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Management Capability, Innovations in Work Practices and Performance: Multilevel Research in Science and Technology Based Firms

Marc Thompson

Aalto University

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Management Capability, Innovations in Work Practices and Performance: Multilevel Research in Science and Technology Based Firms

Marc Thompson

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Abstract

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Abstract

These five published papers focus primarily on the role of managerial resources (the knowledge, skills and abilities of managers) in the use of innovations in work practices and their performance consequences. the papers together take a multilevel approach exploring the role of management capability at individual, organizational and industry level with a particular focus on science and technology firms. The first research paper uses individual level data from R&D scientists in six organizations to understand how managerial capability shapes non-imitable resources such as commitment. Interactional justice, or the perceived fairness of the manager, is identified as a critical moderating factor that can support higher levels of knowledge generation.

The second paper builds on this relational perspective and explores the role of the employment relationship, operationalised though the psychological contract, on knowledge sharing behaviours amongst R&D staff. The job design dimension of the contract is found to have a positive impact on innovative behaviours while performance pay is negative.

The third paper takes an establishment-level focus and differentiates between 'HR-specific' and 'general' management capability. Based on cross-section and panel data from establishment-level survey conducted three times in 7 years in the UK Aerospace industry, the paper finds positive associations in the cross-section data for management capability and innovations in work practices. Tests for the moderation effects of management capability on innovations in work practices and performance using the panel data were contrary to expectations.

The fourth paper uses detailed case study evidence from seven establishments to explore constraints on the adoption of innovations in work practices. Three themes were identified which may shape managerial capability to innovate: industry and production context; the distributed nature of management activity, and social embeddedness.

The fifth and final paper, explores the links between the production context and the use of innovative work practices. It finds that with increasing levels of product and service complexity, the nature and scope of innovative work practices also increases. At low levels of product and service complexity incentives are the primary HR practice deployed whereas at higher levels of product and service complexity establishments use teamwork, employee surveys and a positive approach to trade union relations.

Keywords innovation; work practices; high performance work systems;high commitment work practices; high involvement management;

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Abstract

Innovations in work practices (sometimes referred to as 'high performance', high commitment' or 'high involvement' work practices) are an important topic of research in the strategic management and human resource management fields. Through five research papers, I focus primarily on the role of managerial resources (the knowledge, skills and abilities of managers) to develop a greater understanding the adoption of innovations in work practices and their performance consequences. I take a multilevel approach exploring the role of management capability at individual, organisational and industry level with a particular focus on science and technology firms.

The first research paper uses individual level data from R&D scientists in six organizations to understand how managerial capability shapes non-imitable resources such as commitment. Interactional justice, or the perceived fairness of the manager, is identified as a critical moderating factor that can support higher levels of knowledge generation.

The second paper broadens out this relational perspective on innovative behaviour. Using individual-level data, I explore the role of the employment relationship, operationalised though the psychological contract model, on knowledge sharing behaviours amongst R&D staff. Job design is found to have a positive impact on these behaviours while performance pay is negative.

The third paper takes an establishment-level focus and differentiates between 'HR-specific' and 'general' management capability and explores their impact on the deployment of innovations in work practices and their performance outcomes. Based on cross-section and panel data from establishment-level survey conducted three times in 7 years in the UK Aerospace industry, the paper finds positive associations in the cross-section data for management capability and innovations in work practices. Tests for the moderation effects of management capability on innovations in work practices and performance using the panel data were contrary to expectations.

The fourth paper uses detailed case study evidence from seven establishments in the UK aerospace sector to explore the constraints on the adoption of innovations in work practices. Three themes were identified which potentially shape managerial capability to innovate: industry and production context; the distributed nature of management activity, and social embeddedness.

The fifth and final paper, explores the links between the production context and the use of innovative work practices. Based on industry level data for aerospace, it finds that with increasing levels of product and service complexity, the nature and scope of innovative work practices also increases. At low levels of product and service complexity incentives are the primary HR practice deployed whereas at higher levels of product and service complexity establishments use teamwork, employee surveys and a positive approach to trade union relations.

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This dissertation contains a summary of the following five original articles:

1. Thompson, M., and Heron, P. (2005) The Difference a Manager Can Make: Organizational Justice and Knowledge Worker Commitment, International Journal of Human Resource Management, 16:3, March pp383-404

2. Thompson, M., and Heron, P. (2006) Relational Quality and Innovative Performance in Science and Technology Based R&D Firms, Human Resource Management Journal, Vol. 16, No 1, pp28-46

3. Thompson, M. and Heron, P. (2006) Management Capability and High Performance Work Organization, International Journal of Human Resource Management, 16:6, July, pp1029-48

4. Thompson, M. (2007) Innovations in Work Practices: A Practice Perspective, International Journal of Human Resource Management, 18:7, July 2007, 1298-1317

5. Angelis, J., and Thompson, M. (2008) Product and Service Complexity and High Performance Work Practices in the Aerospace Industry, Journal of Industrial Relations, 49 (5)

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I. INTRODUCTION TO THE DISSERTATION

1.1 Background

Innovations in work practices (also termed 'high performance', 'high commitment' and sometimes 'high involvement' work practices) have attracted the growing attention of management researchers seeking to understand the development of organizational and employee capabilities and their link to organizational performance. While a growing body of evidence (see Hyde et al, 2006, Richardson and Thompson, 1999, Pfeffer, 1999, Wall and Wood, 2006, for reviews) testifies to the strong correlation between the use of innovations in work practices and organizational performance there is much less certainty about how these linkages work (Fleetwood and Hesketh, 2006). This has been characterised as a classic social science 'black box' problem where the causal path between on set of phenomenon (i.e. work practices) and another (i.e. performance outcomes at individual or organizational level) are not clearly theorised or articulated (Guest, 1998, Fleetwood and Hesketh, 2006).

This dissertation seeks to shed more light on this black box problem by focusing on managerial resources (Castanias and Helfat, 2001) as an important explanatory variable in understanding how innovations in work practices shape organizational and individual level capabilities and performance outcomes. I treat innovative work practices, for the most part, as a form of organizational capability (Nelson and Winter, 1982) and see management capability from a 'Penrosian' perspective. As such, management capability is seen as the most critical capability for firm growth and development (Penrose, 1959).

