Technology, Culture and HRM: A 'Neo-contingency' Anglo-French Comparison

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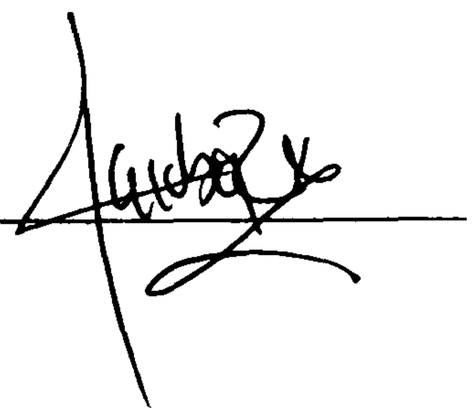
Declaration

I, Jacob Ramirez do hereby declare that this is my own original work and the use of all material from other sources has been properly and fully acknowledged. I confirm that this thesis or any part of the material offered has not previously been submitted for a degree or qualification, in the University of Newcastle upon Tyne, England or any other institution.

I confirm that the above is a true statement.

Signature: 
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Abstract

The objective of this research is to provide a new perspective on how technology, culture and human resources management policies and practices (HRMPP) are approached by firms located in France and England. This thesis offers a new perspective: 'neo-contingency' approach; which analyses both the contingency and the divergence theories. The contingency variable chosen in this study is technology. The divergence theory is specifically illustrated by the national education approach. The HRMPP studied are: recruitment and selection, organisation, training and compensation. One hundred and sixty-three high-, mid- and low-tech firms answered a questionnaire which is analysed along with twenty-five semi-structured interviews in eight firms located in both France and England. The technological aspect of the neo-contingency approach is validated in two factors: 1) technological profile and 2) long-term approach to training. The cultural aspect is notable in two cases: 1) long-term approach to training, and 2) compensation based on performance. A key implication of the findings in this thesis is that employees working in intensive technology firms need a creative and adaptive HR management approach, which would better enable them to cope with the challenge presented by the business environment. The results that this thesis report are illustrated by the strong influence of educational systems on managers' behaviour. French firms seem to prefer higher levels of control and formalisation in recruitment and selection, training and compensation than the UK, which could be interpreted as a reflection of the French educational system. It is important to highlight that the culture and technology factors cannot be the total 'determinants' of organisations. At most, they are important features that, along with others, 'influence' organisations' internal operation. Future 'neo-contingency' studies using other organisational characteristics as moderators and a large sample are needed in order to gain insights into the neo-contingency approach proposed in this thesis.

Keywords: Contingence, technology, divergence, education, 'neo-contingency', HRMPP, France and England.

Acknowledgements

This thesis reports a cross-national study in an attempt to clarify the association of certain cultural and non-cultural characteristics with the operation of human resources management policies and practices (HRMPP) in different settings. This thesis is a compilation of observation and interaction with HR managers, employees, academics and research students accumulated over four years (January 2000 – February 2004) in France and England. Access to organisations' internal HRM operation was one of the cornerstones in building this thesis. Thus, I am tremendously indebted to managers and employees of different companies in France and England, who generously provided their experiences of the influence of cultural and non-cultural characteristics in their daily work-relation and operation activities.

My appreciation to the academic staff at the Management School in Newcastle upon Tyne University, UK and School of Management, Grenoble France, who provided their time and knowledge guiding me in the development of this thesis. My indebted gratitude to my supervisors: Professor Dominique Jolly and Ian McLoughlin, and external examiners: Professor Stephen Procter and Michel Tremblay whose numerous invaluable comments helped to shape this work. Professor Marianela Fornerino set me straight on several statistical details to her my sincere appreciation. Without their guide of professor Jolly, McLoughlin and Fornerino the development of this thesis would not be possible.

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Jacobo Ramirez
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Table of Contents

Appendix

List of tables

List of Illustrations

Chapter One: Introduction

1.1 Research background

Human resource management policies and practices (HRMPP) have been recognised increasingly as the basis for achieving sustained competitive success, particularly for firms operating in challenging and rapidly changing international competitive environments (e.g. Pfeffer, 1994; Geringer *et al.*, 2002). Managers and academics around the world have been concerned by environmental conditions facing organisations (Kerr *et al.*, 1964; Lawrence and Lorsch, 1967; Pavitt, 1998), which are becoming more diverse and encounter constant changes. These concerns are related to technology (Woodward, 1965; Perrow, 1967), strategy (Porter, 1990), culture (Child, 1981; d'Iribarne, 1989; Crouzet, 1990), management (Taylor, 1911; McGregor, 1960) and cross-national management (Adler N., 1983; Hofstede, 1991, 1993) among other disciplines. In management studies one line of investigation has stressed the efficient use of Human Resource Management (HRM) policies and practices, which are presumed to vary across organisations due to different: (1) strategies (Schuler and Jackson, 1987), (2) technologies (Balkin and Gomez-Mejia, 1984; Cascio, 1990; Bolland and Hofer, 1998) and (3) national cultures (Maurice *et al.*, 1980; Child, 1981; Tayeb, 1987; Lane, 1991; Brewster and Bournois, 1991). These concerns are not new to managers and academic research. A specific line of investigation on technology and environmental factors affecting organisational process has been developed since the Second World War by different researchers such as: Burn and Stalker (1961); Woodward (1965); Lawrence and Lorsch (1967); Thompson (1967). They examined how organisations must vary if they are to cope effectively with different environmental circumstances.

Also they argued that there is clearly no single best way for firms to organise themselves in all situations. These researchers can be credited with the foundation of the school known as the contingency theory of organisations. Contingency theory holds that factors in the environment, as well as firms' characteristics, such as size, level of technology and industrial sector, establish the 'best fit' for an organisation in order to reach a maximised, profitable performance.

Although the contingency theory presents different theoretical and methodological challenges, it was decided to base this project on this theory because: (1) previous research trying to link technology with organisational structural process failed to control methodological problems, and therefore failed to demonstrate the validity of the contingency approach; (2) most of the criticisms of the contingency theory have been made by researchers who have proposed theories that might be more complex, unresolved systems of contingency propositions (Donaldson, 2001), for example, the McKinsey 7-S framework (Pascale and Athos, 1986), theory Z (Ouchi, 1981) and the eight characteristics that fit together in the best-run companies (Peters and Waterman, 1982); (3) there is an increased tendency to classify organisations in terms of their technical system. As Charles Perrow (1967: 195-214) points out: "...technology is a better basis for comparing organisations than the several schemes which now exist"; and (4) debate, confusion and controversy on the contingency variables that affect the 'best fit' of organisations that could lead them to a superior performance, still in academic literature. It was decided to enter into this debate in order to make a modest contribution on methodology and theory building to organisations' contingency theory.

1.2 The problem and research questions

Many cross-national studies have reported similarities between organisations' operation in diverse cultural and societal settings (McMillan *et al.*, 1973; Lammers and Hickson, 1979). These similarities were found especially in the relation between the structural characteristics of organisations on the one hand and their contexts on the other. However, other studies have reported considerable differences between organisations operating in similar task environments but different societies. For example Maurice and colleagues (1980) found that there were differences between France, West Germany and England with regard to configuration, work-structure and coordination, as well as qualification and career systems. In a study conducted by Gallie (1978) on French and British oil refineries, he found a substantial contrast in the attitude of employees and their relations with management. His principal conclusion is that 'technology per se', at most, has very little importance for organisations' management practices. The question therefore arises as to the extent to which differences and similarities are to be explained in the following two specific questions:

1. **What is the relationship between a firm's technology and its HR policies and practices?**
2. **How different would this relationship be (HR & technology) from that of firms located in different countries?**

There is clearly a range of possible explanations for organisations, management and especially HRMPP, but most researchers often choose just one approach, either the contingency-type approach or the cultural perspective in order to explain a phenomenon. However, such a viewpoint constitutes only one aspect of the range of variability in organisational management. This thesis attempts to address the relation between one contingency variable, technology, and one divergence institution, the education system, with regard to certain HRMPP in an international context. Therefore, this thesis offers a new perspective in management studies, which is called 'neo-contingency' approach as Miles and Snow (1978) and Maurice (1990) Donaldson (2001) have anticipated. This perspective appears to be in contrast to the claim that different paradigms in organisational analysis are irreconcilable (Tayeb, 1984), the view, which is taken here, is to study the two perspectives (technology and education) potentially to add to the understanding of organisational management as a whole (e.g. Child and Tayeb, 1983).

This research supports the theory that HRM principles are applied differently in diverse industrial settings. It also argues that if two different firms located in different countries have the same level of technology, then the two firms would present a similar arrangement of HRMPP. Furthermore, culture and technology cannot be the total 'determinants' of organisations. At most, they are factors that, along with others, 'influence' organisations. Essentially, this research demonstrates that the contingency variable, technology, moulds certain HRM practices in the same direction in both France and England. However, the intensity in the degree of this direction regarding certain HRM practices is different in both countries, which can be explained by the basic cultural and economic-political differences between France and England. In this thesis, rather than concentrating on, or claiming primacy for, one theoretical perspective, they must all be taken into consideration. The contingency and divergence

approaches are interactive, although at the same time it may be possible to identify some particular influences emanating from each of them.

This thesis covers a wide range of areas: from HRMPP and cross-national differences to technology. The aim is to provide a perspective on how technology is approached in organisations operating in England and France, and how this is related to HR policies and practices. However, management studies such as this face the challenge of overcoming research difficulties. Limitations, such as framing the scope of the project in the obtaining of first hand information, among other variables, present methodology difficulties. Thus, this particular research does not seek to study all the contingencies that might shape management practices. Nonetheless, it offers to shed some light on the proposed neo-contingency theory by analysing institutional and technology strands together.

Finally, this research covers a wide range of areas: from HR practices and cross-national differences to technology. However, it aims to provide a perspective on how technology is approached in organisations operating in England and France, and how this is related to HR policies and practices.

1.3 Justification for the research

The research questions in this work are highly significant and are essential to present-day managers and academic researchers. Because changes in the business environment are so dynamic nowadays, it is important to clarify to managers and to fruitful academic literature which HRMPP would facilitate a firm's internal 'fit'. HRM 'fit' eventually would lead to major organisational effectiveness, efficiency and participant satisfaction, thus maximising a firm's performance (Kast and Rosenzweig, 1985). Furthermore, although some progress has been made over the last ten years in the knowledge and understanding of the management process, "the question remains whether the large amount of research and writing in this field has been useful to or used by industrial managers in tackling their practical problems of organisations" (Dawson, 1992: 252). From a manager's point of view, much of what is being written is difficult to read. In addition, many full-time management students say that much of this literature is difficult to assimilate. Therefore, "there is an urgent need for clarity

and simplicity in what is being said and written" (ibid: 253). Thus, one of the challenges of this research is to communicate clearly the findings reported here to managers and academics.

Moreover, current academic literature calls for the need to reduce the theoretical confusion "of the one best ways to organise in all situations" (Kast and Rosenzweig, 1985). Managers have long recognised that different industrial environments have particular economic and technical characteristics, each of which calls for a unique competitive strategy (Lawrence and Lorsch, 1967). In other words, a set of HRMPP that work well for a firm in the chemical industry will not necessarily meet the needs of a corporation producing textile goods, for example. Unfortunately, some studies have failed to demonstrate these differences (Pennings, 1975; Donaldson, 2001); therefore the importance of making a contribution in this area is also significant for academic literature and practitioners.

By answering the research questions posed here, this thesis offers two main contributions to academic literature and practitioners:

1. It demonstrates that contingency variable technology moulds certain HRM practices (recruitment and selection, training and compensation).
2. Fruitful methodological issues on neo-contingency approach and cross-national research.

1.4 Methods and results

The major objective of this particular study is to gain an understanding of the organisational characteristics which allow firms to deal effectively with different kinds and rates of technology. It is a multidimensional study which, in the context of viewing organisations as social systems, has examined the complex relationships between HRMPP, organisational structure, the firm's economic and technological environment, and the national and economic institutions where the firms are located.

With the aim of answering the major questions of this research, a comparative model was developed. Different organisations were analysed in several industrial sectors located in France and England and different levels of analysis and theories have

guided this research. The first phase of this research aimed to demonstrate the differences of HRMPP between a matched sample of high-tech, mid-tech and low-tech firms located in France and England.

Little effort has been taken to conduct an investigation, which implies different methodological and theoretical framework challenges, specifically studying the effect the level of technology of a firm has and its influence on HRM under a cross-national perspective. However, the challenge was taken up and interesting findings, which are reported here, have been accomplished through the four years of researching firms in different industrial sectors in France and England.

The techniques that have been developed in this research seek to make a contribution to methodology in the area of organisational and management studies. However, many of the techniques utilised in this project are not new and they have been used by different researchers (e.g. Woodward, 1958; Lawrence and Lorsch, 1967; Perrow, 1967; Child, 1972b; Steers, 1975; Drazin and Van de Ven, 1985; Tayeb, 1987; Crouzet, 1990; McGovern, 1998, among others).

The disciplines involved in this research are complex. Therefore, it focuses on profitability-oriented companies, in order to limit the number of complications in trying to match a sample of French and British firms. Additionally, this investigation does not suggest that it can answer all the research questions proposed here. It does, however, describe a research study that attempts to find out what types of HRM practices and policies will be effective under different technological and national settings conditions. In doing so, it offers a way of understanding the complexities of large organisations, which can be helpful in making more sense of some of the current management theories.

The research findings and research proposition presented here are addressed primarily to the practitioner administrators, because they appear to apply immediately to their thinking on HRM policy and practice issues. It should, however, be stated clearly at the outset that the findings of this study seem to have important theoretical implications and suggest a number of opportunities for future inquiry.

