade and floating exchange rates required a shift to more specialised high quality technology-based manufacturing sector. This shift through the 1970s and 1980s necessitated a HRM strategy around high skilled and motivated labour in firms, with strong participation by both employees and management (Bray et al., 2005). This soft/pluralist HRM approach allowed for greater workplace autonomy with potential opportunity for building innovation capacity required in the paradigm shift from protected to global markets (Courvisanos, 2012).

The deep recession of the early 1990s created fear and instability amongst employers and workers so that firms took advantage of the more deregulated environment to implement a more conservative and cost effective approach to production, involving downsizing and utilising casual employees and contractors. This cost minimising approach to labour practices of the 1990s emphasised a more hard/unitarist approach to firms’ management practices and industrial relations policies (Macdonald et al., 2001). Thus with support of government, Australian firms adopted high performance work HRM practices, and in 1996 individual Australian Workplace Agreements (AWAs) were installed to further this process. AWAs were a technique to create a high level of commitment, teamwork, information sharing and employee involvement, and thereby aiming to offer excellent terms and conditions (Wooden, 2000). With the unitarist HRM strategy being primarily implemented after the recession of the early 1990s, it raises the issue as to whether organisational innovation has evolved through this post-1990 unitarist approach.

While hard innovation is associated with HRM practices based around ‘…employee welfare notions that underpin the traditional bureaucratic “people processing” approach to human
resource management’ (Smith et al., 2011, p. 12), increased global competition in the 1980s changed HRM practices towards emphasising skills and abilities of employees as a source of competitive advantage (Barney, 1991). The pluralist approach in the 1980s gave way to a more unitarist approach through the 1990s. While the growth in Australian productivity was a feature of the 1980s up to the early 1990s, this growth has been static and slow for the last two decades, even before the GFC-induced downturn in late 2008. However, the impact on innovation of the pluralist and unitarist approaches to HRM policies is what this paper aims to clarify.

In sum, there are two distinct relationships to consider in the Australian context that relate to commitment and flexibility in the workplace. On the one hand, there are the pluralist HRM policies of the 1980s in concert with technology-based innovation. On the other hand, the unitarist HRM policies that emerged in Australia during the 1990s are associated with cost minimising organisational and incremental change. In both instances, it can be said that firms were addressing the issue of firm competitiveness, but whether this shift in HRM policies actually increased or decreased the organisation’s capacity to innovate is investigated after the state of innovation in Australian businesses is set out below.

4. Innovation in Australian businesses

Australian statistics on innovative businesses are presented in the expectation of finding some pattern between implementation of HRM policies and organisational innovation in general. In particular, this section attempts to identify relationship between business investment in organisational innovation and outcomes like novelty in products, changes in processes and impact on gross domestic product (GDP).
One challenge arises when relating innovation as discussed above to the Australian statistics available. In strict theoretical terms ‘innovation’ is understood as the ‘…creative application of knowledge in a new form to increase the set of techniques and products commercially available’ (Courvisanos, 2012, p. 7); the former being process innovation, and the latter product innovation. The Australian Bureau of Statistics (ABS), which collects the innovation data, has two practical approaches to measuring ‘innovation’.

One approach the ABS adopts is in terms of ‘innovators’ that introduce or implement at least one of the following four types of innovative activities: (i) any novelty arising from new or significantly improved goods or services which result in product innovation – for example, a change in materials such as a breathable textile material, or the introduction of an internet bill payment system, or minor incremental alterations to the product; (ii) new operational processes where the methods of producing or delivering goods or services result in process innovation – for example, the digitalisation of printing processes, or the introduction of an automated ticketing system; (iii) new organisational/managerial innovation process (meaning strategies, structures or routines that aim to improve business performance) – for example, changing corporate directions, or significant workplace reorganisation; (iv) marketing methods where marketing and sales departments develop persuasive strategies to ensure commercial potential of new projects – for example, advertising campaigns, while also critical analysing such commercial potential through marketing research (see ABS, 2008-9; AIS, 2010). This broad ‘activities’ approach to measuring innovation is consistent with the theoretical definition quoted above.