Innovations in work practices are treated quite differently depending on the theoretical perspective adopted. From an Organizational Behaviour or Human Resource Management perspective, it has been proposed that innovative work practices enhance organizational effectiveness through their positive impact on employee ability, motivation and opportunity (Applebaum et al, 2000). This theoretical perspective, anchored in the work psychology literature, takes an individual level starting point for understanding how organizational level performance outcomes can be explained. Put simply, it is argued that innovative work practices which give employees greater levels of decision-making power are likely to allow organizations to innovate and learn at a faster rate than their competitors and thereby enjoy higher levels of productivity and profitability (Purcell and Boxall, 2003). These innovative work practices are considered to be effective because of the higher levels of information sharing they allow at both a vertical level (i.e. between supervisors/managers and workers) and horizontally (i.e. between workers).

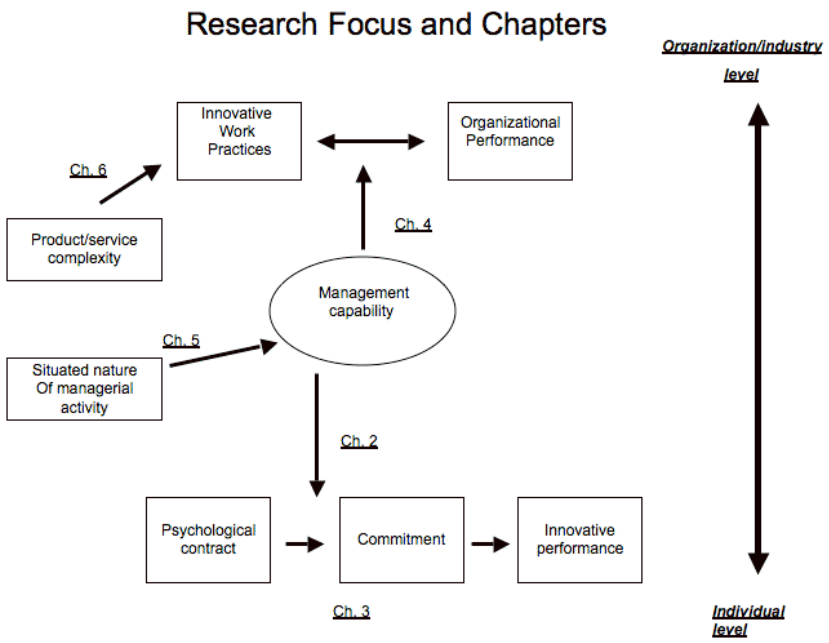
Economists, on the other hand (Milgrom and Roberts, 1990, Roberts 2004) have argued that variations in firm performance might be explained by the complementarities firms achieve in aligning their work system practices and other areas such as technology or operations strategy. The rapidly falling costs of information technology has reduced the cost of flexible manufacturing equipment which facilitates economies of scope as companies vary product features and produce smaller lot sizes of various models and styles. These new product market contingencies can only be successful in contexts where work organization and human resource practices are aligned to high levels of flexibility and increase the skills and

problem-solving capabilities of the workforce. Brynjolfsson and Hitt (2003) explored the impact of investments in IT on the productivity of US firms and found that higher levels of performance are explained when firms invest in complementary assets such as innovative work practices which included teamworking, problem-solving groups and quality circles.

There is also an increasing interest in the role of innovative work practices from within the Strategy literature. The Resource-Based View (Barney, 1991) and Dynamic Capabilities Theory (Teece et al, 1997, Helfat and Peteraf, 2003) contend that the non-imitable, unique and rare resources may explain differences in organizational performance that firms create. Human capital is seen to be a natural source of such firm-specific resources and it is argued (Barney and Wright, 1998) that innovations in work practices (sometimes referred to as 'high performance', 'high involvement' or 'high commitment' practices) are an important way in which firms can develop these resources. In broad terms, the strategy literature has moved from an outside-in view, (e.g Porterian perspective) to an inside-out view (Hansen and Wernerfelt, 1989), which privileges the role of internal organizational capabilities and competences in explaining comparative firm performance. In a further development of the RBV, Grant (1996) and Kogut and Zander (1996) have argued that the role of the firm in the modern economy is to integrate knowledge to solve customer problems and develop complex services and products. This knowledge-based view places increasing emphasis on internal firm-level capabilities that can develop human and intellectual capital.

Together these different literatures focus on the role played by innovations in work practices in developing organizational capabilities. However, this body of research tends to under-attend to the role of managerial resources and how they interact with innovations in work practices to develop valuable, rare and non-imitable resources that are firm-specific. Specifically, the potential mediating or moderating role of managerial resources at both an organizational and individual employee level tends to be under-researched. Managerial resources or capabilities have been defined (Bailey and Helfat, 2000, Castanias and Helfat, 2001) as the differentials in skills levels and abilities between managers within firms and this theoretical work has been important in foregrounding the potentially important role that managerial capabilities play in explaining variations in performance across firms.

This dissertation builds on the managerial resources perspective and brings empirical evidence to bear on the role of management capability in relation to work practices and organizational effectiveness. The studies reported here take a multilevel perspective and explore management capability at the industry, organizational and individual level. By multilevel, I mean that the dissertation attempts to take account of micro and macro level perspectives, exhibiting concern for both top-down and bottom-up processes. In so doing, it seeks to develop a much richer perspective on the phenomena of interest. The terrain covered in the dissertation is shown in Figure 1 (below).



The studies reported in the dissertation move from the individual to organisational level and were conducted within the science and technology sectors in the UK, with a special emphasis on the aerospace industry. The first study, Chapter 2, I examine the managerial behaviours and attitudes (important dimensions of management capability) that are most strongly associated with firm-specific resources such as commitment which are non-imitable, rare and valuable for generating rents. However, managerial resources are in themselves difficult to replicate easily and quickly and firms must develop the skills of their managers over time to ensure there is ready and appropriate supply. In Chapter 3, I build upon the importance of relational capital identified in Chapter 2 and explore how the quality of different dimensions of the employment relationship is important for knowledge generation and performance.