1.5 Plan of this thesis

The organisation of the thesis follows the methodology that the author proposes for the study of HRMPP in different countries and industrial settings. Chapter two presents and discusses the foundations of the contingency and divergence theories by reviewing their pioneering contributors to their assumptions and empirical research. With regards to the contingency theory, the criticisms of this perspective are discussed. The technology contingency variable is discussed in detail and this chapter proposes a new approach in measuring it. This approach suggests the examination of technology through its components: (1) technoware, (2) humanware, (3) inforware and (4) orgaware. The analysis of these components aims to give a holistic view in measuring the level of technology that a firm has. In this way the criticisms of lack of variability of the technology variable (Mohr, 1971; Pfeffer, 1982) could be diminished. On the other hand, the divergence theory is presented and discussed through the institutional strand. Here the argument which stresses the importance of the cultural and national institutional factors prevailing in the place where a firm operates in contributing to its internal organisation is developed. The national culture to firms' internal organisation relation expresses a fundamental tension in management studies (Nelson and Gopalan, 2003). Thus, the study of these contextual variables together would yield to enriching management studies. The degree to which organisational management practices deviated from national patterns, and the manner in which they deviate, may shed light on an important tension between organisations and their contextual internal and external variables. It is important to underline that chapter two does not intend to claim primacy either for the contingency or divergence theory for understanding workplace relations. Rather, this chapter proposes analysing the contingency and divergence theories together in the form of a 'neo-contingency' approach for this particular cross-national study. Chapter three presents the institutional strand introduced in chapter two and is related to the concrete setting for this thesis: the educational system. This chapter develops the argument that the education that managers received from their early years at school, shapes their behaviour in workplaces. A comparison between France and England is highlighted. According to Government data and academic literature, France presents higher levels of formalisation and control in its educational system than England. Additionally, the level of attendance in formal education is

higher in France than in England. These findings have important implications for the development of the neo-contingency approach that this thesis aims to test empirically.

The HRM factor is raised in chapter four. This chapter develops the argument that a firm's level of technology has a different impact on the operation of certain HRMPP. This analysis directed the generation of the hypotheses tested in this thesis. Although the critical interface of the different approaches to HRMPP according to the contingency variable technology seems to be obvious, the 'neo-contingency' perspective proposed in this study provides a different view for cross-national research; which also requires a different research design. Chapter five develops the methods chosen to guide this study. This chapter sets forth both the qualitative and quantitative research methods that were developed to resolve the research questions presented in chapter one that seems to be a paradox to cross-national management researches.

On the other hand, cross-national enquiries present the challenge of obtaining a representative sample from which data to test the hypotheses could be gathered. Chapter six presents the way in which the Anglo-French sample was constructed and validated. It discusses the drawbacks and the solutions given to the problem faced in order to obtain comparable sample sets of French and British firms. Also, this chapter presents the statistical analysis for the sample validation. The sample presented in chapter six was individually analysed in chapter seven, in order to classify each firm according to the technology variable. This analysis involved a detailed examination of the technology components discussed in chapter two, which diminished the problems of measuring technology at the firm level of analysis.

Chapter Eight presents and discusses the results of the instrument validation and model test. The statistical analyses presented in this chapter assisted the validation of the hypotheses, which was supported by the different interviews conducted in France and England. Additionally, the analysis of HRM factors under the neo-contingency approach suggests that French managers tend to have a higher level of formalisation and control in workplace activities than their British counterparts. HRMPP are applied differently; their determinants are both technology and national institutions. This thesis

demonstrates the applicability of the neo-contingency theory in shaping the operation of HRMPP in different settings.

Finally, in Chapter Nine the author presents a synthesis of the arguments developed in this thesis, which confirms the power of the 'neo-contingency' approach proposed. The author of this thesis departs from the traditional cross-national research in order to focus on the theoretical implications of the empirical observations, integrating the elements of labour relations: educational systems and technology. Recommendations for future research are presented as concluding remarks.

The appendix section of this thesis presents the information that supports the quantitative and qualitative analysis of this thesis. Four different appendixes are presented: Appendix 1: Technology definitions; which reviews the different definitions to technology found in the academic literature. Appendix 2: Measurements and general testing approach. This appendix discusses the corrections made on language (English/French) developed in the back-translation process to the questionnaire. Appendix 3: Invitation letters and questionnaires. This appendix presents the documents sent to the HR managers in the sample; and appendix 4: Samples. This appendix lists the firms contacted in this research.

Chapter Two: Theoretical background: Contingency and divergence theories

2.1 Introduction

Management studies require a strong theoretical background for designing research strategies. Comparative HRM research of firms operating in different industrial settings and countries requires a combining of different perspectives. This chapter analyses two theoretical perspectives: the contingency and divergence theories. These theories are compared and contrasted with the purpose of finding a theoretical model to guide this research. The overall aim of this chapter is to disclose a new theoretical perspective whose objective is to underline how the contingency and divergence theories complement each other. As a means of achieving this objective, the contingency theory is studied by emphasising the technological strand. Technology is analysed through four components: (1) humanware, (2) technoware, (3) inforware and, (4) orgaware. From this analysis it was decided to define technology as a continuous variable ranging from low, mid to high tech. On the other hand, the divergence approach is studied from the institutional perspective. This shows how defenders of the divergence perspective are concerned with the national culture as a factor that shapes firms' internal organisation.

This chapter does not seek to discuss in detail the theoretical background of the contingency and divergence theories as a prescriptive approach to management enquiries. Also, it does not intend to claim primacy for either of these two theories. Rather, the contingency and divergence theories are discussed in such a way as to enhance cross-national research through the 'neo-contingency' perspective proposed here. It is concluded that technology and national institutions analysed together give a different perspective to management studies.

2.2 Contingency theory

The review of the two major schools of organisational theory (human relations and classical theory) seems to apply their logic in certain environmental conditions. The classical theory tends to hold in more stable environments, while the human relations

theory is more appropriate for dynamic situations (Lawrence and Lorsch, 1967: 183). Both theories were needed to explain behaviour in organisations operating in distinctly different environments; one theory could not displace the other. However, both traditional theories might be subsumed under a broader theory that is called "a contingency theory of organisations". From the early 1950s different researchers from both side of the Atlantic (e.g. Burns and Stalker, 1961; Woodward, 1965; Lawrence and Lorsch, 1967) have examined how organisations must vary if they are to cope effectively with different environmental circumstances. They founded the school of organisational contingency theory. The contingency approach is a major departure from the principles-of-management model, where the principles are universal and prescriptive, while, the contingency approach is situational and non-prescriptive (Haimann *et al.*, 1978: 37).

Furthermore, the contingent paradigm is that organisational effectiveness results from 'fitting characteristics of the organisation, such as its structure, to contingencies that reflect the situation of the organisation' (Burns and Stalker, 1961; Woodward, 1965; Lawrence and Lorsch, 1967).

Table 2.1: Traditional Organisational Theories

Organisational Theories	Authors	Hypothesis
Classical Management Theory	Brech (1964)	Argues that maximum organisational performance results from maximum formalisation and specialisation.
Universalistic Theory	Taylor (1911); Fayol (1949)	Argues that there is 'one best way' to organise, meaning that maximum organisational performance comes from the maximum level of a structural variable, for example, specialisation (Taylor, 1911).
Neo-human Relations	Likert (1961)	Argues that organisational performance is maximised by maximising participation.

According to Kast and Rosenzweig (1985), the contingency view of organisations suggests that an organisation is a system composed of subsystems and delineated by identifiable boundaries from its environment supra-system. Following the Kast and Rosenzweig (1985) argument, the contingency view seeks to understand (1) the interrelationships within and among subsystems as well as between (2) the organisation and its environment and (3) to define patterns of relationships or

configurations of variables. Therefore, the contingency perspective emphasizes the multivariate nature of organisations and attempts to understand how organisations operate under varying conditions and in specific circumstances.

Contingency views are ultimately directed towards suggesting the most appropriate organisational design and managerial actions for specific situations. In addition, contingency theory differs from all such universal theories in that it seeks firms' performance as a result of adopting, the management practices that 'fit' the firms' internal and external environment demands (Lawrence and Lorsch, 1967; Donaldson, 2001). Thus, it can be suggested that management practices are a dynamic function that have to adapt to different 'circumstances'; 'it all depends' on a number of interrelated external and internal variables. According to Kast and Rosenzweig (1985: 552) "contingency views represent a middle ground between (1) the view that there are universal principles of organisations and management, and (2) the view that each organisation is unique and that each situation must be analysed separately".

2.2.1 'Fit'

One principal argument of the contingency theory is that there is no 'one best way' to organise and manage if a firm seeks to reach a 'fit' between its contexts and its internal organisation. This premise is based on the argument that the survival of an organisation depends upon its efficient and effective (optimum) performance (Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Tayeb, 1987). This optimum performance, in turn, can be achieved if a firm responds and adapts to its environmental demands 'appropriately'. The appropriate response is crystallised in a 'match' or 'fit' between structural characteristics and contextual and other environmental variables (Lawrence and Lorsch, 1967). In fact, a firm seeks to attain 'fit' to contingencies because it leads to organisational high performance (Donaldson, 2001).

The effectiveness of an organisation is affected by the 'fit' between the organisational structure and the contingencies. This leads a firm to adapt its organisational structure so that it moves into 'fit' with the contingency factors. In this way organisational structure is determine by contingencies (Donaldson, 1996). If an organisational

structure misfits a contingency variable, such a firm would exhibit a lower performance. This explains organisational change by contingency theory and, why contingencies and structure are associated empirically (Donaldson, 2001). Furthermore, for each level of contingency variable there is a level of the organisational structure variable that produces a higher performance, and thereby constitutes a 'fit'. Thus a 'fit' is central to contingency theory because it explains variations in organisational performance, organisational change, and associations between contingencies and structure (ibid).

Performance: Organisational performance can be defined in diverse ways; table 2.2 presents two definitions. However, one of the most controversial aspects of performance is how to measure it, which constitutes an important aspect for theory building and practitioners.

Alternatively, the contingency perspective can be hypothesised as organisational context (whether environment, technology, or size) that is related to structure and management practices (centralisation, formalisation, complexity, HRM) without examining whether this context-structure relationship affects performance (Drazin and Van de Ven, 1985), like earlier contingency works such as Perrow (1967).

Table 2.2: Performance Definitions

Definition organisational performance	Authors
The ability of the organisation to attain the goal set by itself	Parsons, 1961
The ability to satisfy its stakeholders	Pfeffer and Salancik, 1978; Pickle and Friedlander, 1967

Nonetheless, contingency literature proposes two approaches: (1) 'fit' as congruence, and (2) 'fit' as iso-performance (Van de Ven and Delbecq, 1974; Drazin and Van de Ven, 1985; Donaldson, 2001).

'Fit' as Congruence: This approach holds that a 'fit' is a combination of the levels of the contingency and structure that produce higher performance (Donaldson, 2001). In a congruence proposition, a simple unconditional association is hypothesised to exist among variables in the model (Drazin and Van de Ven, 1985: 514). In other words, the

greater the task uncertainty a firm has in its work-units, the more complex the structure such a firm would exhibit. Other combinations in a firm's structure are incongruent; therefore if the level of the structure does not have the 'fit' that the firm requires for the level of the contingency, the lower the performance results (Donaldson, 2001).

Pfeffer (1998: 158) refers to a 'fit' as a congruence of the 'consonance hypothesis', meaning that those organisations that have structures that more closely match, or 'fit' the requirements of the context will be more effective than those that do not (Pfeffer, 1982: 148). Additionally, Pennings (1975: 225) refers to the matching concept of 'fit', as: "a value on a structural dimension for each level of an environmental dimension which will maximise effectiveness". This logic embraces the idea that there are different degrees of 'fit' and misfit. Drazin and Van de Ven (1985: 520) supports the idea of different degrees of 'fit' in that the farther the organisation is away from a 'fit', the greater its misfit and the lower its expected resulting performance.

The Woodward (1965) study of congruence (consonance) between technology and organisational structure is an exemplary research of 'fit'-performance relationship. In unit and small batch production, the span of control was low, for mass production it was high, and for process production it was again low (Woodward 1965). Those firms that were at or at about the mean span of control for their technology category performed higher than the firms whose spans of control deviated from the mean. This held for each of the three technology categories. Thus, in Woodward's study, a 'fit' is having the mean structural value for the level of technology contingency and misfit is a deviation from the mean. In other words, she found support for the consonance hypothesis that firms that had congruence between their technologies and structure were more effective than those that did not. This is the general idea across all studies that operationalise 'fit' as congruence (Donaldson, 2001).

'Fit' as Iso-performance: Drazin and Van de Ven (1985) see 'fit' as an iso-performance line. Iso-performance means equal performance, in which each point on the performance line causes equal performance at every point. In other words, all 'fits' are equally good. For each value of the contingency variables there is an

organisational structure value. There is a 'fit' that produces the highest performance for the value of the contingency variable (Donaldson, 2001).

This logic is seen for example in Woodward's (1965) study of the 'fit' of span of control to technology. Those firms that fell in the 'fit' spectrum were the highest performers in the whole study, even though there were three different 'fits, one for each technology category. For example, firm A would be in 'fit' with its mass production technology and firm B in 'fit' with its process production technology. Despite being in different 'fits, the two firms have equal performance ratings, that is, both are in the highest performing sub-group of all the firms in her study. Thus, by being on the 'fit' line, performance was increased. However, there is no increase in performance from moving along the 'fit' line. Iso-performance means that 'fit' to low levels of the contingency variable produces the same performance as 'fit' to high levels of the contingency variable (Drazin and Van de Ven, 1985; Donaldson, 2001).

2.2.2 Contingencies

Different researchers have identified various contingency variables (e.g. Child, 1981; Pfeffer and Cohen, 1984; Tayeb, 1987; Budhwar and Debrah, 2001) Research into organisational structure has identified a number of contingencies factors: (1) task uncertainty (Gresov, 1990), (2) technology (Woodward, 1965), (3) innovation (Hage and Aike, 1967; 1969), (4) environmental change (Child, 1975), (5) technological change (Burns and Stalker, 1961), (6) size (Blau, 1970); and (7) task interdependence (Thompson, 1967). Some contingency variables are within the organisation and others are outside of it. Contingency factors such as task uncertainty and task interdependence are aspects of work being performed and lie inside the organisation (Donaldson, 2001: 17). Organisational size and the presence of a formal HRM department and technology are also internal organisational characteristics. In contrast, other contingency factors are characteristics of the environment, which are external to the organisation. It is important to highlight that the concept of organisational environment has remained one of the most difficult to define and measure. However, one perspective is that environmental complexity refers to the heterogeneity and range of activities which are relevant to an organisation's operations (Child, 1972a: 3). These aspects include cultural, political, economic and legal factors, as well as

technology and the status of information about events relevant to the organisation. They also affect internal contingencies, which in turn mould other internal organisational characteristics, for example, a firm's HRMPP and structure.