The other approach adopted by ABS relates to the term ‘novelty of goods or services’ and applying it in terms of the level of ‘newness’. There are four levels defined:(i) ‘new to the
business’ only, (ii) ‘new to the industry’ in Australia; (iii) ‘new to Australia’ only; and (iv) new to the world (ABS, 2005). In this context, there is no doubt that the last three levels of ‘newness’ are clearly consistent with the theoretical definition of innovation. However, the level described as ‘new to the business’ is highly problematic as a measure of ‘innovation’, as it represents reproduction of goods that are already in the marketplace through the use of adoptive or imitative strategies (AIS, 2011, p. 26).

This could involve using existing off-the-shelf technology inputs not used before in the firm which could be seen as technology diffusion, or making small incremental improvements in their products that have already been introduced by the firm’s competitors which could be seen as product differentiation. This is different to introducing organisational/management innovative activities that are ‘new to the business’. Although this involves implementing in a firm for the first time well-understood forms of operational or organisational change previously adopted by other businesses, the outcome is transformational to the firm, and thus consistent with the term ‘innovation’. If the product differentiation activity requires some organisational change to make the ‘new’ product profitable, then that would be consistent with ‘innovation’ too.

The statistical overview of ‘innovation’ in Australian businesses begins at the broadest level of goods and services with Figure 1. This shows the proportion of businesses introducing ‘novelty’ to goods or services between 2002/3 and 2004/5, which is well before the GFC-induced ‘Great Recession’. In 2004/5, the number of businesses introducing ‘New to the industry’ goods or services was about 2,300 compared to 3,100 businesses in 2002/3. The total number of estimated businesses under ‘New to Australia’ and ‘New to the world’ also decreased over this period. Proportions for all these three types are well below 20% of all
businesses in Australia. Only ‘New to business’ shows an increase over this period of about 20% (from just under 60% in 2002/3), and this is made up of differentiation, diffusion, marginal incremental and marketing methods.

As expected with the onset of the GFC, the figures for 2006/7 to 2008/9 show further decline in all three levels of ‘newness’ that are truly innovative, with ‘new to the business’ rising to over 80% (ABS, 2010). The latter rise reflects competitive pressures felt by respondents still in business, needing to be flexible to survive.

The AIS (Australian Innovation System) Report (AIS, 2011, p. 26) argues this may ‘…contribute to specialisation of existing markets, [but] it will not necessarily create or confer any “first-mover” competitive advantage.’ From such data the picture emerges that there is little ability or incentive to invest in the high risk and strong uncertainty that true innovation would produce (Courvisanos, 1996). This sets the scene in that Australian businesses are competitive to a limited extent within their own industry, yet increasingly unwilling or unable to commit to innovation.

Focusing on innovation and not ‘me-tooism’ competition, Figure 2 reports ABS innovation data for three financial years from 2005/6 to 2007/8 (ABS, 2010). It shows proportions of all Australian businesses that are ‘innovators’ by conducting any form of innovative activity in the period just prior to the GFC. The most common type of innovative activity in 2007/8 was new product goods or services at 21.9% of businesses, up 3.2% points from 2006/7, but only 2.6% up from 2005/6.
Businesses reporting new operational processes rose slightly from 17% in 2006/7 to 17.6% in 2007/8 (3.2% less 2005/6), while 19% of businesses reported new organisational and managerial processes, up 2.5% points from 2006/7 (1.7% less 2005/6). Thus, HRM-based innovative activities can be seen in terms of operational and managerial processes which occupy around 40% in total.

The remaining 14.6% reported is new marketing methods, up 1.7% points from 2006/7 (only 0.3% more than 2005/6). Note that while Figure 1 shows about 75% ‘New to business’ of all firms with goods and services in 2004/5, Figure 2 shows 19.3% only actual goods and services innovation for 2005/6 for all business innovators, from new to firm and right up to new to world. The vast chasm between the two percentage figures is made up of firm competitive behaviour that is not innovative.

[Insert Figure 2 here]

Overall, although all businesses showed some increase from 2007/8 compared to 2006/7 in Figure 2, this increase in effect brought the proportion of innovative businesses back to 2005/6 levels. Pre-GFC, only 39.1% of Australian businesses reported the introduction or implementation of at least one type of innovation, slightly higher than in 2005/6 (at 38.9%).