Chapter 4 moves to the organisational level and using establishment-level data examines the role that managerial resources play in explaining variations in the adoption of innovative work practices. Chapter 5 takes a case study approach to broaden our knowledge of the contextual factors important in shaping managerial action within and industry and firm-specific context. Finally in Chapter 6, I consider one of these contextual factors shaping managerial behaviour, namely the levels of product and service complexity and their relationship with innovative work practices.

Together, the findings of this dissertation provide support for the proposition that managerial resources are important because they enable firms to create the capabilities that can support sustained competitive advantage. In particular, the dissertation shows how the quality of social relationships within, and potentially across the boundary of, the firm, is important for knowledge generation and appropriation in science and technology based firms. Managerial resources, it is argued, are critical in building this relational capital.

2 RESEARCH QUESTIONS

The prime focus of this dissertation is to understand the role of management capability and innovations in work practices that enable firms to build the capabilities needed for sustainable competitive advantage. The research is motivated by the resource based or dynamic capabilities view of the firm. This view argues that heterogeneity and imperfect mobility are prerequisites for rent generation from resources (Barney, 1991). In a development of the resource-based view Castanias and Helfat (1991, 2001) focus on management capability and argue that heterogeneity

takes the form of skills and abilities differentials between managers in firms. These skills and abilities can be scarce if only a few managers have the high quality ones that can generate rents. Furthermore, because managerial skills are largely tacit and involve learning by doing, they are difficult to replicate but also require high levels of investment by firms. Finally, the industry and firm-specific nature of these skills means that they are imperfectly substitutable.

Building upon these resource-based frameworks (dynamic capabilities, managerial rents theory), I explore the role of management capability at different levels (industry, firm and individual) to understand their impact on other firm resources such as innovations in work practices and the development of intangible assets such as commitment and motivation. As such, this dissertation builds on and extends the literature on the resource-based view and specifically the role of managerial resources by addressing the following research questions:

Q1 How important is the quality of the relationship between line managers and R&D employees in explaining levels of commitment and innovative performance?

Managerial resources (i.e. the skills and abilities of managers) are a critical element of the bundle of resources (Penrose, 1959) that enable a firm to generate rents (Castanias and Helfat, 2001). The existing resource based literature while recognising the important role of management capabilities to firm performance, under attends to the relational dimension of these capabilities and how managers build the relational resources that are critical for rent generation. This question complements the existing studies by exploring the role of relational quality in building non-imitable and

causally ambiguous firm-specific resources such as commitment and organizational citizenship behaviour.

Q2 How important is relational quality in explaining the innovative performance of R&D employees?

In order to complement the research question on the relational quality of managers, I broaden out the definition of relational quality to include multiple elements of the employment relationship. The employment relationship has been identified as a critical resource that conforms to the criteria of the resource-based view (Barney and Wright, 1998, Lepak and Snell, 1998). Firms can develop different types of employment relationship to meet strategic objectives (Lepak and Snell, 1998) but where knowledge creation and innovation is an important requirement the quality of the relational assets developed (Leana and Van Buren, 1999) can be an important differentiator in firms' capabilities and performance. Building on this perspective, I explore the extent to which the quality of the employment relationship is important in accounting for the innovative performance of a critical group of knowledge producers, R&D employees.

Q3 To what extent do management capabilities (a) influence the adoption of innovations in work practices and (b) their impact on organizational effectiveness in science and technology based firms?

The existing body of empirical and theoretical work on the HR-Performance link leaves a number of important questions unanswered about how innovations in work

practices generate higher levels of performance. This 'black box' problem is one of the biggest challenges facing the future development of the field of Strategic Human Resource Management. Barney (1991), writing from a resource-based view, identifies management talent as one of the most critical factors that explain variations in performance between firms. Managerial rents theory (Castanias and Helfat, 1991, 2001), which developed from the resource-based view, provides strong theoretical support for the role of management capabilities in explaining differential performance. This research question builds upon this theoretical base and adds to our existing knowledge by providing empirical evidence on the mediating or moderating role played by management capabilities in the 'black box' space between innovations in work practices and performance.

Q4 How does organizational context and managerial action shape the adoption of innovations in work practices?

This question addresses the important role of context and situated management practice in shaping innovations in work practices. The literature on the HR-Performance domain has been helpful in exploring contingencies that can shape this relationship and has been primarily quantitative and survey based.

However, there is little literature that is based on qualitative case studies that explore the role of context and practice in the adoption of innovative work practices. This is an important gap in the literature and this research question seeks to explore how managerial action in organizational context can enrich our understanding of the factors shaping the use of innovative work practices. Taking a practical evaluative

framework (Emirbayer and Mische, 1998, Child, 1997) I explore how managers reconcile their existing knowledge of the firm and its market with the need to adopt and adapt innovative work practices in order to adjust to changing conditions. This perspective complements the broader managerial rents model (Castanias and Helfat, 1991, 2001), which privileges the role of managerial resources and capabilities in building sustained competitive advantage.

Q5 Is there a relationship between levels of product and service complexity and the deployment of innovative work practices?

This final question provides insight into the contextual factors shaping the use of innovative work practices. For establishments in high technology manufacturing, the level of product and service complexity can be an important differentiator in competitive terms . Indirectly, higher levels of complexity can be seen as a proxy measure for differences in management capability across firms (Castanias and Helfat, 2001). Higher levels of complexity in products and services may also require higher levels of skills and competence from employees, which may increase the use of innovative work practices.

This research question builds our knowledge of the influence of production factors on the range and type of innovative work practices used in high technology manufacturing environments.

By answering these five questions, the dissertation seeks to provide greater insight into managerial resources, innovations in work practices and organisational

capabilities. The terrain covered by the chapters in the dissertation is shown in the Figure 2 below.

Figure 2 The Research Terrain

Managerial Capabilities	**Performance**	**Innovations in Work Practices**
Industry level		The role of product and service complexity in UK aerospace in shaping the use of innovative work practices (Ch. 6)
Organisational level	What are the links between Management capability, innovative work practices and performance (Ch. 4)?	How does management capability influence the adoption of innovative work practices (Ch. 4 and Ch. 5)?
Individual level	How does relational quality (managers and R&D employees) impact on the creation of intangible resources (Ch. 2) and innovative performance (Ch. 3)	

3 THEORETICAL BACKGROUND

My principal research focus is on how managerial resources and innovations in work practices interact to enable the development of organizational capabilities. I examine the role management capability (knowledge, skills and abilities) at different levels (industry, firm and individual) and their role in explaining variations in the level of

innovation in work practices and also how the quality of managerial resources can shape and influence the development and use of other resources such as knowledge sharing and employee commitment. By extending and developing knowledge of managerial resources and their role in the firm, it can help us understand the role managers' play in the evolution and development of firms and industries.