Above all, a contingency is any variable that moderates the effect of an organisational characteristic on organisational performance (Donaldson, 2001), as Donaldson (2001: 89) states: "whether a factor is a contingent of an organisation depends on whether aligning the structure and the contingency produces higher performance". Thus, the complexity in organisational contingency makes it difficult to find the 'perfect' 'fit' between the organisational structure and its context.

Structure: The prevailing approach to explaining organisational structures in societal and business school literature has been the structural contingency theory. Contingency-structure emphasises efficiency, in common with the market failures approach.

Jay R. Galbraith (1973:2) has briefly and aptly summarised the premises of the structural contingency theory:

1. There is no one best way to organise.
2. Any way of organising is not equally effective.

Woodward (1965) has shown that some traditional ideas on organisational structure pertain to firms with a particular kind of technology and are less relevant for firms with other technologies. Furthermore, organisational structures are determined to a high degree by contingency variables, where dissimilar technologies and size cause variations in the structure of an organisation. For example, firms in mass-production industries tend to have more levels of authority and narrower spans of management (Woodward 1965). Thus, the structure of an organisation is *contingent* upon the technology that the organisation uses (Haimann *et al.*, 1978: 38).

Woodward found that in many structural variables there were curvilinear relationships, with batch and process production being more similar to each other than to mass

assembly-line production. Additionally, Woodward's work patterns became discernible: firms with similar production systems appeared to have similar organisational structures. Her research empirically demonstrates the link between technology and social structure first postulated by Thorstein Veblen (1904). However, her research did not suggest that technology was the only important variable in determining organisational structure. In addition, Woodward's research suggests that organisational factors such as the history and background of a firm and the personalities of the people who built it up and subsequently managed it are important (Dawson and Wedderburn, 1980: 50).

Size: Size is the number of organisational members who are to be organised. This contingency has turned out to be a major factor that affects many different aspects of structure (Blau, 1970; Donaldson, 2001). The number of employees is often closely correlated with other aspects of the scale of an organisation, such as sales or assets; therefore these variables may be used as an indicator of size (Donaldson, 1996). Nonetheless, they are not always highly correlated, so they are, at best, mere proxies for the number of employees, which remains the operational measurement of size (Donaldson, 2001).

Woodward's (1965) findings established that there was also a link between a firm's technology and the relative size of its management group: the ratio of managers and supervisors to non-supervisory personnel increased according to the level of technological advancement. In the same line of investigation Aldrich H. (1972), states that technology is a prior causative factor to size in relation to structure. His main model suggests that initial decisions are made about processes and products; from this follows a technological system which, in turn, needs certain kinds of specialists to run it. An organisation grows in size as a result of the technical needs for certain skills.

Technology: On examining the influence of technology on organisational processes, one must keep in mind that technology and other system inputs are interdependently related (Lawrence, 1967: 133). A useful way to begin an examination of technology, in fact, is to explore the three basic ways in which technology influences behaviour through its effects on other inputs. First, technology is a determinant of the human

inputs required by an organisation and thus, indirectly, of the predisposition of employees. Second, technology is a determinant of certain gross features of organisational structure and procedure. Third, technology is an immediate determinant of individual and group job design and, therefore, is indirectly a determinant of social structure and norms (Kast and Rosenzweig, 1985).

Different approaches to technology: Academic literature poses a great debate in relation to the definition of technology (for a review, please see table 1 in the appendix 1: Technology Definitions). Indeed, some of the misunderstanding about the concept of technology is due to the lack of a precise agreement on the meaning of technology (Kast and Rosenzweig, 1985). On reviewing the attempts to conceptualise and measure technology, Scott W. R. (1981) noted that past researchers indicated that technology has been viewed very broadly to include:

1. The characteristics of the *inputs* utilised by the organisation;
2. The characteristics of the *transformation process* employed by the organisation; and
3. The characteristics of the *outputs* produced by the organisation.

The approaches to technology vary according to whether analysts emphasise: (a) the nature of the *materials* on which work is performed; (b) the characteristics of the *operations* or techniques used to perform the work; or (c) the state of *knowledge* that underlines the transformation process (see example in table 1 of the appendix 1: Technology Definitions). This table shows that there is a large number of ways of conceptualising the technology construct, which has led to inconsistency in research results.

Woodward (1965) conceptualised technology in terms of the time period in which the technology was introduced and the length of the production process, with the technical scale ranging from prototype production through small-batch, large-batch, and process production. She was one of the first to focus on the importance of technology in organisational processes. In fact, her research and measures are among the most important studies conducted on technology. Woodward's (1965) studies demonstrated

that firms making technically complex products, both prototypes and large equipments, had a higher ratio of clerical and administrative staff to hourly-paid employees than those making simple products to customers individual requirements, either as a unit item or in small batches (ibid).

In the same line, Thompson (1967) showed that the internal technology of the organisation is a situational factor that determines the required organisational structure. Hickson, *et al.,* (1969), however, failed to replicate Woodward's results for the importance of technology. They argued that one reason might be that technology impacted structure only in those units most immediately associated with the workflow. In large organisations with a smaller proportion of the firm devoted to the actual production task, the effect of technology might be less noticeable. Thus it can be argued that technology does not affect such firms' internal organisation. Mohr (1971), studying public health organisations, found little support for Woodward's central predictions and no support at all for public organisations. Whether the consonance hypothesis would be expected to hold is unclear, since the performance pressures on such organisations might be reduced. Zwerman (1970), using Woodward's exact procedures and methods on a sample of U.S. firms, did replicate her results.

On the other hand, the British research group Aston developed an approach to technology based on operations and machinery (Hickson *et al.*, 1969). One of the findings of the original Aston research that aroused a fair amount of interest, if not controversy, is what might be described as the pre-eminence of size over technology as a predictor of structure. This is due to the importance given to technology at the theoretical level, and, owing to the empirical findings of Woodward (1958), a special analysis was carried out (Hickson *et al.*, 1969). On the basis of this analysis it was suggested that: "Structural variables will be associated with operations technology only where they are centred on the workflow". This effect appears in such characteristics as the proportion of employees in functions like maintenance or production control (Pugh and Hinings, 1976: 172). Hickson *et al.,* (1969) summarised the general findings of the Aston group: technology has some relationship to specialisation, but very little compared to size. It is related to other functions, which are closely tied in an ancillary capacity to the main workflow; and technology has a

somewhat stronger relationship to structure in small organisations. Another school, such as Perrow (1967), defines technology in terms of the kind and nature of knowledge and information needed by the organisation. Perrow's conceptualisation opens up a variety of interesting possibilities; however, it presents one major difficulty, as it is not clear what such a definition excludes.

Most of the early research in technology conceptualisation has focused less on operational or production technology and instead has conceptualised technology in terms of its complexity, analysability, or routineness. Hage and Aiken (1969), for instance, found that organisations characterised by routine technology were more centralised and more formalised. In much of the technology literature, there is an often implicit argument that runs something like this: technology, in terms of its routineness, analysability, or complexity, affects the skills and discretion of the work force and, thus, the control that must be employed. Different structural arrangements (centralisation, formalisation) imply different types of control structures and procedures; and, therefore, technology is linked to structure through its requirements for procedures to control work, which varies in its characteristics; this is like the early arguments developed by Woodward (1965). Nonetheless, it is clear that this argument is couched largely in terms of the impact of technology on control at the level of the individual worker of a work group. Routine technologies permit rules and formal procedures to be developed and implemented because the way in which the job should be done is well understood and the job is repetitive enough to justify the investment in systems, procedures and forms. Unanalysable tasks require control systems and structural arrangements permitting more discretion, and so forth.

Above all arguments and implications that technology might pose to work structure and management, technology in the most general sense refers to the application of knowledge for the more effective performance of a certain task or activity (Kast and Rosenzweig, 1985: 208). According to Galbraith J. R. (1973), technology has two minimum requirements: (1) the systematic application of scientific or other organised knowledge to practical tasks and (2) a division of labour so that this knowledge can be focused on a well-defined segment of work. Alternatively technology could be defined as: "...the organisation and application of knowledge for the achievement of practical

purposes. It includes physical manifestations such as tools and machines, but also it includes intellectual techniques and processes used in solving problems and obtaining desired outcomes" (Kast and Rosenzweig 1985: 208). Technology means the systematic application of scientific or other organised knowledge to practical tasks (Galbraith J. K., 1972: 31).

Table 2.3: Categorisation of Technology

Facets of Technology	Stage of Processing		
	Inputs	**Throughputs**	**Outputs**
Materials	Uniformity of inputs (Liwak, 1961) Hardness of materials (Rushing 1968) Variability of stimuli (Perrow, 1970)	Number of exceptions (Perrow 1970) Interchangeability of components (Woodward, 1965)	Major project changes (Harvey 1968) Multiplicity of outputs (Pugh, Hickson and Hinings 1969) Customisation of outputs (Pugh, Hickson and Hinings 1969)
Operations	Pre-processing, coding, smoothing of inputs (Woodward 1965; Thompson 1967)	Complex of technical processes (Woodward 1965) Workflow integration (Pugh, Hickson and Hinings 1969) Routineness of work (Hage and Aiken 1969) Interdependence of work units (Thompson 1967)	Control of outputs through stockpiling, rationing (Thompson 1967) Value added in manufacture
Knowledge	Predictability (Dornbush and Scott, 1975) Anticipation of fluctuation in supplies (Thompson 1967)	Knowledge of cause-effect relations (Thompson 1967) Analysability of search processes (Perrow 1970) Information required to perform the task compared with information possessed (J.R. Galbraith 1973)	Time span of definitive feedback (Lawrence and Lorsch 1967) Anticipation of fluctuations in demand (Thompson 1967)

Source: Scott W. R. (1981) and own adaptation.

Nevertheless, it is clear that one of the most important impacts of technology on organisations is the way that it has changed the nature of the workforce. This phenomenon has caused the increase in organisational internal complexity (Haimann *et al.*, 1978). Indeed, it is a well-known proposition in the open-systems theory that organisations will tend to map the complexity of environmental elements into their own structures (Buckley, 1967). Scott W. R. (1991) has pursued empirically a specific instance of this argument: that organisations operating in more complex and conflicted environments will exhibit greater administrative complexity and reduced program coherence.

2.2.3 Criticisms of the contingency theory

The contingency theory has been challenged almost from its initial proposition by many researchers (e.g. Mohr, 1971; Pennings, 1975; Schoonhoven, 1981; Pfeffer, 1982; Donaldson, 2001). Two line of criticism can be identified in management literature: (1) lack of clarity in the contingency theoretical statements and (2) lack of methods in empirically testing the contingency approach.

In the first line of criticisms there is one major specific argument in relation to theoretical aspects: (1) theory founded on assumptions of linearity and as being deterministic, tautology and conservative (Schoonhoven, 1981). This criticism has arisen in academic literature because past studies have used the contingent criterion as a predictor of organisational effectiveness (Pennings, 1975; Schoonhoven, 1981). Furthermore, some these researchers have failed to demonstrate if the structural-contingency model was useful for explaining why organisations differ in effectiveness in terms of the contingency variables (Pennings, 1975). Indeed, major proponents of the structural-contingency model have confused or combined technology with the environment (e.g. Hickson *et al.*, 1969). They show little agreement as to whether organisational environment and/or technology have structural correlations. Thus, no conclusive evidence to support the contingency model has been put forward by their studies.

Opponents of the contingency theory who emphasise its views as: (1) conservative and based on assumptions (Schoonhoven, 1981) and (2) deterministic are in fact unrealistic (Kast and Rosenzweig, 1985). A strict deterministic and conservative view suggests that the nature of the environment and the technology dictates the proper organisational structure. This in turn requires a particular managerial system in order to maximise performance (Donaldson, 2001). However, management practices can be seen as an adaptive process of responding to deterministic forces. According to Kast and Rosenzweig (1985), the organisational environment is not absolute; there are facts that can be verified as well as managerial perceptions vs. reality. They also suggest that managers have substantial discretion concerning the task environment they will inhabit (their domain), the goals they will pursue, and the technologies they will use. Managers can make strategic choices (both reactive and proactive) in coping with

contextual forces. They include their own beliefs, values, and attitudes, plus those of other people in the organisation. Furthermore, managers select new structures, and in that way add value, but choose the structure that 'fits' the contingencies, so that the structure is determined by the situation (Donaldson, 1996: 50-52). Indeed, "managers do exercise discretion, and it is wise to develop congruence with the environmental opportunity and among the various subsystems" (Kast and Rosenzweig, 1985: 557).

Contingency theory holds that an organisation in misfit will change its structure to move into 'fit' with its contingency (e.g. Burns and Stalker, 1961; Lawrence and Lorsch, 1967). This contingency statement has raised criticism in relation to a conservative theory, which is based on assumptions. In this regard, Donaldson (2001: 246) identifies three problems with the traditional contingency theory: (1) when a firm is in misfit because it has changed its level of contingency variable (for example task uncertainty), and therefore the firm has moved out of 'fit'. The question that arises is: why the organisation changed its contingency. The contingency theory does not explain this phenomenon. Thus there is a need to extend the contingency theory to explain changes in the contingency factors; (2) the second problem emerges in the situation in which a firm changes from misfit to 'fit': how managers know what the 'fit' is. If managers are unsure about what structures 'fit' their contingencies, it is quite plausible then that they cannot move decisively into 'fit'; and (3) contingency theory states that the 'fit' line is a line of iso-performance; this signifies that each 'fit' produces as high a performance as any other 'fit' (Drazin and Van de Ven, 1985). In this logic, the question is: why organisations move from one 'fit' to another if there is no performance gained from doing so. These three criticisms can be analysed using the logic that firms present a different 'fit' according to their context. Therefore, performance can be evaluated in terms of the congruence that firms' contingencies maintain with their internal organisation. Thus, these criticisms are debatable.