The ABS noted that ‘…only a third of Australian firms innovate, and that the figure has remained unchanged for many years’ (ABS, 2010, p 9). This proportion has remained virtually unchanged in the period post-GFC of 2009/10 (AIS, 2011, p. 58), as shown in Figure 3. This is despite the fact that Australia emerged from the GFC in 2009 without the GDP growth rate falling into negative territory as in almost all developed economies,
followed by a sharp rise in the GDP growth rate by late 2009 (see Courvisanos, 2012, p. 84). Thus, viewing the proportion of innovation-active firms over the period 2005/6 and 2009/10 there was a positive but quite low annual growth rate of about 0.7% per year (AIS, 2011, p. 57). Further, for this whole period the proportions between types of innovative activities have also remained roughly unchanged and in almost all firm sizes as well (AIS, 2011, p. 26).

Firm size in Australian innovative activities does matter, as is clearly evident in Figure 4. The vast majority of innovative activities introduced in the last year before the GFC in 2007/8 was by large corporations (200 employees and over). In fact 65.9% of all large firms were innovative (see the outer purple line) compared to only 31.6% of all microbusinesses that have 0-4 employees, which is represented by the inner blue line (AIS, 2010, p. 18).

From Figure 4 one can see a significant difference between Small-to-Medium Enterprises (SMEs) that have less than 200 employees and large firms, particularly in international modifications. Since virtually all large firms are multinationals, they are more than twice as likely to modify innovations already available on international markets and then sell them on to international markets. Large firms are also up to five times more likely to introduce innovations new to the domestic markets than SMEs (AIS, 2011, p. 21). Consistent with the previous statistics in this section, Figure 4 shows that domestic modification of innovations already introduced elsewhere in the world is by far the most common way Australian firms ‘innovate’ (AIS, 2011, p. 21).
The 2011 AIS Report argues that the modification type of Australian ‘specialisation’ in innovation dictates R&D investment. This means R&D should be targeted towards incremental modification rather than creation of totally new goods and services. AIS (2010, p. 17) shows that Australian Business Expenditures on Research and Development (BERD) increased between 1998/9 and 2007/8 in absolute terms, from just over $4 million to nearly $14.5 million; increasing 0.6% of GDP over this period. This resulted in a decrease in the BERD/GDP gap by 0.78% points compared to average BERD/GDP for the OECD (Organisation for Economic Co-operation and Development) group of 28 advanced economies. Even though Australia was still below the OECD in 2008, the nearly 60% BERD/GDP gap reduction over the period is a strong support for R&D spending in Australia from a low base. However, comparing this data to Figure 2, the conclusion can be drawn that this R&D expenditures were primarily allocated during this period to operational process and organisational/managerial innovations.

In summary, the ABS statistics reported above consistently show that in the two decades from the deep recession in the early 1990s, innovation in Australia has been incremental and involved more or less continuous small modifications and improvements in processes rather than products. Major technological breakthroughs have been eschewed. In particular, most of the innovations implemented involved organisational process, and organisational/managerial innovations. In the early 2000s, of the 35% of Australian businesses that undertook any form of innovation activity, operational process innovation and organisational/managerial innovation, had more than 20% of that share, while innovation in goods and/or services was reported at 16%, a significantly lower proportion (ABS, 2005-6). In the late 2000s, in these businesses, operational process innovation and organisational/managerial innovation
grew to about 22% and 25% respectively, while innovation in goods and/or services was about 20% (ABS, 2008-9).

Linking to the question on the role of HRM in fostering innovation, the above data set up the background that innovative activities in Australia are heavily skewed towards HRM-related operational and managerial functions, while technology-based innovation tends to be limited, incremental and marginal that only concentrates on modifying existing technology. Further, the majority of the managerial and organisational innovations have occurred in manufacturing, communication, wholesale trade, property, and finance industries (ABS, 2005). This is a surprising trend as in the past these industries were renowned as implementing technology-based innovation, especially for new goods and services (ABS, 2008-9). The trend raises the crucial question in this paper of whether the shift since the early 1990s recession to a more hard/unitarist approach in firms’ management practices and industrial relations policies is related to the innovation outcomes described above.