As the dissertation is built upon a series of individual studies, the relevant literature and theoretical frameworks are dealt with in each of the following chapters. However, I focus here on presenting the dominant theoretical frameworks informing the dissertation. Firstly, I introduce the concept of 'managerial resources', which has its roots in the Resource Based View of the firm and the related Dynamic Capabilities framework. Secondly, I provide an overview of the key themes in the literature on innovations in work practices. This includes the growing body of literature within the strategic human resource management domain and in particular the work on HRM and performance.

3.1 Managerial Resources

Managerial resources have been defined as the skills and abilities of managers (Castanias and Helfat, 1991, 2001) and from a resource based view differences in firms' performance may be attributed to the quality of these resources. The resource-based view has developed four specific criteria to identify whether resources are useful for competitive advantage. Resource must be scarce, not easily imitable, valuable and not easily replaceable. Castanias and Helfat (2001) observed that not all management resources meet these criteria but where they are present higher levels of

rent generation is possible. An important contribution of the managerial resources perspective within the resource based literature is that it foregrounds the transformational role that managers have on internal firm resources. Managerial agency becomes central in models explaining competitive advantage by reference to internal resources such as human capital, knowledge, routines and systems (Rosenbloom (2000), Holbrook et al (2000). Firms may be 'bundles of resources' as observed by Penrose (1959) but the resource based view privileges the role of managers in shaping and integrating these resources. This framework is important for my research because it is based on the argument that rent generation derives from the application of managerial skills and abilities to other firm resources. This opens up the link between management capability and innovation in work practices. Such innovations are a central activity within the managerial task structure (Mintzberg, 1972).

The extant literature on innovations in work practices within the Strategic Human Resource Management field has tended to underplay the role of managerial resources. The majority of theoretical and empirical research has tended to focus on the relationship between work practices (however conceived and measured) and various measures of organizational performance. Consequently, the research has under-attended to the potentially important part to be played by mediating and moderating factors such as management capability.

While the resource-based view (and the managerial resources perspective) is important in foregrounding the role of managers and management, it needs to take greater account of how situation and context shape how managers develop and apply

their skills and abilities. Consequently, I complement the resource-based view with a practice perspective (Embirayer and Mische, 1998) on managerial resources to understand the role of context on the development of innovations in work practices. This practice perspective in itself is supplemented in two of the studies that take an individual-level perspective. Here, I draw heavily on psychological contract theory (Rousseau, 1996) and the growing body of work on the quality of social relations in the workplace, sometimes referred to as relational capital (Leana and Van Buren, 2002). Dependent on level (individual, organisational and industry) my research has examined management capability using a number of different lenses and constructs, which can help provide a more rounded picture of the multi-dimensional nature of the phenomenon.

3.2 Innovations in Work Practices

The term innovations in work practices cover new forms of work practice that organizations introduce to adapt to their changing environments and address performance issues at individual, group and organizational level. There is no agreement amongst researchers on the practices that should be considered 'innovative' with both empirical and theoretical literature varying considerably in the range and type of practices to be included (Wright et al, 1996, Becker and Gerhart, 1998). The debate on the links between the adoption of innovative work practices (often termed 'high-performance', 'high-commitment' or 'high-involvement' work practice) and organizational performance is largely informed by three broad analytic perspectives: Contingency, Best practice and the Resource Based View (Delery and Doty, 1996). To date nearly 100 studies (see Hyde et al, 2006; Wall and Wood, 2005,

for most recent reviews) have been published reporting a variety of results on the presence or adoption of a range of HR practices on an equally wide range of performance outcome measures. While, these three theoretical perspectives have generally (but not exclusively) informed research activity in this area, most of this research has deployed quantitative survey research designs to establish the performance impact of using HR practices. As Wall and Wood (2005) observed this body of evidence is far from consistent in terms of theory, methods and results, which in turn has, been criticised for providing a dubious knowledge base to guide practitioner action.

Others (e.g. Pfeffer, 1999) have argued that because there have been a wide range of studies in different contexts which have generally found a positive link between use of these practices and performance, this is as good an evidence base as one may hope to achieve in the domain of social science. On the other hand, Purcell (1999) has questioned the relevance of much of this research suggesting that it either leads researchers and practitioners into a *cul de sac* or the evidence produced by these studies is itself chimerical. Yet other researchers (Fleetwood and Hesketh, 2006 and Guest, 1998, for example) have been much more critical arguing that the research area lacks rigorous theory. Some have argued that research needs to build in a stronger temporal dimension and study the basis of competitive advantage over time and investigate how organizations manage internal resources such as HR systems (Wright, Dunford and Snell, 2001).

In this dissertation, I have attempted to address a number of these concerns. Firstly, one of the research studies, which underpin two of the chapters, draws on data

collected over a 7-year period from the same industry (aerospace), which enabled the construction of a panel data set as well as 3 cross-sectional data sets. Such in-depth studies of single industries are unusual (Arthur's (1994) study of steel mini-mills is one rare example) and also enable greater control over contextual variables that may explain relationships between phenomena. Secondly, this research was complemented by detailed case study work in 7 organizations, 5 of which were visited twice in a five-year period to understand innovations in work practices. Such a research design can provide much greater depth and insight into the dynamics within an industry and also greatly enhance explanation. Thirdly, the research studies have been conducted at different levels of analysis. I have explored questions about management capability and innovations in work practices using organizational and individual level data. The unit of analysis chosen was shaped by the research questions being addressed but the dissertation is valuable in that the multilevel approach enriches our knowledge on the phenomenon being investigated.