In fact that contingency theory presents problems in its theoretical statements, thus affecting the methods by which studies have empirically tested their contingency approach. Some researchers have based their analysis on assumptions that are imprecise in their conceptual framework. The following problems are found in academic literature: (1) lack of variation in the data, especially in the contingency

variables (Mohr, 1971) and, (2) shortcomings in method and model specification (Schoonhoven, 1981; Pfeffer, 1982). These problems refer to statistical analysis and computational procedures, which researchers apply to their data. For example, criticisms of the relation between 'fit' and performance, Schoonhoven (1981) pointed out that many researchers have not appropriately operationalised their concepts of 'fit'; therefore it has posed the problem of the statistical methods used be researchers. In particular, when researchers have intended to utilise multiplicative interaction terms of regression analyses, they have in fact limited the form of interaction only to cause a statistical acceleration and deceleration effect. By employing these methods, researchers have not specifically hypothesised their concept of 'fit' (Drazin and Van de Ven, 1985).

Criticism for a lack of variation in the data has been based on studies that failed to show conclusive evidence to support the effect of contingency variables on organisational 'fit' (e.g. Mohr, 1971). However, the problem of lack of variation in contingency data can be resolved by ensuring that the data being analysed shows adequate variation in testing the chosen contingency variable. Median-splits can be performed on all variables, and the resultant means differences can be compared using *t*-tests (Drazin and Van de Ven, 1985). In this way, the problem of a shortcoming in methods can be resolved (Donaldson 2001). Multiplicative interactions are usually correlated with the variables from which they are developed, causing multi-colinearity problems in the analysis (Schoonhoven 1981). Furthermore, when several contextual factors (contingency) are correlated with the structural variables (dependent variables such as HRM), they might conflict with the contingencies (Child, 1975). In this case, more complex systems tests for internal consistency may be needed. For example, a single contextual variable, strongly related to many organisational structure and process variables, indicates that ANOVA might not detect the effects of mismatches between context and structure on performance, and a deviation-score approach may be more appropriate (Drazin and Van de Ven, 1985: 522). By relying on the interaction approach alone, one might erroneously conclude that the contingency theory is not relevant (Pennings, 1975).

Scott W. R. (1981) has analysed three problems, which mainly rest on methods, with the contingency approach. He noted that most of the technology-structure studies have used an entire organisation as the unit of analysis. Thus, the failure to find results may be in part a consequence of conducting the studies at an incorrect level of analysis. Additionally, failure could arise in three cases: First, there may be differences in structural perceptions that reflect individual differences much as there are differences in the amount of uncertainty perceived across individuals. Second, the perception of technology, particularly the routines or the analysability, may vary between those doing the job and those observing the task from the outside. People come to terms with their task in a variety of ways, including developing rules of thumb and standard operating procedures that make job complexities manageable within the structural arrangements in which they work. Third, there may be a variation between the level at which the objective indicators are measured and the individual responses are gathered. Typically, the objective measures the technology defined for the organisation as a whole. For example, questionnaires or interviews will measure technology at the level of the individual or the work group. Thus, fourth, to the extent that there is a great deal of variation in technology or structure, or both, within the organisation, the aggregate measure is meaningless and so is the procedure of combining responses from individuals across work units that have very different structural properties (Pfeffer, 1982: 154).

Most of the problems identified by Scott W. R. (1981) lie in technology conceptualisation. As discussed earlier, academic literature presents significantly different approaches in defining and, thus, measuring the technology concept. Nevertheless, these four problems presented by Scott W. R. (1981) can be diminished in three basic elements: (1) by clarifying the concept of technology in such a way that its operations in measuring a firm's level of technology could be less ambiguous; (2) on the other hand, in order to avoid problems of perception between 'those doing the job and those observing', researchers can develop interviews at both levels in order to understand the technology concept better; and (3) research instruments could be designed in order to capture the technology measure at the level of the individual and work group according to the desired level of analysis. For example, in the case of evaluating the effect of technology on HRM for a firm, it would be necessary to define

whether it is high-tech or not. However, the questionnaire and/or interviews assessing the effect of technology on the HRM dependent variables need to be developed in such a way that they measure said effect at the appropriate level of analysis. In this example, this could be accomplished by distinguishing HRMPP between 'skilled and non-skilled' workers. Finally, Scott W. R. (1991) suggests that technology was in the saddle and seen as shaping organisational structure.

2.2.4 Alternatives to the contingency theory: Neo-contingency approach

The principal challenges to the contingency theory have been presented, along with some possible solutions. In this way, it is hoped that the contingency views, through continual refinement by scientists, researchers, and theorists, could develop into a more applicable theory. There is nothing as practical as a theory that works (Kast and Rosenzweig, 1985).

Contingency theory will only be revealed in its true light by carefully resolving technical problems and developing complementary theory (Donaldson, 2001). For example, examining multiple approaches to solid contingency studies and relating these findings to unique sample characteristics can help in the development of mid-range theories in contingency studies (Drazin and Van de Ven, 1985).

Nonetheless, besides the possible solutions to contingency problems, academic literature discusses different alternatives that challenge contingency views; which are analysed as follows:

1. Replace the structural contingency theory with a theoretical approach that focuses on individual perception, belief and choice (Silverman, 1970). This approach rejects the quantitative methods in favour of the qualitative ones. Although qualitative methods are a good source for gathering information first hand, quantitative methods are useful for comparing a large sample. Therefore, both methods can be combined in a fruitful research project.
2. A move from the contingency theory to other kinds of theories popularised in the USA started in the mid-1970s (Donaldson, 1996). Examples are the population-ecology theory, institutional theory, resource-dependence theory, and the agency

theory, among others (Jensen and Meckling, 1976; Pfeffer and Salancik, 1978; Hannan and Freeman, 1989; Powell and DiMaggio, 1991). They see the contingency theory as having problems of theoretical and empirical validity. However, as mentioned earlier, in general, theories present challenges to their theoretical fundaments; thus the solution is not to change from one theory to another. Rather, learning from former studies in order to build a stronger contingency theory by combining it with other theoretical approaches would have a greater impact on management studies.

3. Rejection of the determinism, functionalism or generalisation of the contingency theory. The argument is that people exercise choice rather than bowing to situational dictates (Donaldson, 1996). However, as discussed earlier, managers do practice choice, but their choice is in keeping with their organisational context variable and environment, which looks for the best 'fit' among those variables.

This research intends to enhance the contingency approach by: (1) proposing a tool for measuring a firm's level of technology. In this way, technology can be controlled and a comparison with similar firms could be developed, and (2) analysing the contingency and divergence approaches together. In so doing, patterns of the relation between technology and cultural factors in management practices could emerge. The aim is for these two approaches to help to build a more dynamic contingency theory labelled a: 'neo-contingency' theory (Miles and Snow, 1978; Sorge and Maurice, 1990; Donaldson, 2001). The following sections will discuss the two propositions presented.

2.2.5 Technology Analysis

Technology components: References have already been made to the lack of a satisfactory instrumentation for measuring technology (Dawson and Wedderburn, 1980). The technology conceptualisation framework presented here, has been developed in an attempt to generate a tool for comparing organisations in different settings. In comparative studies one cannot expect a particular relationship found in one organisation to be found in another unless these organisations are in fact similar with respect to their own technology (Perrow, 1967). This is one of the major arguments for emphasising the technology strand in this thesis. Indeed, the aim is to control the technology variable in order to diminish complications in comparing firms

located in France and England. There is little point in testing the effect of a parameter variable, such as size, age, etc. unless technology has been controlled. For example, in the case of size, to compare the structure of a small R&D lab, where the tasks in all areas are unlikely to be routine, with the structure of a large bank where they are likely to be routine is fruitless (Perrow, 1967: 204). Therefore, if the objective is to compare large R&D labs with small R&D labs, a meaningful analysis could be reached by controlling technology (ibid). Thus, it is important to clarify the definition of technology in order to have a better understanding of this contingency variable and its effect on HRM.

In order to clarify the technology concept presented earlier, a dimensional view of technology is presented. This view sees technology as a more complex concept; embodied by different elements that go beyond the traditional ones of high and low-tech firms, and product and process technology. This approach analyses technology as a continuous variable that interplays between hardware or technoware, orgaware, humanware and other types of invisible assets (Ramanathan, 1994; Hagström and Chandler, 1998).

Technoware: The word technology brings to mind machines; this is not surprising since machinery is one of its most visible manifestations (Galbraith J. K., 1972: 33). However, machines are merely the physical artefacts of technology, and the object embodied in technology is called technoware (Ramanathan, 1994). Technoware consists of tools, equipment, machines, vehicles, physical facilities, in short: 'raw materials' that may be a living being, human or otherwise, a symbol or an inanimate object (Perrow, 1967: 195). Technoware emphasises the importance of machines' hardware (non-human) and human-machines' interactions (Mintzberg, 1993; Ramanathan, 1994). Additionally, technoware comprises a material transformation subsystem and an information processing subsystem. The material transformation subsystem performs the desired mechanical operations that the technoware has been designed to perform (Ramanathan, 1994).

Manufacturing operations basically consist of transformation procedures. These activities emphasise the technoware category. Ramanathan (1994: 229) points out that

the technoware component "carries out the necessary 'transformations' based on a set of 'decisions' that have been taken to generate the desired output". Nevertheless, the workforce operates the transformation of most of the technoware activities (Ayres, 1986). Additionally, when an employee only operates the technoware activities involved in these activities, the degree of sophistication is low. However, the degree of sophistication of the technoware increases as the employees acquire 'sophisticated' capabilities and information to operate a machine, for instance sensing information needed to operate a machine (Ramanathan, 1994). Thus, semi-skilled or unskilled workers may be used in the case where a few simple processes are supervised (ibid). On the contrary, when the monitoring criteria are complicated and the range of choices are so wide then employees are required to extrapolate and interpolate from known and understood situations, and very skilled operatives may be needed (Ramanathan, 1994: 231).

Humanware: Continuing in the logic of a sophisticated technoware, it would imply specialised manpower to operate the activities required in a high-tech environment. Indeed, the more sophisticated the technology, the greater, in general, will be all of the foregoing requirements (Galbraith J. K., 1972: 34). Thus person-embodied technology can be called humanware (Ramanathan, 1994). This technology component refers to experiences, skills, knowledge, wisdom and creativity, among other features required to operate a sophisticated technoware. In other words, humanware consists of the skills needed to realise the potential of technoware and consists of 'contact humanware' and 'support humanware'. Contact humanware refers to the operators of the technoware while support humanware refers to the maintenance crew and indirect technoware used by facilitators, such as software specialists (for specialised machines) and production management personnel (ibid). Furthermore, this perspective can be seen as knowledge that highlights the importance of *know-why* and *know-how* and implicitly introduces the role of human skills into gathering, using, and updating knowledge (Ramanathan, 1994). These concepts are also widely known as software (human) knowledge e.g. people's intelligence and capacity (Braun, 1998; McLoughlin, 1999).

Ozaki (1991) describes the importance of humanware by presenting three Japanese humanistic-economic philosophies: (1) human resources are the most important factor

of production and are the ultimate origin of the market value of all goods produced, (2) people, unlike non-human resources, are intellectual (intelligence-carrying) beings in that they are capable of thinking, analysing, inventing, innovating, and developing information vital for the creation of wealth; and (3) people are psychological beings whose productivity may rise or fall depending on whether they are motivated or demoralised by their work environment. Although the above philosophy is based on Japan's culture, it is plausible to argue that a similar thinking can be applied to Western organisations.

Furthermore, Makino (1992) quoting from a report entitled: "The economics of human wave" by Keio University Professor Harua Shimada states that: "the key to corporate success is neither the factory equipment and other hardware, nor the software of technological know-how; the most important element is 'humanware', or individuals who help each other find fulfilment in their work". Therefore, the type of humanware needed to manage technoware would depend on the characteristics of the job to be carried out (Ramanathan, 1994: 233).

On the other hand, according to various studies in the field (e.g. Kleingartner and Anderson, 1987; Balkin and Gomez-Mejia, 1992; McGovern, 1998), there is a clear difference in the way firms deal with employees working with high-tech machines (sophisticated technoware) and tools, and the way they deal with 'knowledge' employees (sophisticated humanware) who create the equipment and machines. Indeed, the interesting issue of technology is to recognize the management methods that organisations instigate to deal with the creation of high-tech equipment, processes and their utilisation for 'economical purposes'.

Additionally, humanware specification can vary according to its complexity. This complexity can be analysed in terms of five core work-unit characteristics according to Schermerhorn (1989):

1) Skill Variety: The degree to which a job requires a variety of different activities in carrying out the work and involves the use of a number of different skills and talents of the individual.