5. Organisational innovation, HRM policies and productivity in Australia

The framework of innovation in Courvisanos (2012, p. 95) shows implementation of HRM and technological (essentially R&D) management practices co-determine firm’s innovation capacity. Together these two innovation management strands account for all of knowledge-based intangible investment that underpins innovation. The AIS Report (AIS, 2005, p. 1) notes that Australia’s intangible investment and its spill-over benefits (known technically as multifactor productivity, or MFP) account for 62% of Australia’s productivity growth between 1994/5 and 2004/5. In this way, MFP measures at a given technological level of ‘progress’, the changes in output per unit of all inputs combined, reflecting the joint effect of all factors of production as well as organisation of production (i.e. organisational innovation).
As noted above, since the early 1990s there has been limited product innovation by entrepreneurs investing through R&D and other creative inputs to be the ‘…first to avail themselves of the technical novelties’ and thus adding a new level of demand (Kalecki [1968] 1991, p. 442). As a result in Australia, the alternative avenue has been through increased productivity in the form of process innovation, particularly non-technological organisational and managerial processes which allow market demand to be met more effectively. The literature review in Section 2 shows that HRM practices are the enabler for this to occur by building innovation capacity in the organisation.

Green (2009) examined management practices in Australian manufacturing firms against the global best and finds that there is a clear link between the quality of management – scored across 18 dimensions of people, performance and operations – and productivity (Green, 2009). This is where HRM strategy matters for innovation, via the link by which human capital formation in organisations builds innovation capacity (Courvisanos, 2012, pp. 91-129). The productivity-innovation link via HRM as supported by the studies in Section 2, thus, the focus here is between BERD which in Australia has been focused strongly on organisational innovation involving HRM, and outcomes in productivity.

In the context of productivity-innovation link, the growth in Australia’s MFP as seen in Figure 5 needs examination. Figure 5 shows a significant productivity growth in the 1990s; however, since then, growth has stalled and declined slightly. This pattern needs to be linked to BERD.

[Insert Figure 5 here]
In order to investigate changes in the rate of return to investment in BERD, first the relationship between investments and GDP growth is examined. Figure 6 shows the correlation between GDP and BERD growth rates, which is positive, as expected from the literature.

[Insert Figure 6 here]

Second, the changes in the proportion of BERD relative to GDP are plotted. This reveals changes in BERD investment as a proportion of output, which as expected show growth pre-GFC (as mentioned in AIS, 2011). Figure 7 shows the positive rate of growth in BERD as a proportion of GDP (i.e. ratio BERD/GDP) during the period, 1992-2010.

[Insert Figure 7 here]

In summary, the relationship between BERD and GDP growth rates is positive, and investment in BERD is increasing as a proportion of GDP. The issue raised in this section is whether Australia’s specialisation in incremental innovation (spurred by investment in organisational innovation) also increases productivity. Figure 8 shows that MFP for aggregate of all industries was increasing from 1994/95 to 2003/04, and then decreasing rapidly onwards through to 2010/11. When productivity is in decline, then investment in BERD is not delivering the expected outcome. As a result, the rate of return to investment in BERD has been decreasing in the most recent period of available data. This raises serious questions in relation to the argument that Australian specialisation in incremental innovation is crucially important to foster growth and profitability.
When examining the picture that emerges from the statistics above, the historical account of the HRM policy environment set out in Section 3 comes clearer in focus. Specialisation did increase the capabilities to innovate in the 1980s and, with a time lag in the 1990s, based on the soft/pluralist HRM strategy. This coincides with increasing productivity up to the late 1990s. The data presented in this section indicate a pattern related to the hard/unitarist HRM policies introduced to induce organisational innovation – in terms of deregulation and specialisation of the workplace – with increasingly greater force since the 1990s, but significantly emphasised in the first decade of the 21st Century. These patterns show increasing costs of implementing these changes relative to the expected revenues, and relative to the expectation from the neoliberal policy makers who pushed strongly for this form of HRM strategy to take effect. This link has been broken in the 2000s. In the following section the findings are discussed by investigating historical changes in the Australian HRM system to identify the causes and explain the results with a conceptual framework.