The dissertation while sensitive to some of the methodological criticisms levelled at the research on HR and performance has also taken account of theoretical controversies about the nature of work practices and organizational performance. As my research has developed it has been increasingly influenced by a practice perspective on innovation and work organization. A practice perspective on innovation in work practices questions the implicit assumption that work practices are stable entities that have fixed meanings and defining content. Rather I recognise that practices such as appraisal, teamworking and performance pay are continually being enacted, re-enacted, interpreted and re-interpreted within any given organizational context. As such, work practices are situated (Lave and Wenger, 1991; Contu and

Willmott, 2003). Schuman (1987) argues that situation provides an interpretive context for action in that any social practice (such as performance appraisal) derives its meaning and significance from the situation in which it is enacted. Furthermore, this interpretive context consists of two important elements – social embeddedness and history.

Social embeddedness means that activities, practices or enacted strategies are shaped by broader social phenomenon. These may be economic, social or political in character and they can generate institutionally embedded codes of conduct for actors in any given situation (Di Maggio and Powell, 1983; Giddens, 1984). For example, within an industry such as aerospace, one of the sites of my research, the political, economic and social activity at the macro-level of the MoD, The US Defence Department, aviation regulators and so on shape what goes on in organizations at a micro-level. In other words, practices at the organizational-level are the product of the interplay with broader social, political and economic institutions. This underlines the importance of in-depth work in specific sectors to take account of these institutional factors and to be sensitive to these in interpreting results.

4 KEY CONTRIBUTIONS

4.1 Theoretical contributions

In Chapter 2, I begin at the individual level of analysis and make an empirical contribution based on detailed case study data from employees in 6 high technology R&D units. The paper uses the managerial rents model (Castanias and Helfat, 2001) as a starting point to understand how managerial behaviour and attitudes are critical in shaping the context in which knowledge creation and innovation can prosper. The quality of the employment relationship is argued to be central to knowledge worker commitment, which in turn has an effect on levels of knowledge creation. Given the high levels of discretion enjoyed by knowledge workers, managers' decisions over work distribution, content and resources are critical for R&D workers commitment and knowledge creation. Where firms can create strong positive internal relationships between employees and managers they are in a stronger position to create and appropriate new knowledge. The central argument of this chapter is that the perceived fairness of leaders, as evidenced through followers assessment of different modes of justice (procedural, distributive and interactional) is critical in influencing knowledge worker commitment and in consequence knowledge creation.

The chapter explores the three-way interaction of procedural, interactional justice and the psychological contract measures to predict knowledge worker commitment. We found that when employees simultaneously perceived high levels of procedural and

interactional justice that this moderated the relationship between psychological contract breach and knowledge worker commitment. Furthermore, where there was contract breach, positive perceptions of procedural justice moderated the relationship with commitment. However, in the context of contract fulfillment, low perceived levels of interactional justice predicted lower comparative levels of commitment regardless of the level of procedural justice. The results suggest that the perceived quality of the relationship between the knowledge worker and their manager can make a positive difference in the context of breach of the psychological contract and this in turn can help maintain levels of commitment important for knowledge creation.

In Chapter 3, I develop more in-depth insights in to how relational quality amongst high-end knowledge workers shapes the innovative behaviour of these employees. The knowledge-based view of the firm implies that the innovative performance of R&D based organizations is strongly influenced by the quality of relational capital. However, the role of the employment of relationship has been underplayed in this perspective. A model is developed that tests the quality of three dimensions of the employment relationship: the psychological contract, affective commitment and knowledge-sharing behaviours; and their consequences for innovative performance amongst 429 R&D employees in six different science and technology based firms. Analysis found that affective commitment plays an important role in mediating psychological contract fulfillment on knowledge-sharing behaviour, which in turn is strongly related to innovative performance. More specifically, fulfillment of the job design dimension of the psychological contract has an independent positive association with innovative performance, whereas fulfillment of the performance pay dimension is negatively associated. Given the importance of managers to the design

and implementation of such work practices, I argue that management capability in these knowledge domains is crucial for the development of knowledge based assets for sustained competitive advantage. The employment relationship in its broadest sense is largely absent from the knowledge-based view of strategy. My argument is that it needs to be more central.

The next Chapter (4), moves the analysis to the establishment level in a single industry, the UK Aerospace sector. I use the managerial resources framework (Castanias and Helfat, 2001) to explore a number of questions on the role of management capability in the deployment of innovative work practices. Using both cross-sectional and panel data collected over 7 years; two forms of management capability are examined – 'general' and 'HR-specific'. This empirical contribution finds that, in the cross-sectional data, both forms of management capability are associated with the use of innovative work practices in 1999 but this association does not hold for the 2002 data. Using panel data, I find there is a strong and positive relationship between the use of innovative work practices in 1999 and value-added per employee in 2002 (taking account of controls). Contrary to expectations I find high levels of value-added per employee where the use of innovative work practices is high but the measure for 'general management capability' is low. This may be explained by a substitution effect in the context of higher use of innovative work practices where power, knowledge and skills are devolved to employees, requiring fewer managerial resources.

In Chapter 5, I draw upon detailed case study data from 7 establishments in the aerospace supply chain to understand the relatively low comparative adoption and

diffusion of innovations in work practices. Proceeding from a dynamic capability perspective, I argue that such work practices enable firms to be more adaptive to their changing environments. In order to understand the low take-up of these innovative work practices, I take a practice perspective and identify three themes that are under-attended to in the current research. These are the role of industry and production context; the distributed nature of managerial activity and finally, social embeddedness. The paper calls for more sensitivity to these factors in future research and also greater attention to their interactive effects on managerial behaviour when introducing innovative work practices.

In Chapter 6, I explore one of these themes, namely the role of production context to understand its relationship with the use of innovative work practices. The chapter makes a further empirical contribution and using cross-sectional data from the aerospace industry, finds that the use of innovative work practices increases in sophistication as the levels of product or service complexity also increases. At low levels of complexity, incentive reward practices are primarily used while at medium and higher levels of complexity, skill enhancing and employee involvement practices are deployed.

The mains results from the research are shown in Figure 3 (below).