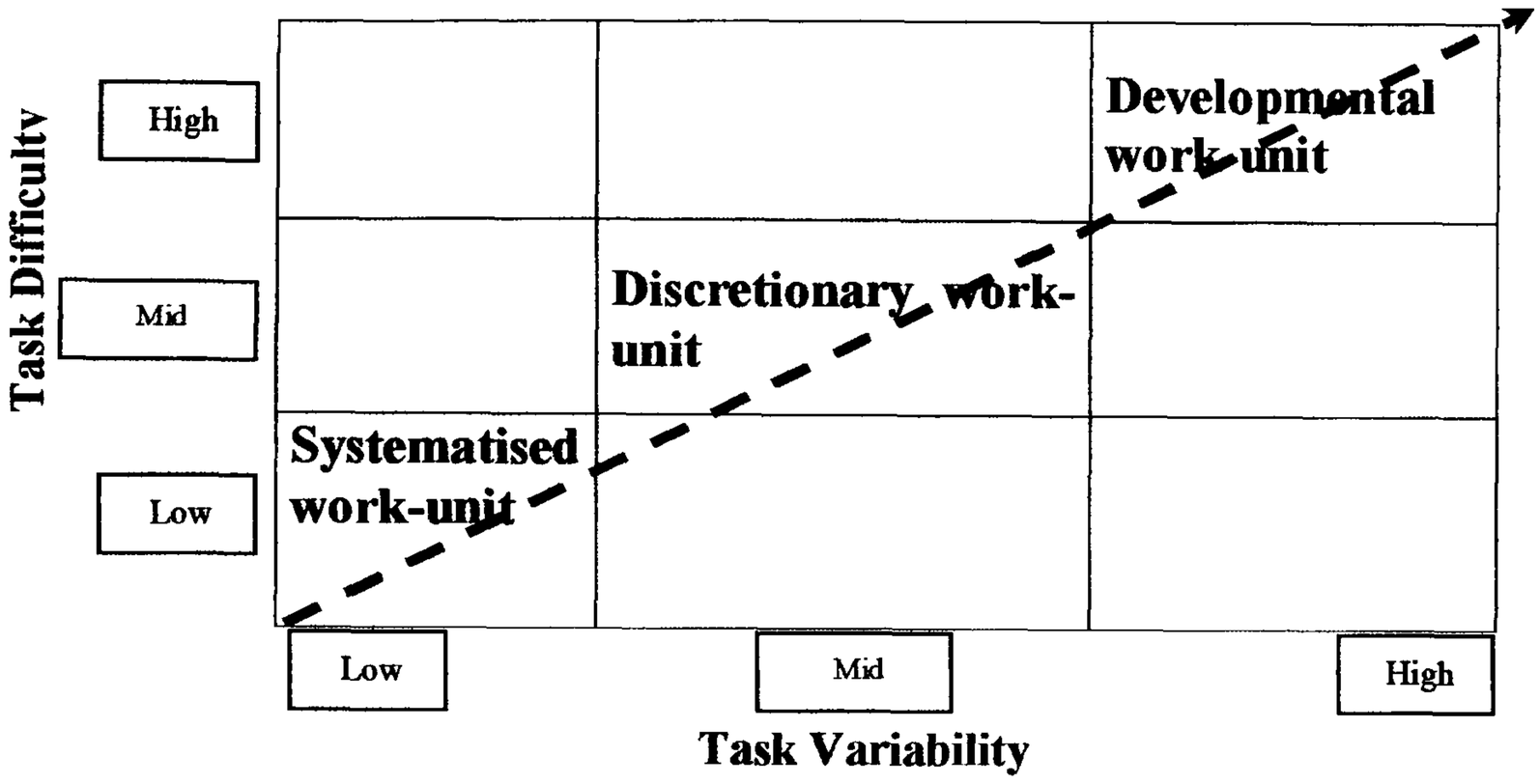
2) Task Identity: The degree to which the job requires completion of a 'whole' and identifiable piece of work -that is, one that involves doing a job from beginning to end with a visible outcome.
3) Task Significance: The degree to which the job has a substantial impact on the lives or work of other people elsewhere in the organisation or in the external environment.
4) Autonomy: The degree to which the job gives the individual substantial freedom, independence, and discretion in scheduling the work and in determining the procedures to be used in carrying it out.
5) Feedback (from the job itself): The degree to which performing the work activities required by the job results in the individual obtaining direct and clear information on the results of his or her performance.

The sum of these work-unit characteristics can to some extent define a firm. Using this logic, the work of an organisational unit is conceptualised in two dimensions: task difficulty and task variability (Van de Ven and Delbecq, 1974). Work units in an organisation can be measured in a continuous line from low task difficulty and variability to higher levels. In this way the proportion of work-units that fall into this continuous line can be calculated. The higher the number of complex work-units that a firm has, the higher the organisational technological complexity; in short the higher the number of work-units in an organisation with systematised operations, the closer this organisation would be to a low-technology environment and vice versa.

Thus, this argument is in keeping with the assumption that humanware moves in a continuous line from low to high levels of the five work-unit characteristics as shown in figure 2.1. The sophistication of the humanware requires an adaptive HRM policy that could enable employees to cope with the business dynamic according to their job's level of sophistication. Furthermore, a dynamic HRM does not depend only on formal technical training related to the operation of a sophisticated technoware, but it also sets limits on how work-units can be designed, supervised, and executed. A low-skilled work force usually requires a more rationalised set of work-task difficulty and variability, and a more systematic supervision and vice-versa for a high-skilled work force (Blau and Schoenherr, 1971; Rose, 1985).

Informware: Document-embodied technology can be called informware (Ramanathan, 1994). This includes all kinds of documentation pertaining to process specifications, procedures, theories, observations, etc. Informware represents the accumulation of knowledge needed to realise the full potential of the technoware and humanware.

Figure 2.1: Relation of work-units between task difficulty and variability



Source: Van de Ven and Delbecq (1974) and own adaptation

Ramanathan (1994: 243) states that informware represents the accumulation of knowledge by human beings. He also proposes the idea that informware is a codified form of the "know-how" that resides in specialised humanware and which has been recorded in an appropriate form to enhance the multiplier effect and to be used for value-added activities. In addition, the information components of informware require the effective use of technoware by humanware that needs information to interpret, plan, implement, monitor, diagnose, and rectify value-added activities that may be undertaken by an organisation.

Orgaware: Orgaware refers to the support of principles, practices, and arrangements that govern the effective use of technoware by humanware. It may be viewed in terms of the technological support for the requisite organisational, administrative, and cultural structures: work rules, task roles, requisite skills, work contents, formal and informal covenants of the workplace, system standards and measures, management styles and culture, organisational patterns, among other elements (Zeleny, 1986). In

addition, it may even be said that the effective use of technoware and humanware really depends on the virtuosity of the orgaware used by the firm (Ramanathan, 1994). Orgaware refers to the institution embodied into technology (Ramanathan, 1994). This is required to facilitate the effective integration of technoware, humanware, inforware, and consists of the linking of organisational processes, structure and management policies in order to find the 'fit' between the organisation's contingencies and its orgaware. In the course of changing material in an organisational setting, the individual must interact with others. The form that this interaction takes is called in this thesis the structure of the organisation. It involves the arrangements or relationships that permit coordination and control (Perrow, 1967). However, the distinction between technology and structure has its grey areas, but basically it is the difference between an individual acting directly upon a material that is to be changed and an individual interacting with another individual in the course of trying to change that material (ibid: 195).

Technology variable: The technology components presented facilitate the definition to be used in this thesis. Technology is viewed here as a variable that could have different levels of technoware, humanware, orgaware and inforware to a higher level. If a firm presents high levels of the technoware specification, it would affect the other technology components in the same direction. Thus, the effect of 'fit' on performance is derived from the congruency between the firm's contingencies and its internal management arrangements. This congruency is interpreted here as the combination of technology (contingency) and the firm's structure in HRM.

Additionally, if an organisation aims to cope effectively with the general nature of the change needed to gain the 'best' 'fit', it would require a different approach to HRMPP. Employees at all levels, including managers, need to be able to cope with retraining and other HRMPP to keep up with changes in technology and day to day business demands. This means that employees need more flexible capabilities, and thus this flexibility requires higher levels of education, more frequent periods of education and retraining along with an innovative compensation system and organisational structure. Even if particular workers do not need retraining for some years, the management should still encourage them to continue their education to ensure that they retain their

capacity to learn (Senker, 1992: 107). In an environment of rapid technological change, a workforce accustomed to learning is a critical asset.

Table 2.4 shows diverse approaches mainly focusing on the humanware and orgaware of the technology strand, which highlight different levels of sophistication. Defining technology as a continuous variable could help to establish the patterns of structure and process dimensions of a work-unit. These patterns would also present a continuous definition of its structure from systematised and discretionary to developmental modes. Defining a firm according to its employees (work-units) would eventually help to define its technology dimension.

Table 2.4: Patterns of Work in Present and Future Factories

Present pattern	**Factory of the future**
Single skills	Multiple skills
Demarcation	Blurring of boundaries
Rigid working practices	Flexible working practices
Operation mainly by direct intervention	Mainly supervision of advanced operations
High division of labour	Moves towards team work
Low local autonomy	High local autonomy and devolution of responsibility
Training given low priority	Training and organisational development given high priority

Source: Bessant and Senker (1987: 162).

At this point, technology and its components have been discussed. However, it is important to define technology in such a way that its intensity can be measured. Thus, a comparison with similar firms, in terms of technology intensity, could be established. It is important to highlight that the technology variable is integrated from a nominal variable: industrial sector and a continuous variable: R&D expenditure and organisational structure (technoware, humanware, orgaware and inforware). Taking into account these two factors, the variable levels of technology studied here cannot be defined as a continuous scale variable.

High-tech: According to the Random House Dictionary of the English Language in its second edition, cited by Bolland and Hofer (1998), high technology is referred to as being, 'any technology requiring the most sophisticated scientific equipment and advanced engineering techniques, such as microelectronics, data processing, genetic engineering or telecommunications'. Moreover, it has been said that the environment

of high-tech firms tends to be characterised by high levels of individualisation and relatively low concentrations of employment, volatile markets and rapidly and constantly changing technologies, which result in a high degree of ambiguity and uncertainty (Cascio, 1990; Sandberg *et al.*, 1992; McLoughlin and Gourlay, 1994; Jolly and Roche, 1999). However, this definition does not help much in drawing a line between high, mid and low-tech firms.

One dimension in measuring a firm's level of technology is within its structural-technology context. This involves measuring technology in a holistic manner, integrating different criteria along with the technology's components. Firstly, it is important to analyse technology in terms of the resources that a firm invests in its innovation activities. This criterion can be assessed through the turnover spent on research and development (R&D) (Pottier, 1987; Kleingartner and Anderson, 1987; Balkin and Gomez-Mejia, 1992; Stuart and Quinn, 1992; McGovern, 1998; Jolly and Roche, 1999). Analysing turnover invested in R&D, can help to divide industrial sectors by the technological intensity in terms of R&D spending, which constitutes the second criteria.

Various studies have evaluated different industrial sectors. However, few of them have analysed technology intensity as a continuous variable. Two examples are analysed here: The R&D Scoreboard institution evaluates differences in R&D intensity (R&D to sales ratio) between industrial sectors in the UK and internationally. This analysis includes the distribution of companies in a number of sectors between high, medium and low R&D intensity. There are thirty-two sectors represented in the UK Scoreboard, however only about half of these contribute more than about 1% of the total R&D in the Scoreboard report. All these sectors are displayed in table 2.5. There are three groups: high, medium and low R&D-to-Capex ratio.

Table 2.5 clearly presents the R&D intensity calculated by the capital investment and the average of R&D/Sales. The high R&D intensity sectors are: pharmaceuticals, IT hardware, software and services, and aerospace. Globally, these sectors spend over 115% of their capital investment on R&D.

The OECD (1996) proposes another industrial classification divided into four categories, which is presented in table 2.6. This classification corresponds to the overall R&D intensity (direct and indirect). Direct intensity refers to the production of technology and indirect intensity to its use. The aforementioned technology classification refers clearly to constructing further categories based on technological intensity. However, one limitation of classifying technological intensity by sector, particularly R&D intensity, is that research in each industrial sector is attributed to the principal activity of the firms that make up that sector. Thus, a significant proportion of the aerospace industry's R&D, for example, concerns electronics as is also true of other sectors. Accordingly, the R&D intensity of the aerospace industry will be overestimated, and that of electronics underestimated (OECD, 1996).

Table 2.5: Scoreboard Industrial Classification

	High **R&D more than 115%** Capex	Medium **R&D 45-80%** Capex	Low **R&D less than 10%** Capex
Sectors	1. Software & IT Services 2. Pharmaceuticals 3. Aerospace 4. Health 5. IT Hardware	1. Electronics & electrical 2. Automotive 3. Chemical 4. Media 5. Engineering 6. Personal Care 7. Food Processors	1. Telecom 2. Oil & Gas
Average <u>R&D</u> Sales **UK**	9.6%	2.0%	0.4%
International	8.7%	3.9%	0.9%

Source: Scoreboard Report (2001)

Another limitation is the lack of disaggregated data for the high-tech industrial sectors. The principal limitation associated with the lack of detailed data is that many products manufactured by high-technological sectors are medium- or even low-tech, while conversely some of the products made by medium- or low-technology sectors are high-tech (ibid: 10).

On the other hand, the third criterion in defining the technological dimension is organisational structure. This factor analyses the proportion of skilled and semi-skilled workers that a firm has, measured by the work-unit task variability and intensity. As discussed previously, the level of humanware sophistication is in direct relation to the

technoware intensity. Higher levels of technoware sophistication, requires higher levels of sophistication in the humanware and vice-versa.

Table 2.6: Manufacturing Industries Classified According their Global Technology Intensity

High-technology	Medium-high-technology	Medium-low-technology	Low-technology
Aerospace	Scientific instruments	Rubber and plastic products	Paper printing
Computer, office machinery	Motor vehicles	Shipbuilding	Textile and clothing
Electronic-communication	Electrical machinery	Other manufacturing	Food, beverages, and tobacco
Pharmaceuticals	Chemical	Non-ferrous metals	Wood and furniture
	Other transport equipment	Non-metallic mineral products	
	Non-electrical machinery	Fabricated metal products	
		Petroleum refining	
		Ferrous metals	

Source: OECD, 1996

Based on the aforementioned criteria, a high-tech firm is defined (1) on the basis of its occupational structures - humanware: an above-average share of engineers, technologists and scientists. Engineers and scientists in high-tech organisations are responsible for new product development and scanning the environment to capitalise on technological opportunities (Coombs and Gomez-Mejia, 1991); (2) the relative amount that it spends on R&D, from 3% to 5% of the sales revenue (Pottier, 1987; Kleingartner and Anderson, 1987; Breheny and McQuaid, 1987a; Balkin and Gomez-Mejia, 1992); and (3) if the firm falls into the high-tech industrial-sector classification (OECD and Scoreboard). This definition has been shared by a large number of researchers.

Some of the studies mentioned above measure 'the percentage of the annual budget spent on R&D, compared to the sales revenue'. Controversially, according to Bolland and Hofer (1998), in some industries such as biotechnology, there are no commercial sales at all or sometimes just at the beginning of their operations. These types of companies concentrate on R&D and most often, these firms invest more money (see example of Mérieux – a French biotechnology firm-) on R&D than their total sales

revenue. Relying on this definition as a measure of 'high-tech' might lead to some problems, especially when we are dealing with biotechnology, chemical or pharmaceutical organisations.