6. Discussion

The soft/pluralist approach was at the foundation of the post-Fordist management practices developed in the 1980s (Piore and Sabel, 1984; Burstein and Linger, 2003). The hard/unitarist approach was at the foundation of the neo-managerialist management practices of the 1990s and 2000s (Brewster et al., 1997). Both approaches supported deregulation and specialisation as a neoliberal reaction to the regulated Fordist era. Yet, whereas pluralism relied on greater workplace autonomy and flexibility, unitarism concentrated on strategic lean worksystems. Using the Cavagnoli (2011) framework, unitarism tends to increase tight systems of control through high performance work systems that aim at ‘containment’ of human action. This increases negative stress in the workplace, especially in times of growing
uncertainty and crises. On the other hand, pluralism tends to negative stress based around intricate and complex workplace arrangements that aim at ‘contingency’ of human action.

Within this framework, management strategies in the 1980s, underlined by post-Fordist practices, were closely linked to industrial relations strategies (Thurley and Wood, 1983). However, HRM policies were not so. This created a gap between pluralist industrial relations and soft HRM strategies, which affected the process of alignment of HRM policies to the ‘business strategies’ and to the way workplace policies were planned and implemented. The solution arrived at in the 1990s was unitarist industrial relations strategies linked to hard HRM strategies. In this way, improved performance in the workplace through unitarist management policies were able to be aligned to the ‘expected-by-the government’ outcomes from macroeconomic policies of international trade. Firms’ HRM policies were thus better connected to neoliberal economic policies such that firms and the country can be competitive internationally.

By the late 1980s it was clear that industrial relations policies did not have to have a ‘fixed’ institutional approach to workplace policies, and management had a role in managing the costs of labour and other resources, to induce change. For example, a more ‘flexible’ (but hard unitarist) industrial relations system made possible for management to control labour and production costs, where product price was important for sales (Sappey et al., 2006, p. 44). Thus, the relationship between management and industrial relations policies was transformed. More hard proactive industrial relations policies were developed to render changes in the workplace more ‘flexible’ for management. This unitarist approach highlights
a different strategic gap, between hard HRM/industrial relations policies and the expected flexibility in external-to-the-firm competitive advantage environment. The gap reflects a problem that needs to be negotiated by all market-based economies seeking to sustain strong economic growth like China. This problem affects the expected proportion of costs for the use of labour and other resources, relative to the revenues.

The statistical analysis on Australia above indicates that changes in the conditions of the external environment, in particular in the cost of affecting hard HRM policies to promote organisational innovation are affecting the firms’ productivity and innovation outcomes. Whereas the soft/pluralist HRM policies provided organisational innovation capacity that increased productivity as contingency was enhanced, it created for management negative stress through intricate and complex workplace arrangements that limited their ability to control the profit-making competitive situation. Issues with possible ‘tight’ labour markets and ‘rigid’ contracts for hiring labour were particularly noted as negative stress. This was particularly felt in the early 1990s deep economic downturn. Management had to deal with external changes that affected the costs of obtaining inputs (i.e. highly-skilled, professional employees as well as information). Thus, the hard/unitarist HRM policy strategy was developed and increasingly implemented through the late 1990s and with increased vigour in the first half of the 2000s.

Well before the onset of the GFC, the 2000s evidenced productivity falling in Australia, despite continued rises in organisational-based R&D expenditures, with mostly domestic modifications going on as innovation outcomes. Thus, both in terms of quality of innovation (innovation types) and quantity of innovation (reflected in productivity), the results of higher BERD have not been ‘paying dividends’. This concern was echoed in the Cutler (2008)
report on Australia’s Innovation System that was released only a few days prior to the Lehmann Brothers initiated GFC-collapse that drowned out these innovation problems. The hard/unitarist HRM policy strategy pushed strongly by the Howard Coalition Government (up until its demise in 2007) and enacted by its affiliates in business, created in the workplace increasing negative stress detrimental to innovation that was also exacerbated with the arrival of the GFC and increased public uncertainty about the future.

From the analysis in this paper, the unitarist strategy results in costs rising due to a very ‘flexible’ structure of labour contracts, with the hiring of contractors or outsourcing being much more expensive than what it was with the cost of hiring specialised labour in the 1980s under a pluralist strategy. It may well be that these costs are a result of more decentralised, less formalised and less specialised labour market under organisational negative stress that limits quantity and quality of innovation.