Figure 3 Summary of Key Findings:

Key constructs explored	Innovative work practices	Performance
Relational quality		Perceived quality of relationship with manager (interactional justice) moderates breach of psychological contract and supports employee commitment
Psychological contract		Fulfillment of job design dimension of psychological contract is positive for individual innovative performance whereas fulfillment of performance pay dimension is negative
Management capability	'general' and 'HR-specific' management capability positively associated with higher level of innovative work practices in cross-sectional data.	(1) Value-added per employee higher when 'general' management capability is low in panel data. (2) Positive association in panel data between use of innovative work practices in 1999 and value-added per employee in 2002.
Managerial agency	3 themes identified that shape adoption of innovative work practices: (1) industry and production context (2) distributed nature of management (3) social embeddedness	
Product and service complexity	Incentive rewards dominant at low levels of complexity, team working, employee involvement and collective voice practices significant at high levels of complexity	

4.1 Practical Relevance

The dissertation raises a number of implications for practitioners.

Firstly, the studies provide empirical evidence on the important role that management capability plays in shaping the quality of relationships within the firm and how organizational capabilities and knowledge generation as well as appropriation is generated by these relationships. Specifically, the evidence presented suggests that investment in raising the quality of management capability will pay-off through its knock-on effects on other resources within the firm, as predicted by Castanias and Helfat (2001). While this may not appear to be an earth shattering recommendation for practitioners, in the UK context where investment in management capability is still comparatively low (CEML, 2002), my research provides further evidence to support arguments for firms to invest more resources in this objective. It also suggests that investment in improving the relational capability of managers and, in particular, attention to justice and fairness in work relationships, may be critical in knowledge-intensive sectors.

Secondly, the detailed case study work reveals the situated nature of managerial agency and the important role that organizational context plays in shaping innovations in work practices. The important implication for managers is that they need to be sensitive to context when introducing innovations and develop mechanisms and processes for engaging key stakeholders to ensure that the constraints arising from

'embeddeness' can be overcome. The role of management is to mould and adapt practices to the current operational context and then modify them as contingencies change and the firm needs to respond to external developments. Firms could provide managers with the space and resources to undertake these alignment activities and allow variations around standard practices at the local level. This may also require investment in management capability to enact change at a local level.

Thirdly, the findings stress the importance of managing the employment relationship in an effective manner. If organizations are seeking to establish high levels of organizational citizenship behaviour (i.e. 'going the extra mile'), which can sustain competitive advantage in science and technology firms, managers need to monitor continually the state of their employees' psychological contract. This might require better support from the HR function in order to keep managers apprised of potential problems that may impinge on prized organizational objectives such as commitment, flexibility and knowledge generation.

5 FUTURE RESEARCH

The dissertation adopted a multilevel approach to explore the role of management capability in shaping innovation in work practices. I have examined management capability at both a micro and macro level using individual and organizational level constructs. The study has provided a range of empirical evidence to demonstrate how managerial resources (skills, ability and knowledge) can influence, in particular, the adoption and diffusion of innovations in work practices. Organizational level analysis pointed to the potential moderating role of management capability but also raised

questions about how this should be interpreted when comparing cross-sectional with panel data. The use of case study and ethnographic methods allowed a much finer grained picture to emerge of the constraints under which managers operate when seeking to introduce new practices or renew existing ones. This research stressed the situated nature of managerial action and how the social embeddedness of the work context shaped innovations in work practices.

Individual-level data explored how management capability (defined from a relational perspective as justice and fair treatment) played a moderating role between employees' perception of the employment relationship and delivery of HR practices and desirable outcomes such as commitment and innovative behaviour. I argue that the relational perspective needs to be more fully integrated into current models and theory on management capability and adds a further dimension to more traditional human capital based models. In particular, I stress the importance of equity as a managerial resource.

The dissertation has raised a number of potential avenues for further research and there are two broad areas where I suggest new contributions could be made.

5.1 Theoretical development

One important theme to have emerged is that there is unlikely to be one theoretical perspective that can address innovations in work practices and their performance effects. From within the strategic human resource literature there are problems in defining the scope and focus of the field, which has limited theory development.

Indeed, the field is marked by its theoretical heterogeneity and fragmented nature (Schuler and Jackson, 2001). For example, one review of theoretical development in SHRM pointed to at least ten different perspectives being used by researchers (McMahan, Virick and Wright, 1998), which can make cumulative development of the field more problematic. A similar criticism can be leveled at the Strategy literature, which is also characterized by a multiplicity of theoretical perspectives. These too, often fail to attend to the more complex questions of the mechanisms that organizations use to develop dynamic capabilities or idiosyncratic resources (Priem and Butler, 2001).

While diversity of theoretical perspectives is enriching and can contribute to a much more rounded understanding of strategy and organizations, there is a need for more studies to adopt multilevel approaches that can advance our theoretical and empirical knowledge base (Kozlowski and Klein, 2000). The challenge in multilevel research is to focus on a specific phenomenon (e.g. training effectiveness, knowledge sharing, inter-organisational relationships, management capability) and examine this in different contexts and different levels. Such an approach can reveal the micro-foundations of phenomenon while being sensitive to and alert to the implications for higher level and wider system level properties. In this way we can energise a productive conversation between micro and macro level research. While I recognize this is not necessarily a straightforward task, more attention paid to the multilevel nature of phenomenon such as management capability or indeed innovations in work practices can enable us to clarify our concepts and enhance our theoretical models.

Both fields can also suffer from problems of validity in their theoretical development. The theory that seeks to explain the causal links between variables or phenomena of interest is often weak or non-existent. As a result, it is often difficult to establish high levels of construct validity (i.e. being sure we are measuring what we say we are measuring), which, in turn, means that it is difficult to generalize and thereby develop a parsimonious and robust theory.

Responses to these limitations have tended to rest on the hope that further empirical work will, in a piece-meal way, eventually address this problem. Another approach is for researchers to develop new or more integrated theoretical models that can help understand why innovations in work practices should impact on employee and organizational performance. Future theoretical development could, in principle, be based on carefully constructed case study work as Eisenhardt (1989) has suggested. It could also start by reviewing existing theoretical approaches with a goal of integration and new theory building. It could also combine both approaches. Whatever method is adopted (and there may be more than the ones mentioned above), this theoretical lacuna is probably the most pressing limitation to future knowledge development in the field of both strategic human resource management and strategy. Without better theory we are unlikely to generate robust, testable hypotheses and future research will suffer from the construct, internal and external validity problems that face current endeavours.