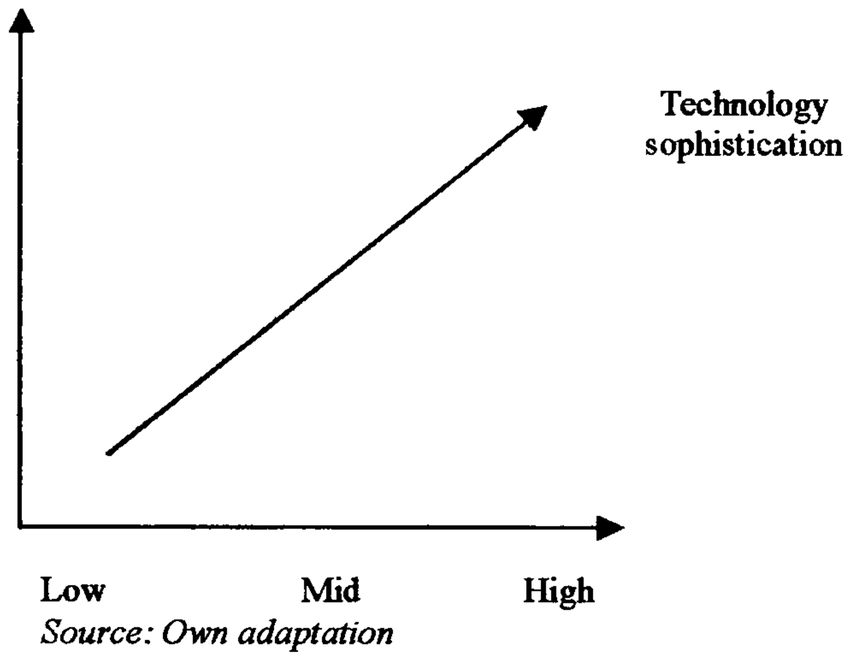
One broad distinguishing characteristic of high-tech firms includes a high proportion of engineers, scientists, and technicians, the importance of research and development, and the application of science (Kleingartner and Anderson, 1987). In addition, intensity in technology refers to the level of capital expenditure earmarked to advance technology (Noori, 1998). Above all, these distinguishing characteristics led Cascio (1988) to conclude: "innovation, science, and research are hallmarks of high technology firms".

Mid-tech: The mid-tech classification involves those firms which are definitely not low-tech, but classifying them as high-tech could be controversial. For example, (1) firms that invest in R&D activities; however, the percentage invested is less than 3% of sales revenues, and (2) firms that belong to the high-tech industrial sector, but the average number of engineers and scientist do not figure in the total organisational workforce.

Low-tech: Low-tech organisations focus on manufacturing and "the number of engineers that implement or develop technology in their plants is not more than the 5% of the total workforce" Jolly and Ramani (1996). Furthermore, the workforce is 'non-professional/non-knowledge', their specialised knowledge is not important for the kind of duties that they perform. These workers mainly deal with repetitive tasks that are mostly very simple functions which can be learned within a short period of training. "They possess a public knowledge that can be purchased easily in the labour market." (Leonard-Barton, 1995) According to Cascio (1990), "to many observers, unskilled, semiskilled, and clerical workers usually are not offered the array of benefits and incentives that are allocated to the technical and management staff of high-tech firms." Low-tech organisations may work with sophisticated technoware such as digital equipment, robots or 'high-tech' instruments within the transformation processes. However, as mentioned earlier, the tasks of the workforce are repetitive. This kind of work scheme is similar to the Taylorist/Fordist working practices.

Evaluating technology according to the three classes presented here could help to achieve a comparable technology measurement. Figure 2.2 graphically presents technology as a continuous variable ranging from low to high tech as proposed. In terms of industrial sector, the OECD and Scoreboard researchers support this classification. Additionally, the humanware element has been included in the classification proposed.

Figure 2.2: Technology Classification



Source: Own adaptation

2.2.6 Contingency theory and convergence approach

The contrasting perspective of the universal (convergent) thesis is based on the assumption that organisational and social relationships are free from cultural manifestations (e.g. Kerr *et al.,* 1964; Hickson *et al.*, 1969). Additionally, it is argued that contingent variables such as technology will impose the organisational administration policies and practices (ibid). Consequently these policies and practices will be valid in all societies, irrespective of culture and economic or political systems.

According to Kerr *et al.*, (1964) societies (nations), regardless of their different starting conditions, will convert to the same end-point industrialisation because "modern industrial nations share common basic economical and social structural features" (Lane, 1988: 21). Furthermore, Kerr *et al.*, (1964) state that culture and political economies would eventually be swept away by industrialisation and one homogeneous type would remain. In fact, the underlying force that drives all societies towards this end-point is said to be productive technology (Lane, 1988). The constant development of science and the resulting creation of more and more highly developed

forms of technology and production processes set in motion a vast number of processes of social and political change (Kerr *et al.*, 1964). Hickson *et al.*, 1969) developed this line of reasoning that suggests a universalism and culture-free thesis on the relationship between contingency variables and internal organisational arrangements. Their statements are controversial, as they maintained that context-structure relationships are stable across societies. Additionally, "whether the culture is Asian or European or North American, a large organisation with many employees not only improves efficiency by specialising their activities but also by increasing controlling and co-ordinating specialities" (Hickson *et al.*, 1976). Similarly, it is argued that dependence and 'uncertainty' in market conditions is external to organisations, and technology will have the same structural effect in every country (Child, 1981). Moreover, "technology determines organisational structure and behaviour and that the resulting organisational characteristics will be stable across nations, regardless of any differences between industrial nations in culture of forms of ownership or productive resources" (Lane, 1988: 22). Thus, cultural differences are of diminishing importance (Child, 1981; Jefferys *et al.*, 2001; Budhwar and Khatri, 2001).

2.3 Divergence theory

Contrary to the cultural-free thesis, later contingency studies were concerned with national culture as a factor that led to different relationships between contingencies and firms' internal organisation (e.g. Gallie, 1978; Lammers and Hickson, 1979; Maurice *et al.*, 1980, Tayeb, 1987). For example, the results from the Aston group in England appeared to have different implications when they were applied in other societies (Rose, 1985). For instance, a clear difference between each national sample emerged when McMillan and colleagues (1973) compared eighteen British manufacturing organisations in Birmingham, England with eighteen similar organisations in Cleveland, Ohio, USA. Then they added Canada to their comparison. However, the Aston researchers continued talking of the 'culture-free context of organisational structure' (Hickson *et al.*, 1974).

John Child, who became a research fellow locate at Aston and an associate of members of the group, though never actually a member of it, had already disconfirmed

an Aston thesis of bureaucratic 'polymorphism'. He demonstrated (1972b) how a more 'authentically' bureaucratic characteristic such as formalisation intensified in a firm with a growth in size but without a technology or order contingent variable. However, he reached his conclusions with a subset of manufacturing organisations from the original sample of the Aston group (Child and Mansneld, 1972). Child has been critical of any naively universal approach to management studies.

Nonetheless, the national cultural approach has been criticised as the "sociology of residual variables" approach (Donaldson, 2001), because it presumes that nationality is the cause of any variations in findings; in fact there are many other potential reasons for this effect (Lammers and Hickson, 1979). This research does not intend to develop a controversy on how national culture is a more important factor than the contingency variable technology in shaping firms' internal organisation. Rather, this research aims to study how the divergence and contingency theories complement each other in establishing organisational management practices. This thesis proposes to enrich these theories by analysing one aspect of each theory. In so doing, a more realistic theoretical background called the neo-contingency theory in management studies can emerge as Mile and Snow (1978), Sorge and Maurice (1990) and Donaldson (2001) have proposed.

On the other hand, in terms of the management and divergence theory, there are different aspects that influence management decisions. For example, the "resource dependency" theory argues that corporate policy could not be seen only as an expression of managerial discretion; it is a product of exchange and negotiation between a company's leadership and the major actors in the environment (Gomez-Mejia and Welbourne, 1990: 106). Indeed, the threat of reducing options, such as accessibility to needed capital, may be used to influence the discretionary decision-making of the leveraged institution (ibid). Their findings argue that managers' decisions, especially in high-tech environments, depend on outside capital, which places the fundamental decision-making power in the hands of chief executives who have almost un-limited discretion in running the firms.

Contingencies that might shape management behaviour could take different forms. It is not only the environment and firms' internal configuration that may influence management decisions. There are different factors that could influence managers' decision, as mentioned above. Access to financing outside the company, such as venture capital, is one important aspect. Organisations are engaged in continuous interactions with other organisations or actors that control certain resources. This dependence could be explained by different theories such as the "dependency theory".

On the other hand, the divergence theory can be analysed by different approaches: national culture (e.g. Child, 1981; Hofstede, 1991; 1993); economic and political systems (e.g. Porter *et al.*, 1975); educational systems (e.g. Jefferson 1964; Crouzet 1990; Calori *et al.*, 1997); institutions (Sorge and Maurice, 1990; Child, 1981); and religion (Weber, 1964). However, an overall theory that encloses these determinants remains undeveloped (Calori *et al.*, 1997). Indeed, in the absence of theory and evidence, it is important to note that culture is not a contingent variable. It cannot provide performance evidence (Donaldson, 2001), which is one of the main premises of the contingency theory. However, this thesis aims to find an explanation for the differences between France and England through the institutional approach.

2.3.1 Cultural strand

The societal effect approach has demonstrated the cross-relations between the structure and functioning of an organisation and the characteristics of the societal environment in which the organisation operates (Maurice *et al.*, 1980). Country-related factors like societal and economic policy, and the labour market and educational system account for the differences found in the study developed by van der Klink and Mulder (1995) when comparing HRM practices between four European countries (Germany, the United Kingdom, the Netherlands and France).

Culture is not inherent but learned and learned anew with each passing generation. There must be vehicles for the creation and transmission of political culture, and cultural analysis must say more about those vehicles. In the absence of such an account one is left to wonder why such cultural differences occur and persist (Hall, 1986: 9). Traditionally, culturalists have defined culture in terms of "values and norms

which, in the final analysis, direct and shape observed behaviour" (Maurice, *et al.;* 1986: 227). On the other hand, an anthropological approach states that culture is a complex concept which includes knowledge, belief, art, morals, law, custom, and any capabilities and habits acquired by man as a member of society (Taylor, 1911). Child (1981) adds other components to this definition such as: values, preferences, traditional practices, behaviour, mechanisms and artefacts. Another approach to culture is referred to as "a whole way of life of a people, such as their interpersonal relations and their behaviours as well as their attitudes" (Benedict, 1934). Additionally, 'culture' is a collective construct that is sometimes seen as one facet of a political system, but analyses of state action that identify political culture as the determinative variable provide us with a way of explaining political outcomes that need not entail the functional analysis common to most systems theory. Although cultural analyses share the emphasis of public choice theory on the role of individual action, the way in which they understand the bases of individual motivation differs sharply (Hall, 1986: 8).

The conception of a differentiated and competitive institutional environment also supports the view that organisations are not passive actors being imprinted by cultural templates (Scott W. R. 1991). Rather, just as is the case within their technical environments, organisations may be expected to exercise "strategic choice" in relating to their institutional environments (Child 1972a).

From the aforesaid definitions of culture, one might assume the dominance of the national culture that a country has over the organisational culture of a particular firm. Culture-oriented researchers attempt to explain micro-level findings by direct reference to the macro level, without identifying how the two interact (Winch, *et al.*, 2000: 665). This logic stands in contradiction to the contingency approach discussed. However, a closer examination of the culture theory suggest two types of cultural approaches: a) the *essentialist* (Maurice *et al.*, 1980) in which researchers analyse behaviour at the micro-level and attempt to explain their findings by asserting a direct link to a macro phenomenon, such as the works of d'Iribarne's *logique de l'honneur* (1989); and b) the *reductionism*, such as the work of Hofstede (1993) which takes

cultural values themselves as the main independent variables and then asserts a direct link to behaviour.

Researchers such as Hofstede (1993) have suggested that while acknowledging the role of contingency factors, a more complex culture-bound argument must be applied in organisational practices. Indeed, management practices including HRM are not universal but *'socially constructed'* in each society (e.g. Boxall, 1995). Cultural and societal factors in each nation make a qualitative difference in organisations. Their internal processes tend to vary across nations (Maurice *et al.*, 1980).

Hofstede (1991, 1993) argues that cultural differences between organisational structures reflect differences in value systems. These value systems can also be identified in the theories that are developed and favoured in these different cultures (Hofstede, 1993). For example, the French approach to organisation theory places emphasis on hierarchy (Kieser, 1994: 610). Thus, values shape organisational structures as well as organisational theories that legitimise these structures (ibid).

The 'societal effect approach' to organisational research has been propounded by Brossard and Maurice (1974) and views such factors as training, education, task characteristics, working relationships and so on as constituent parts of the societal culture (Nicholas, 1985: 156).

Finally, Swidler's (1986: 273) image of "culture as a 'tool kit' of symbols, stories, rituals and world-views, which people may use in varying configurations to solve different kinds of problems". This view is consistent with the opinion that there can exist multiple and competing versions of institutionalised belief systems from which, to some extent, organisations can select (Scott W. R. 1991).

Management functions and culture: The above discussion suggests that certain management functions are facilitated and others are inhibited in certain cultures (Triandis, 1983: 156). It is useful to consider some of the classic management functions in relation to the described culture differences. The classic management

functions are: (a) defining goals, (b) planning, (c) selecting people, (d) training, (e) controlling, and (f) motivation.

1. Defining goals: The definition of goals is likely to be facilitated in cultures in which mastery of the environment is valued and to be inhibited in cultures in which subjugation to nature is valued. Goals such as money and promotions are likely to be emphasised in masculine cultures and good interpersonal relations in feminine ones (Triandis, 1983: 156).
2. Planning: Planning is likely to be facilitated by an orientation toward the future and to be inhibited by an orientation toward the past or the present. When power distance is low and uncertainty avoidance is high, planning is effective; when power distance is high, there is too little trust to make planning effective (Hofstede, 1991).
3. Selecting, training, and controlling: Functions concerning selecting, training, and controlling people are likely to be affected by the kinds of differentiation that are emphasised in a culture: age, sex, in-group/out-group, etc. There will be some facilitation in selecting in elitist, high-power-distance cultures like France; there will be more efforts at controlling in cultures in which human nature is conceived as 'bad'. Controlling others through criticism is likely to be inhibited and ineffective in cultures in which people have very high or very low self-esteem (Triandis, 1983: 157).