The Cavagnoli (2011) conceptual framework for innovation clearly identifies the negative stresses for inducing innovation from both contingency ‘soft’ and containment ‘hard’. Complexity from the first and procedural measurement from the second; these are the two distinct stresses that can restraint innovation capacity. The challenge that businesses in Australia need to address is the best way to balance the containment-contingency stresses. So far such sensitivity to opposing forces has not been considered, and the political economy environment in which political parties in Australia tend to talk opposing positions on workplace issues, does not provide any assurances that such sensitivity to innovation support can arise in the near-to-medium future.
7. A discrete dynamic model with a random innovation component

Given the organisational innovation policy experience analysed above, a discrete dynamic economic model is developed in this section to provide a transferable explanation for building workforce innovation capacity in an organisation. The conceptual framework described in the previous section is modelled against the organisational investment behaviour as it affects innovation output. Investment behaviour is viewed in three states of HRM practice, each leading to distinct innovation outputs. The first is a ‘hypothetical’ organisational innovation state in which expected and actual innovation output, measured by MFP, are equal. The other two states reflect situations where expected MFP is less than (below) or greater than (above) actual MFP. The underlying assumption is that innovation output is conditional to investment stemming from the three states of organisational innovation that are embedded in different HRM models of practice. A discrete approach to the specification and estimation of innovation output functions is proposed. These functions are assumed to consist of a deterministic innovation component with random distribution. This implies that each organisation has a random probability distribution over the available investment levels.

Based on the discussion in the previous section, different states of HRM practice are founded on distinct HRM and innovation investment policies, and that these in turn affect the costs for innovation investments and hence the MFP associated with these investment choices. Thus, the ‘hypothetical’ HRM state is obtained with the use of all the expected production factors in proportions that reflect firms’ investment choices. Innovation output changes in this ‘hypothetical’ state are fairly simple to interpret.

Variations in MFP are measured as follows: INN for investment output level $I_i$, gives rise to
$MFP_i$ under HRM state $HRM_k$, which is equal to a deterministic component $INN(MFP_i)_k$ plus random innovation component $v_i$, so that:

$$INN_{i,k} = INN(MFP_i)_k + v_i$$

The advantage of this approach is that it is only necessary to compute a difference in the rate of MFP corresponding to a specified investment level (I), at the ‘expected’ (as if in the hypothetical state) multifactor productivity rate. See the illustrated example in Figure 9.

[Insert Figure 9 here]

As per Figure 9, the distribution of the random component reflects an ‘Extreme Value type I’ distribution, with investment levels in the three HRM states, at different points in time. Assuming that $(INN)$ is the dependent variable and that innovation output is compared at different points in time (i.e. under the three HRM states of practice), then MFP can also be compared at different points in time. Variations in MFP can be captured in this model. As MFP is equal to innovation output divided by a weighted average of input costs (i.e. investment in organisational innovation), variations in MFP reflect changes in the costs of investment in innovation. In this model there is also the distribution of a random innovation output component ($v$). The random term is expected to be the same in the three HRM states, in terms of ‘before and after the HRM changes’, as it would be expected if costs are proportional, or constant, with respect to $INN$ output growth rate.

In this illustrative simple model, tax and other policy changes are excluded, as are measures of the responsiveness of firms to changes in costs. Variations in actual MFP shown in Figure 9 reflect movements away from expected behaviour of the random term. In this way, these variations reflect changes in shares of input costs relative to ‘expected’ total cost of inputs.
Using the Australian historical analysis from the previous sections, the 1980s-to-early 1990s soft/pluralist HRM state of practice is assigned the term $HRM_0$. Investment level 2 ($I_2$), which reflects more investment in organisational innovation and corresponding to innovation output ($INN_{2,0}$), will be chosen if $INN_{2,0} > INN_{1,0}$ (i.e. innovation output in $HRM_0$, with investment level 1, $I_1$). The following inequality is then true:

$$INN_{2,0} = INN(MFP_2)_{0} + v_2 > INN_{1,0} = INN(MFP_1)_{0} + v_1$$

From mid-1990s onwards, the HRM state changes to a hard/unitarist strategy with less regulation in the labour market and wage system, this is assigned the term $HRM_1$. Then, $I_2$ (investment level 2) in $HRM_1$ will be chosen, if innovation output in this HRM state 1 ($INN_{2,1}$) is greater than with $I_1$ (investment level 1) with $INN_{1,1}$, as per the following inequality:

$$INN_{2,1} = INN(MFP_2)_{1} + v_2 > INN_{1,1} = INN(MFP_1)_{1} + v_1$$

$I_1$ is chosen if the inequality is reversed. That is, if $INN_{2,1} < INN_{1,1}$. $I_2$ in another $HRM_2$ state will be chosen if innovation output is greater than with $I_2$ in $HRM_1$, and the following inequality is true:

$$INN_{2,2} = INN(MFP_2)_{2} + v_2 > INN_{2,1} = INN(MFP_2)_{1} + v_2$$

$I_1$ will be chosen if the inequality is reversed, $INN_{2,2} < INN_{2,1}$. However, for innovation output to be greater in $HRM_2$ when compared to output in $HRM_0$ and $HRM_1$, then $I_2$, in $HRM_2$ will be chosen only if the difference (or inequality) between innovation output in $HRM_2$ and $HRM_1$ is lower than the difference (or inequality) between innovation output in $HRM_1$ and $HRM_0$, as per the following:

$$(INN_{2,2} - INN_{2,1}) > (INN_{2,1} - INN_{2,0})$$

and hence, where
\[
INN_{2,1} = INN(MFP_2)_1 + v_2 > INN_{1,1} = INN(MFP_1)_1 + v_1
\]

and

\[
INN_{2,2} = INN(MFP_2)_2 + v_2 > INN_{2,1} = INN(MFP_2)_1 + v_2
\]

\(I_2\) is expected to deliver a MFP that is greater than a MFP with \(I_1\) in all HRM states (0, 1 and 2). Hence, the rate at which MFP increases is expected to be positive and increasing. However, as the historical statistics in the previous sections show, this is not the case, as MFP in recent HRM states has decreased. The analysis in this section depicts clearly the dilemma in the containment-contingency spectrum which the neoclassical economic model cannot address.

More generally, if there are a number of investment options, assuming that a level of investment \(I_m\) is chosen in a ‘best option’ HRM system (or state 0, which represents the 1980s), then after the shift to HRM system 1 (which represents the early 2000s), then there is a measure of the effects of these investments on innovation output, as a change (or variation) in \(MFP_j\) where:

\[
INN(MFP_j + \Delta MFP_j)_1 + v_j \geq INN(MFP_m)_0 + v_m
\]

The rate of change in MFP is given by a Min \((\Delta MFP_1, \ldots, \Delta MFP_m)\). That is, an ‘expected’ minimum rate of change in MFP will result, which is the lowest between investment options and in each HRM state. These measures can be calculated in each HRM state of practice, by type of firm and industry. The probability distribution of the random innovation component reflects the average expected rate of change in MFP.
8. Conclusion

In this paper the impact of two distinct HRM policies – soft and hard – were investigated in relation to organisational innovation, productivity and innovation in Australia. In terms of the first question, the two distinct HRM policies of soft/pluralist and hard/unitarist were identified as having been adopted in Australian businesses. The former based on greater worker autonomy dominated in the 1970s and 1980s, with the latter based on worker performance increasingly becoming relevant through the 1990s as competitive advantage was specified. Both policies aim to foster innovation, but through different mechanisms. The former through participation of workers in the autonomy space allowed by firms that enhances creative solutions in the workplace. This approach brought difficult complex organisational issues for firms at a time when costs were rising and required to be significantly squeezed. The latter allowed for cost minimising solutions in high performance work environments that are based on effective ‘people processing’ of workers by firms.