Theoretical development may also benefit from more dialogue with and the involvement of the practitioner community. As David and Hatchuel (2008) argue, potential breakthroughs in management theory can take place through collaborative

research methods. Such an approach recognizes that pioneering firms can play a critical role in the development of new management models and theories. It also recognizes that academic developed models need to be rigorously validated in the real world in order to create actionable knowledge. This may be the most fruitful avenue for future research and theory development.

5.2 Management Capability: The Construct and the Future Research Agenda

Barney (1991) has asserted that managerial talent is a critical differentiator of performance between firms and the conceptual work of Castanias and Helfat (1991, 2001) has further developed our thinking in this area, differentiating between levels of managerial human capital from firm-specific to generic. In this dissertation, management capability has been explored as (1) a collective resource that can explain variations in performance between firms, and (2) an individual resource that can explain variations in employee performance within firms. The concept has been studied with specific reference to Human Resource Management (HRM) systems in science and technology based firms. At the individual level, management capability was identified as an important moderator between employees experience of different dimensions of the HRM system (as measured by the psychological contract) and employee performance (as measured by commitment, organisational citizenship behaviour and innovative behaviour). At the organizational level, management capability was seen to play a role in moderating the relationship between HRM systems and organisational performance.

However, in both cases, the definition of management capability differs. I argue that management capability is a multi-dimensional and multi-level construct and the

definition used depends largely on the context in which it is deployed. Furthermore, I suggest that part of the challenge of future research in this area is to develop a construct that is meaningful at multiple-levels within an organisational system.

In order to develop a robust construct that can meet the demands of multi-level research, I suggest two related approaches. Firstly, that Activity Theory (Engeström, 1987) provides a conceptual framework and a methodological approach that can help generate a more robust construct of 'management capability' and secondly, that future case study research should focus on the mechanisms and processes that explain how management capability as a collective level resource emerges from the individual level and also how individual level management capability is shaped by top down processes.

Management capability as a multi-dimensional construct

The definition of management capability has been approached through a range of different lenses (psychological, economic, strategic, sociological etc) and each of these can highlight different attributes of a complex phenomena. It is not the purpose of this addendum to review this diverse literature but see the following for useful overviews (Northouse, 2007, Watson, 2006, Hales, 2001). In broad terms, this literature has expressed management capability as consisting of tasks, skills or behaviours or in terms of personal qualities. Most, if not nearly all of these studies have treated management as a generic category and most of the research conducted has been on senior managers and mostly in Anglo-Saxon contexts.

What this body of research has been less concerned with, until relatively recently, has been to consider managerial capability in terms of its goals and objectives. In other

words, research needs to address the question ‘management capability to do what in which situation?’. There is no single form of management capability that enhances performance in the same ways in all situations and there is also likely to be no simple way to develop this capability. The work of management, in other words how managers negotiate and deploy collective and individual resources to achieve goals and objectives, is likely to vary. Consequently, future research on management capability needs to be more precise about the object or focus of the capability. In my own work, I have focused primarily on management capability in the context of the adoption and deployment of innovations in human resource management practices. This focus draws a boundary around the types of capability that I consider important. However, I recognise that the constructs informing this research are at an early stage of development and now turn to suggest how more robust constructs can de developed that can move the field on. I draw specifically on Activity Theory as it addresses not only the object of management capability but also takes account of multi-level phenomena such as norms, stakeholder interests, power and the division of labour. Such a framing can potentially enrich our conceptualisation of the management capability in relation to innovations in work practices. After discussing Activity Theory I will then address some of the challenges in approaching individual and collective level dimensions of management capability.

Activity Theory and Management Capability Construct Development

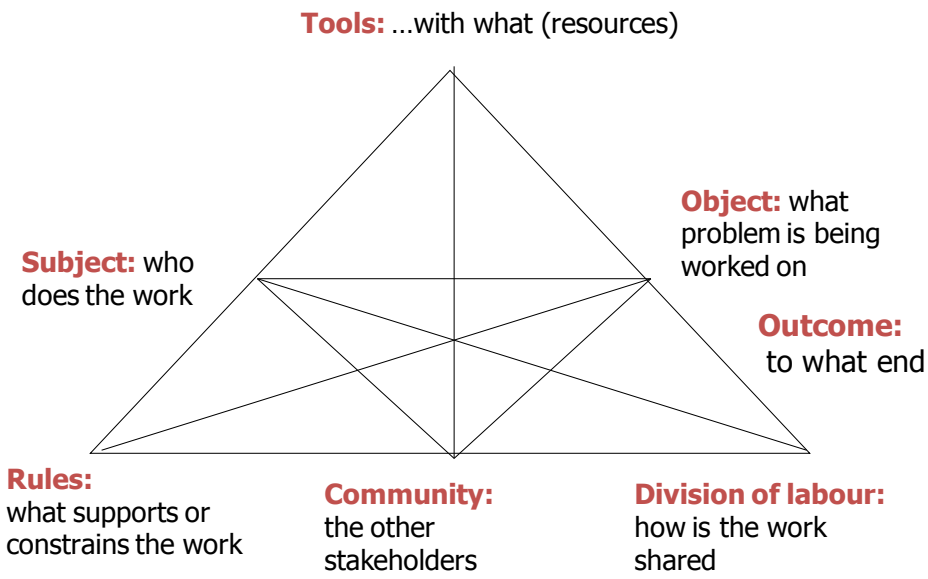
Activity Theory (Engeström, 1987) provides a set of methodological tools that can be used to understand the practices that constitute management capability in different contexts. In activity theory, the activity is defined with the help of the concept of

object. The object of activity is twofold in that the object is both something given and something projected or anticipated (Leont'ev, 1978). According to Leont'ev, the object determines the horizon of possible goals and actions that functions as the motive force driving the activity forward. The subject constructs the object, and identifies those properties which are important for social practice.

Management capability is a multi-dimensional construct and can be defined by the objective of the activity. For example, the management capability required to introduce an Enterprise Resource Planning system would be quite different from the management capability needed to sustain inter-organisational relationships, or to support new product development. However, all of these objects have the potential to be something projected as well as something given. It is therefore an appropriate framework to deploy in considering contexts of innovation and change. Furthermore, activity theory provides an integrated approach to understanding the tools, resources and capabilities used by managers to achieve different objectives within the organisational system and holds open the possibility for learning and adaptation. This dimension is explored through the frameworks emphasis on tensions and contradictions.