2.3.2 Institutional Strand

It is plausible to argue that the divergence and contingency approaches appear to be in contradiction. As discussed earlier, some researchers assert that economic development will sweep away the cultural strand (e.g. Kerr *et al.*, 1964). Conversely, as discussed earlier, there is a long tradition of work affirming that cultural and institutional idiosyncrasies of nations outweigh the significance of any similarities in the formal structures and processes of organisations (Richardson, 1953; Lincoln *et al.*, 1981; Wade, 1996). These studies have reported considerable differences between organisations operating in similar task environments but different societies (e.g. Gooderham *et al.*, 1999; Nelson and Gopalan, 2003). Additionally, other researchers have demonstrated that technology has little influence on management practices (e.g.

Gallie, 1978; Maurice *et al.*, 1980; Tayeb, 1987). They recognise the importance of a national bond in shaping management practices. Nonetheless, this work aims to find a new model where contingency and divergence approaches can complement each other.

Hall (1986) suggests that managerial behaviour may well be a product of national culture, but it is the institutions that shape and, in turn, are shaped by a nation's culture. Indeed, despite the increasing internationalisation of some industries over the past four decades, especially in the technology intensive firms, there is considerable evidence that national institutions remain quite distinct in Europe (e.g. Sorge and Maurice, 1990; Brewster *et al.*, 1996). It has been argued that national institutions reproduce systems of economic organisation which vary significantly between countries (Whitley, 1992: 1). Indeed, institutions play an important role in determining a society. They can be political, legal, financial systems, as well as educational institutions (ibid). As such, a nation's social and political institutions form the context in which managerial practices are developed (Sorge and Maurice, 1990; Sorge, 1991).

Berger and Luckmann (1967) emphasise in their definition of institutions that the shared cognitive systems, although created in interaction by humans, come to be viewed as objective and external structures defining social reality.

Institutional theory attempts to explain a source of organisational structure as interpenetration of the environment into the workings of the organisation (Tolbert, 1988). Indeed, Scott (1995: 33) offers a broad, inclusive definition of the concept of institutions –"Institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behaviour" –is consonant with much recent work in sociology (DiMaggio and Powell, 1991).

Whitley (1992) provides a useful conceptualisation of institutions; he distinguishes between "proximate institutions", such as the political, legal, financial systems, and "background educational institutions", such as the family, religious organisations, and schools. Proximity institutions tend to have a coercive influence on management practices in the sense that they define a set of constraints and opportunities for firms and managers (Calori *et al.*, 1997). On the contrary, background social institutions

tend to have a more normative influence, for they provide general patterns of trust, cooperation, identity, and subordination (Whitley, 1992). Therefore, "proximate and background educational institutions" play an important role and are distinctive national coherences. They link the major components such as primary socialisation, education and vocational training systems, social structure and important aspects of organisational life and managerial practices.

Institutional and Technical Environments

Progress has been made in the conceptualisation of institutional environments. They were distinguished more and more explicitly from technical environments. Early definitions were vague: technical environments involve "complex technologies" and "exchanges", while institutional environments involve "rules" and "socially defined categories" (Meyer, *et al.,* 1981: 152). Later formulations have provided increasingly explicit criteria for distinguishing between the two types of environments. Thus, Meyer and Scott (1983) propose that "technical sectors are those within which a product or service is exchanged in a market such that organisations are rewarded for effective and efficient control of the work process" (Scott and Meyer, 1983). And in contrast, "institutional sectors are characterised by the elaboration of rule and requirements to which individual organisations must conform if they are to receive support and legitimacy from the environment" (Scott, 1991: 140).

Technical environments exercise output control over organisations...In institutional environments organisations are rewarded for establishing correct structures and processes, not for the quantity and quality of their outputs (Scott W. R., 1991).

Indeed, cross-classifying the two dimensions yields an interesting typology of environments in which some organisations such as utilities and banks are viewed as subject to both strong technical and institutional pressures; other organisations such as health clubs are seen as subject to weak technical and institutional environments; organisations such as competitive manufacturing companies confront relatively technical but weak institutional pressures; and organisations such as schools and churches operate in relatively strong institutional but weak technical environments (Scott W. R. 1991).

Models giving exclusive attention to technical features have been challenged to incorporate cultural elements. There is increasing recognition that no organisation is just a technical system and that many organisations are not primarily technical systems (Scott W. R. 1991). Therefore, this thesis proposes the neo-contingency theory which attempts to study institutional and technological factors together.

2.4. Neo-contingency approach

The debate between the contingency (convergence) and divergence theories continues today. Mainly, it is about the extent and explanation that convergence and divergence theories can give to management studies (Harzing and Sorge, 2003). At the more general theoretical level, the national culture to firms' internal organisation relation expresses a fundamental tension in management studies (Nelson and Gopalan, 2003). As presented earlier, management studies have identified great pressures which oblige organisations to conform to the forces in their environments. The institutional, population ecology and contingency schools are all based on these assumptions to one degree or another (ibid: 1117). One would expect this dilemma to surface in important ways in the development and dynamics of organisational management practices. The degree to which organisational management practices deviated from national patterns, and the manner in which they deviate, may shed light on an important tension between organisations and their contextual internal and external variables. Thus, the study of these contextual variables together would yield to enriching management studies.

Additionally, Pugh and Hickson (1996: 3899) state that "the subject of organisational convergence is concerned with how far organisations in different countries have travelled along a path to global convergence in operations and management, and conversely how far the influence of specific cultural factors must be understood and planned for if the manager is to be effective in cross-national situations". For example, the convergent approach in Europe can have a major strand through the creation of a supranational labour market institution in Europe through the social dimension. In practice this has been developed through the development of EU labour laws and the rationalisation of the employment practices of European scale (Baldry, 1994: 97). Under this notion, convergence is essentially a socio-structural concept which can be analysed under other perspectives than that of the divergence theory. As discussed

earlier in this chapter, the divergence approach stresses the role of the environmental influences in management practices (e.g. Child, 1972a; Gallie, 1978). Nevertheless, different researchers have claimed that HRM are better explained by country than industrial sectors. For example, Tremblay and Chênevert (*forthcoming*), claim that the role of national institutional factors explains better than the industrial sector the formulation of HRM strategies. Similar results were found by Gooderham *et al.*, (1999) where they studied a sample of firms from Germany, France, Norway and Great England. Their findings indicate that the national institutional embeddedness of firms plays a far more important role in shaping HRM than does their industrial embeddedness. HRM is an organisational practice that is particularly sensitive to national idiosyncratic institutional pressures (ibid). Furthermore, different types of management practices may be determined to a considerable degree by the imperative of maintaining external legitimacy through adherence to institutional structures, rules, and norms at the national level- and may vary as a result of dissimilar national contexts (ibid: 508). However, the Gooderham *et al.*, (1999: 527) study found evidence for the need to incorporate country-specific institutional factors in studies of patterns of organisational practices in general and HRMPP in particular. However, Nelson and Gopalan (2003) discuss from their empirical evidence in studying USA, Brazilian and Indian firms that convergence and divergence represent two opposing intellectual tendencies in academic thought, and that they also clash in practice. Therefore, on studying the relationship between organisational and national culture, it would appear less fruitful to debate whether one perspective or the other is more accurate and more useful and, instead, to focus on how cross-national forces for homogeneity interact with forces for divergence in the arena of actual practice (ibid: 1116). There is clearly a range of possible explanations for organisations, management and especially human resources management policies and practices (HRMPP), as mentioned before some researchers often choose just one approach, either the contingency-type approach or the cultural perspective in order to explain a phenomenon. However, such a viewpoint constitutes only one aspect of the range of variability in organisational management. Therefore, to illuminate the role of the contextual factors that shape HRM, in here a cross-national research, integrating an analysis the level of technology that a firm has with the social institutions and cultural values which mould a specific society will be developed. Indeed, the need for both

factors (institutions and technology) in organisations studies will be argued. They and their inherent perspectives can supplement each other in a fruitful way and thereby lead to further development of the understanding of outer contexts that may influence the structure and functioning of organisations in different environments.

The controversy and confusion in management studies suggest a different approach in research strategies and methods. The notion of the 'contingency' theory proposed here tries to resolve the technical problems of the traditional contingency approach, which has been discussed in terms of the technology strand. The new approach to management studies proposed here is the 'neo-contingency', which aims to complement the traditional contingency logic with the divergence approach. This proposition is justified due to the fact that early contingency studies were presumed to have a universal effect, as mentioned earlier (e.g. Kerr *et al.,* 1964; Pugh *et al.*, 1969; Blau, 1970). Nonetheless, this assumption has caused a great deal of controversial debate in academic literature in terms of how much is explained by the contingency variable: technology in relation to the effect of culture on management practices (e.g. Gallie, 1978; Tayeb, 1984).

Therefore, in order to build a congruent management theory, the neo-contingency approach has guided this study. Miles and Snow (1978) suggest studying this view by emphasising managers' choice stance; while Sorge and Maurice (1990) suggest placing emphasis on the cultural factors of a firm's location, and Donaldson (2001) suggests testing empirically the 'neo-contingency' views through the concepts of fit and firms' performance.

The approach that Miles and Snow (1978) Sorge and Maurice (1990) have proposed is based on a fitting link-up of the societal effect framework, which roughly maintains that organisational structures and processes are interdependent with the business strategy and the market segment into which a firm launches itself (Miles and Snow, 1978). The neo-contingency approach has particularly underlined functional equivalence, reciprocal interaction instead of unidirectional causation and the importance of strategic choice. The neo-contingency theory could help to revolutionise the static assumption of the traditional contingency theory, which could be analysed

through a realistic and dynamic approach. Furthermore, neo-contingency thinking tried to respond to such criticism of the traditional thinking of the contingency theory (Sorge and Maurice, 1990). If all this is plausible, then existing varieties of organisational theory must be selectively applied. Additionally, it is increasingly recognised that there is no 'one best' theory (any more than there is no one best organisational structure, form of leadership, or whatever) unless it is so general as to be of little utility in understanding the variety of organisations (Perrow, 1967: 204).

2.5 Conclusions

The contingency theory has been analysed from the technology perspective. Analysing technology as a continuous variable through its components: technoware, humanware, inforware and orgaware provided a holistic understanding of this contingency variable. This analysis led to the proposal of the three technology categories: low-, mid- and high-tech firms. Thus, the problems that earlier contingency researchers have encountered in the application of a high-tech definition in field-work seem to be minimised. On the other hand, this chapter discusses the divergence theory, emphasising the important role that culture and institutions play in shaping firms' internal organisation. Although the contingency and divergence approaches pose some contradictory elements, it appears to be difficult to separate one from the other. In an attempt to find a way to build a 'dynamic' contingency theory, it is proposed here to complement the contingency approach with the divergence theory in the form of the 'neo-contingency' approach. This is not to say that one theory is more important than the other, or that there are no other factors that could influence management practices.

Indeed, numerous unresolved theoretical and empirical issues in the analysis of contingency and divergence theories remain; however on the path to resolving these problems further examination of their logic is needed and not the abandonment of any of these theories (e.g. Donaldson, 1982: 71). This chapter has discussed one of the cornerstones of this thesis: the 'neo-contingency' approach (Miles and Snow, 1978; Sorge and Maurice, 1990; Donaldson, 2001). In this way, the understanding of the actual dynamic in management studies could be enlightened.

Chapter Three: Cross-national Research: France and England Compared

3.1 Introduction

Testing the neo-contingency approach introduced in chapter two would require the analysis of the effect of technology and culture on HRMPP. Chapter two analysed the technology variable. It showed how researchers of the contingency theory support technology among other contingency variables as a better way for comparing firms than other perspectives presented. This chapter proposed a technology definition and classification in order to avoid the problem of incompatible data sets. As mentioned before, the intention of this thesis is to analyse contingency and divergence views together in order to generate a new perspective in management studies: the 'neo-contingency' approach. Therefore, the divergence theory introduced in chapter two must be analysed.

This chapter begins by presenting the different approaches to cross-national research. Education is the perspective selected, and France and England are the setting of this study. It discusses the justification for selecting this perspective and countries, which aims to answer the challenges that cross-national enquiries confront. Cross-national comparisons are plagued by problems in the definition and concepts operation. Testing cross-national research empirically poses difficulties in obtaining comparable data sets (Lane, 1991). Thus, this chapter presents how France and England show a similar technological and economical development by highlighting their features of economic, institutional and industrial development. On the other hand, the differences that France and England present are discussed through the educational system. This chapter presents a comparison of the educational system and development between these two countries. The chapter ends by discussing the findings of previous management investigations concerning France and England that are of particular interest to the present study.

3.2 Cross-national research

Cross-national research could be expressed as any research that transcends national boundaries, which systematically utilises comparable data from two or more nations

(Kohn, 1989). Another perspective offered by Hantrais and Mangen (1996: 1) is that a cross-national study can be defined as such if one or more units in two or more societies, cultures or countries are compared with regard to the same concepts and concerning the systematic analysis of phenomena, usually with the intention of explaining them and generalising from them. On the one hand, Khon stresses the comparability of data sets. On the other, Hantrais and Mangen underline the importance of comparable concepts. These two issues are important in order to establish relationship patterns between different countries. In this study, technology is a key concept; therefore, organisations with similar technologies should present some similarities in management practices (Kast and Rosenzweig, 1985: 549). On the contrary, the difference in management that might be found between two countries could be explained by national culture (e.g. Weber, 1964; Hofstede, 1991; Calori *et al.*, 1997).

In this study, the term cross-national has been chosen, because this study focuses on comparing two European countries -France and England, which are divided into administrative units, enclosed by territories and national boundaries. Additionally, "the term 'nation' not only refers to culture but also to other societal, economic and political institutions, which have a connection in the nature of organisations located in particular countries" (Tayeb, 1984). Furthermore, as Kohn (1989: 21) states: "It is nevertheless generally useful to distinguish between research whose primary purpose is to tell us more about the particular countries studied and research whose primary purpose is to use these countries as the vehicle for investigating the contexts in which social institutions operate". In an attempt to reconcile the culture-free and divergence theories through the 'neo-contingency' approach, France and England are the context of this study.

The first justification for this cross-national research is based on the growing inter-penetration of national economies both within the European Union (EU) and beyond. This phenomenon has led to an increasing interest in comparative cross-national research in organisations and management (e.g. Tayeb, 1987; Winch *et al.*, 2000; Budhwar and Debrah, 2001). Indeed, as the business world develops into a 'global village', there is a greater need to know how managers in various parts of the world

cope with issues and problems related to HRM and what major factors have an impact on HRMPP in different contexts (Hofstede, 1991). In addition, a cross-national comparison, in general, provides a framework for observing, understanding and judging social phenomenon variations across different social contexts (Lane, 1988; Øyen, 1990). Normal behaviour and norms cannot be studied without acknowledging deviations from standard practices. Øyen (1990:4) states: "no social phenomenon can be isolated and studied without comparing it to other social phenomena".