The second question focused on how the organisational innovation policy experience analysed in the first question can assist in reframing the economics of innovation by developing a unique dynamic theoretical model to explain innovation-successful HRM practice. A discrete model was developed to compare innovation investment and innovation output in the context of specific, but different, HRM systems. The model is illustrative of the historical study conclusion that innovation output is conditional to investment stemming from the distinct states of organisational innovation that are embedded in different HRM models of practice. This model is exploratory, but provides an approach to transferring unique historical experiences into an analytical depiction that can recognise the role and effects of HRM systems in the innovation process.
The relatively low productivity in Australia during the early 21st Century reflects a weak innovation environment both in terms of capital formation (see Bloch et al., 2011) and in a hard/unitarist HRM system (see this study). The hard/unitarist strategies embedded in current HRM-based activities are associated with levelling off and declining productivity despite increasing organisational-based R&D expenditures. This is in contrast to strong productivity outcomes through the 1970s and 1980s when soft/pluralist HRM strategies dominated. However, this latter HRM approach created negative stress for management through intricate and complex workplace arrangements that limited their ability to control the profit-making competitive situation. This led to the incremental movement through the 1990s towards a hard HRM system in Australia.

The Cavagnoli (2011) containment-contingency conceptual framework enables the researcher to discover the appropriate balance between the hard and soft HRM systems. Such an approach is not easy. The difficulties in identifying and measuring the effects of the implementation costs for HRM practices and hence, the effects of those on the net benefits from organisational innovation arise when, for example, business, banking and labour contract practices, differ substantially between regions, countries but also over time. Norms and regulations reflect the political and historical flavour of governments’ monetary and fiscal policies, labour market, education, health, banking, taxes and wage systems. These alter the ‘cost’ of organisational innovation for firms and for countries wishing to invest or co-operate with each other. These differences alter the expected responses to changes in the cost of implementing organisational innovation. This paper argues that understanding the historical, social and political differences regarding organisational innovation, and hence, on the net benefits of HRM policies, are fundamental to increasing the probability of success of
a balance between these two divergent HRM policies. The use of the discrete model
developed can assist this balancing endeavour.

The limitations of this paper are acknowledged in terms of limited empirical evidence but not
in terms of the theoretical basis and framework proposed. In order to estimate variations in
successful HRM policies, an appropriate set of data and disaggregation of the data are
required. For example, HRM policies introduced in ‘homogenous’ types of firms can be
compared across time. Additional disaggregation by industry and regions, for example, as
well as size and survival time is recommended. However, such sets of data in a social science
setting are not available.

There is an inevitable dilemma in using the containment-contingency spectrum innovation
framework to assist in appreciating explicitly how innovation is organised. At the
containment end there are the hard HRM routines based on tight rules and performance
measures that come from the centre. Regulatory authorities dominate the innovation process,
whether within large organisations or from the State. This places huge constraints on
developing ‘efficient’ structures to deliver creativity. At the contingency end there are the
soft HRM factors based on open-ended decentralised systems that allow bottom-up creativity
to emerge. Complexity dominates this contingency end of the innovation process. Here,
uncertainty of processes and outcomes places huge constraints on the ability to deliver
creativity.

Countries have different ways of negotiating this dichotomy that depends on the culture and
politics of the country under question. However, what is clear is that this negotiation requires
a resolution of this trade-off that retains some elements of routine to ensure an adequate level
of control, consistency and outcome orientation, while still allowing for creativity to emerge out of open-ended complex processes. Australia has found it difficult to manage this process, with poor innovation outcomes resulting. However, the analysis arising from this historical experience and the complementary discrete model can assist in building a stronger Australian Innovation System so often demanded.

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Note: ABS is the acronym for Australian Bureau of Statistics

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Figure 9: Probability distribution of innovation output in a discrete model to indicate the change in MFP at levels of investment in three HRM states

Innovation output (INN)

NOTE: The figure indicates that by moving from HRM system 0 (regulated) to 1 (less regulated), investment shares (as costs shares, not quantity shares) become larger. The responsiveness of firms to invest becomes greater. Changes in MFP due to less regulation are faster but smaller. The opposite would be true if INN output is investigated as moving from regulated to highly regulated HRM systems.

MFP can measure each individual industry within the market sector grouping (ABS, 2012). For example, there are MFP indices for 12 separate market sector industries, such as agriculture, forestry & fishing, mining, manufacturing, and so on. The aggregate measure is presented in Figure 8. One reason for this is that the estimates of industry-level MFP growth show that growth rates for particular industries are sensitive to choice of years, while there are minimal differences at the aggregate market sector level (Robert, 2006, p. 4).