Before we describe in more detail the advantages of activity theory as an approach to the conceptual development of management capability it is important to comment on the term ‘management’ itself. Management can be defined in either collective or individual terms. It can refer to a group of managers at different levels (senior, middle, front-line) or different functions (marketing, personnel, finance etc) but it can also refer to the tasks and activities deployed by individual managers to do their work.

Activity Theory sees expertise, such as management capability, as a collective attribute that is spread across systems and which is drawn upon to accomplish specific objectives or tasks. As such it recognises the diversity of work that expertise can be used to accomplish. It also contends that management capability lies in both the system and individuals ability to recognise and negotiate its use. Such capability has been described as the 'collaborative and discursive construction of tasks, solutions, visions, breakdowns and innovations' within and across organisational systems' Engeström and Middleton (1996). This definition, takes us away from a primary focus on expertise, or capability as individual mastery of well-defined tasks. In the context of workplace innovation and change which is the focus of this dissertation, the work of managers in introducing and sustaining commitment to new ways of working potentially draw on a wide range of knowledge, skills, tools, artefacts and attributes. The capability of managers when confronted with these challenges could be seen to be one of bricolage, in how they knit together solutions that are appropriate given the collective resources in the system and the embedded norms.



The figure above represents an activity system (Engeström 1999, 2008), which consists of interacting elements. If we were to apply this framework to understanding management capability for introducing and sustaining innovations in work practices, the following process might be conducted. The 'object' of the work could be adoption of specific new work practices and the 'outcome' improved productivity or customer service. The focus of our research would be on the tools that managers (the 'subject' who does the work) use to work on the problem. These tools might involve cognitive tools such as the concept of a high performance work system, or skills such as the ability to negotiate with union representatives, or personal resources such as the ability to communicate a strong vision of the future workplace. This work in the top triangle is constrained and shaped by forces within the organisational context. These forces might include norms (i.e. individual performance pay is not acceptable) to communities (engineers and scientists) to how work is currently organised. The model suggests that in the activity of working on a new object such as a high performance work system, this work may also establish new norms that support the objective, engage new stakeholders (for example, operations managers) and also lead to reforms in how managerial work is shared.

Such a dynamic framework helps address many of the tensions and contradictions surfaced by changes in work and I contend that it is a valuable approach to deepening our understanding of the types of managerial capability (at the collective and individual level) required to support innovation in work practices. Furthermore, the cultural and historical embeddedness of this approach moves us beyond the dominant and limited positivist paradigm that has shaped most of the extant research on high performance work systems.

I now turn to consider a further dimension in the construct development for managerial capability, namely its multi-level character and the interplay between individual and collective resources. Given the situated nature of management capability and how it is shaped by goals and objectives, the discussion focuses on understanding the processes that can account for the interplay between the collective and the individual.

Understanding the Multi-level Processes that Shape the Emergence of Management Capability

In any study of organizational phenomenon that take a multi-level perspective, the primary goal is to identify the principles that enable a more integrated understanding of how they unfold across different levels in an organization (Klein and Kozlowski, 2000). In the case of management capability for innovation in work practices, future research needs to explore both top-down and bottom-up processes. Fundamental to a multi-level perspective is that micro phenomena are embedded in macros contexts and that these macro phenomena often emerge through the interaction and dynamics of lower level elements.

The macro perspective is rooted in sociological perspectives whereas the micro tends to be anchored in psychological ones. Neither perspective is helpful for a holistic understanding of organizational phenomena such as management capability. The macro perspective neglects the means by which individual behaviour, perception and affect (in my research the relational quality developed by managers with their employees) give rise to higher level phenomena (such as organisational performance).

On the other hand, the micro-level perspective can underplay the contextual factors (for example, firm size, technology, production system, exposure to international market competition) that can shape micro-level responses.

The real challenge researchers face is the extent to which the observation of a micro-level phenomena (e.g. management relational quality) can be scaled up to the organisational level. This raises questions about the extent to which conclusions can be drawn that it is this individual level capability than can explain higher levels of capability and performance. It is possible that other mechanisms and processes might account for these higher-level effects. These types of misspecification are long-standing challenges in multi-level research.

Another factor to take account of is the extent to which higher-level constructs may either moderate or have direct affects on lower level phenomena. If we take the case of management capability, the levels of investment in managerial human capital at a macro-level may have a direct or even moderating effect on the micro-level of management capability (i.e. as demonstrated by the relational quality at the individual manager-employee level). These two processes are inter-dependent and an increase in the higher-level construct has knock-on effects at the lower level. Firms that do not invest in HR-management capability may experience less satisfactory outcomes at the individual management-employee level.

At the micro-level, emergent processes that enable high levels of relational quality to develop might in turn begin to shape higher-level constructs such as management capability. For example, innovative managerial practices at a micro-level enacted by a

small group of managers may be noticed by higher-level and macro-level mechanisms may begin to institutionalise these practices across the organisation. Detailed case study research is required to explore how the micro and macro levels interact to shape constructs such as management capability in relation to innovation in work practices. Any such case study work needs to take account of temporal aspects to reveal these mechanisms at work. Although my own research has a longitudinal perspective, it is characterised by slices of observation at different times rather than long-term engagement in evolving processes. This raises epistemological questions about whether a construct such as whether management capability changes or is perceived differently over time at different levels in an organizational system.

In summary, management capability could be seen as an emergent phenomenon, one that is continually adjusting to new contexts and situations. It originates in the cognition, affect and behaviours of individual managers and is amplified by their interactions and manifests as a higher-level collective phenomenon. Management capability can also constrain the emergence of higher-level phenomena. For example, low levels of capability could undermine the successful introduction or extension of new work practices and could also limit the quality of the relationships developed between managers and employees. The challenge for future research on management capability in the context of innovation in work practices (or for that matter any other object of management activity) is to be sensitive to these multi-level and multi-dimensional aspects.

The potential research terrain opened up by a focus on management capability, innovations in work practices and performance at the multilevel is exciting and

challenging and I hope that this dissertation has made its own modest contribution to developing this area.

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