This kind of study should be of value to managers and employees in multinational organisations and could help to enhance understanding between employees from different cultural backgrounds. It could draw the attention of managers, researches and others to the role that HRM practices and polices in different countries play in influencing employees' and managers' behaviour. Finally, the investigation into the influence of both culture-free and culture-bound variables on HRM in a cross-national context is therefore crucial to the growth and development of the field of HRM (Budhwar and Khatri, 2001).

However, one of the challenges of this research is to explain the extent to which the contingency and divergence views can be applied to the relatively new field of HRM and high-tech firms. McGaughey and De Cieri (1999) argue that organisations are becoming more similar in terms of macro-level variables (convergence –'the tendency of societies to grow more alike, to develop similarities in structures, processes, and performances' Kerr *et al.,* 1964), but are maintaining their cultural-based dissimilarities in term of micro-level variables (divergence -'the tendency to recede from one another, to develop greater dissimilarities in structure, processes, and performances' (McGaughey and Cieri, 1999). The nature of HRM is known to be 'context specific' (Boxall, 1995). Therefore, the degree and direction of influence of both cultural-bound and cultural-free factors on HRM varies from country to country and is responsible for the context-specific nature of HRM (Locke and Thelen, 1995). This study aims to put into perspective how the HRM variables appear to be convergent and divergence across nations.

3.3 Educational Institutions

Institutional theory suggests that firms adopt structures and forms for legitimacy within their domain of operation (Zucker, 1986). In terms of educational system, and notably the tapestry of vocational training courses avaible in a country, substantially influences the nature and quality of the initial competencies of school-leavers, and also affects the distribution of competencies among the working population (van der Klink and Mulder, 1995: 159).

Formalised educational systems are, in fact, theories of socialisation institutionalised as rules at the collective level. Education re-structures whole populations, creating and expanding elites and redefining the rights and obligations of members. The institutional effects of education as a legitimating system (Meyer, 1977). In here education is seen as an allocating institution –operating under societal rules which allow the schools to directly confer success and failure in society quite apart from any socialising effects (Meyer, 1977). Indeed, modern education is seen instead as a system of institutionalised rites transforming social roles through powerful initiation ceremonies and as an agent transforming society by creating new classes of personnel with new types of authoritative knowledge (Meyer, 1977: 56). Participation in schools creates notable effects on all sorts of socialisation - from knowledge to social values to status expectations (Meyer, 1977).

The traditional socialisation theory defines educational as an organised set of socialising experiences. It treats the fact that modern educational systems are society-wide and state-controlled institutions as peripheral (Meyer, 1977). Indeed, modern extended and institutionalised systems of education build into society certain rules which actors take for granted, know others take for granted, and incorporate in their decision and actions. For example, institutionalised educational systems create a situation in which social gatekeepers - even if they read and believe Ivan Berg's book - nevertheless know that they must hire people on the basis of educational credentials (Meyer, 1977).

Almost everywhere, education is made compulsory and universal by national law, often in the national constitution (Boli-Bennett, 1976). In most countries its structure

is closely regulated by the nation-state (Ramirez, 1973; Rubinson, 1973). Indeed, if one hires an executive, a civil servant, or a teacher one must inspect educational credentials - inspecting the person's competence is optional (Meyer, 1977).

One of the legitimating effects of education is that mass education creates a whole series of social assumptions about the common culture of society and thus expands the social meaning of citizenship, personhood and individuality (modern ideas). It establishes a whole series of common elements for everyone (Meyer, 1977: 69).

The neo-contingency approach to this thesis proposes to complement the contingency theory with the cultural aspect. The approach chosen for studying the cultural aspect is educational institutions, with the purpose of tracing the relationship between the influences of a firm's level of technology on its HRM and the educational system. As mentioned earlier, HRM is particularly sensitive to institutional pressures; therefore it could be appropriate to illustrate the French and British management differences from the educational perspective. This thesis does not intend to say that other background institutions (Whitley, 1992) are not as important as educational institutions. Family and religion, as well as politics also play an important role. However, owing to the nature of this cross-national research and the arguments presented, the educational perspective was selected here to illustrate the salient results from this study. It is important to highlight that this thesis does not aim to provide data to measure national institutional variables directly, especially the educational institutions. Therefore, the educational institution will be delineated through the description of the salient characteristics of the French and British systems. The educational institutional description is used as a foundation for country-specific predictions of firms' adoption of the HRMPP studied in this thesis. Such an approach aims to view HRMPP itself much more consciously as a social institution, rather than as a mere technical system responsive principally to universal contextual influences.

Nevertheless, education is a vast topic; therefore, this thesis investigates the French and British national education systems and their relation to certain HRMPP. Calori *et al.*, (1997), developed a study comparing French and British heritage in management. They demonstrated that industrialisation characteristics have only a partial and indirect

influence on current administrative practices. In effect management practices are most highly affected by educational institutions, which communicate science and culture. Also, Calori (1997) and colleagues argue that the administrative behaviours of a nation are strongly influenced by the primary socialisation that its people receive at school during their youth. They based their argument on the theory of socialisation (Berger and Luckmann, 1967), which posits that the schemas learned during an individual's formative years are deeply internalised, and therefore greatly influence later behaviours. Indeed, management education and the workplace tend to be interpreted through their earlier years of education (Calori *et al.*, 1997). Hence, management education influences management practices (Locke, 1985). This is not to say that other background institutions are not as important as educational institutions. Family and religion also play an important role, however, it is the educational system that tends to be the most nationally bonding (Calori *et al.*, 1997). In fact, the government establishes, designs, organises and monitors its schools. For example, a large part of the history curriculum in each nation celebrates its own glorious eras, landmark events, revered philosophers, and legendary figures. Therefore, schools play a major role in defining, imprinting, and shaping a modern nation's behaviour by perpetuating certain key ethnocentric biases (ibid: 658). In the Calori *et al.*, (1997), logic educational institutions effectively produce a convergence of beliefs, values and eventually administrative practices among members of one nation, which in turn distinguish that nation from others.

On the other hand, institutions play an important role in determining a society. They can be political, legal, financial systems, as well as educational institutions. In the following sections the French and British education systems are described, because of their importance in shaping patterns of trust, cooperation, identity and subordination in society and in managerial practices by prescribing the boundaries of acceptable behaviour (Whitley, 1992). Additionally, the educational-institution, particularly the school-system, approach was selected as a cornerstone for managerial behaviour in France and England, because it is the principal vehicle for shaping a nation's administrative heritage on 'how things ought to be done', as well as for transmitting those beliefs and practices to successive generations (Calori *et al.*, 1997). With this

background, the objective is to show how nations differ from and are similar to each other.

3.4 Justification of the research setting: France and England

The evaluation of the effect of technology and culture on HRM requires a study in which technology can be controlled (held constant) and culture can show some varieties. Testing these variables is necessary to compare organisations located in countries with a 'similar' economic development; as James D. Thompson (1967: 1-2) says: "...organisations with similar technological and environment problems should exhibit similar behaviour; patterns should appear". France and England were chosen for the setting of this research because, on comparing them, similarities of the level of technology in companies located in both countries could be ensured. France and England are countries that present a relative homogeneity in size, level of development and historical experience among other factors. France and England were "the two first nation-states, the two pioneers of modern industrialisation, the two major empires of the modern era" (Cassis *et al*, 1995: 1). As François Crouzet (1990) points out: "France and England were the guiding lights of Europe and the world in technology and parliamentary politics".

Additionally, England and France were the first 'nation states' with centralised monarchical governments and populations imbued with a feeling of belonging to a community. England and France were the first large states to experience violent revolutions, which in the long run (though more slowly in the case of France) led to liberal parliamentary systems pursuing moderate policies. England and France were the pioneers of industrial revolution and modern economic growth. They both gained by conquest, and finally lost, great colonial empires -even if France's was only a smaller-scale copy of the majestic British Empire. Both have left their mark, sometimes a deep one, on their erstwhile subjects (Crouzet, 1990: 6). However, from World War II to the present time the rise of the USA and Japan as world leaders and Germany in Europe has not completely diminished the importance of France and England in the world's economy and technological development. Further comparisons with America, Germany and Japan have taken precedence. Nonetheless, the object of this research is to explore the potential for comparison in Anglo-French business,

because of the significance that France and England businesses play in the world and particularly within the EU.

On the contrary, France and England present important differences in their social structure. They have hated each other yet they have never ceased to borrow ideas, institutions, techniques, and works of art from each other, and their geographical proximity has only served to increase psychological alienation with each viewing its neighbour as the personification of *foreignness* (Crouzet, 1990: 7). "The French declared in the nineteenth century that the British were hypocrites and egoists, this meant that they regarded themselves as upright and generous; when the British saw the French as frivolous and immoral that meant that they judged themselves to be serious and virtuous. On a different plane, during the nineteenth-century the British regarded France as the country of egalitarianism, which most of them also disapproved of; in the 1940s and 1950s, however, the British did often criticise France for the social inequality believed to prevail there" (Crouzet, 1990: 467).

Finally, comparing organisations located in France and England should lead to finding a model of variations posed by technologies and environments. Such a comparison should show more clearly which of the factors that are peculiar to England and France may have determined the unique and 'universal' phenomenon in these countries' HRMPP.

3.5 France and England: Some Demographic and Industrial Data

England was industrialised earlier and to a greater extent than France and was, as a consequence, for more urbanised. The British are mainly protestant, while most of the French are Roman Catholic or anti-religious. The British political structure changed gradually, while the political development of France was punctuated by revolution (Jefferson, 1964). Nonetheless, similar social groups in the two countries had similar ideas on the need for worker education. Nevertheless, if movements were similar in many ways in England and France, there was one particular difference: in England the bulk of work involving adult education was conducted by voluntary groups, while in France the government was the prime mover (ibid).

There are historical, religious and political factors that are decisive in causing differences between France and England. Firstly, in the sixteenth century the monarchy established Protestantism in England, while the French to this day remain loyal to the Catholic Church. Officially in France there is no state religion, but all the religious fêtes are bank holidays (fifteen days per year). Secondly, the two countries' educational institutions, in particular their respective school systems, represent the vehicle by which the historical conjunctures from their past influence the administrative routines adopted by modern institutions (Calori *et al.*, 1997).

Table 3.1: Outlook of France and England

	France	**England**
Land area (1 000 Km^2)	632.8	241
Agricultural area (1 000 Km^2)	300.0	187
Population (thousands)	60,186 (1999)	58,789 (2001)
Capital	Paris	London
Government Type	Republic	Monarchy
Head of State	President Jacques Chirac	Queen Elizabeth II
Head of the Government	Prime Minister Jean-Pierre Raffarin	Prime Minister Tony Blair
Language	The official language is French, although regional languages and dialects are found in many places. English is widely spoken in the business community, but an understanding of French is considered essential for visitors and business people.	The official language is English. English and Welsh are the official languages in Wales, around one-quarter of the population of Wales speak Welsh.
Ethnic Composition	France is relatively homogenous. Its main immigrant communities include the Spanish, Portuguese, Algerian and Moroccan, with smaller communities from former French colonies.	English 81.5%, Scottish 9.6%, Irish 2.4%, Welsh 1.9%, Ulster 1.8%, West Indian, Indian, Pakistani and others 2.9%. Immigrant ethic minority groups tend to be concentrated in the main urban areas.
Major religions	There is no state religion, but Roman Catholicism predominates. The Muslim community is the largest in Europe.	Anglican 27 million, Roman Catholic 9 million, Muslim 1 million, Presbyterian 800,000, Methodist 760,000, Sikh 400,000, Hindu 350,000, Jewish 300,000

Sources: OECD 2000; UK National Statistics (Census, 2001)

3.5.1 France

France is one of the European Union's four largest economies and holder of one of the five permanent seats on the United Nations Security Council. France is a key player in

the global community. During the cold war period its de facto leadership of the EU provide France with an outlet for its sense of super-national importance, compensating for the loss of most of its overseas empire. However, with EU expansion threatening and Germany increasingly confident of its own diplomatic voice, France sometimes appears to be struggling to find its position within the newly evolving world and European order. Furthermore, at times France makes a great effort to assert its right to a special place in the world's cultural and political map. Nevertheless, France was the only European country that presented a positive economic growth in the first quarter of 2003: 3.5% (INSEE, 2003).

Although the economy performed well during the 1997-2000 period, the global slowdown has also had an impact on France. The electorate are looking to the newly-elected centre-right administration to work with its re-elected presidential mentor to get the economy back on track through a mixture of structural reforms and tax cuts. With one of Europe's most polarised and politically involved electorates and facing opposition from the powerful labour unions, the path ahead for the new French administration is likely to be rocky.

Politics: Policy-wise, the incoming centre-right administration has promised structural reforms and tax cuts, which should assist France's recovery from its recent economic slump. However, there are concerns that the promised tax cuts might upset the fragile public finances, and political opposition to structural reforms, particularly with respect to pensions, will be fierce. Additionally, pension reform has put *La France* on hold. In May 2003, diverse public-servant strikes (from public transport to school lectures and agriculture) literally paralysed the country.

Economy: The French economy accomplished an impressive performance during the course of the late 1990s, achieving relatively high rates of economic growth coupled with falling unemployment and low-stable inflation. France maintained a solid trade surplus over the period, assisted by the weak state of the euro with respect to the US dollar and other currencies. However, during 2001 and 2002 the economy experienced a market slowdown, in common with other countries, as the effects of the US downturn took effect. A degree of fiscal slippage has also become apparent, which

may well be exacerbated if the incoming administration pushes ahead with its tax-cut programmes.

Key Industries: France was a late mover in industrial revolution. By the early 1940s, it had only three industrial sectors (luxury products, automobiles and aluminium) that could compete with international rivals (Calori *et al.*, 1997). The French government played an important role in protectionist policies throughout most of the eighteenth and nineteenth centuries so that nowadays it is difficult for France to fit into the EU industrial development policies. Furthermore, since the famous 1992 deadline of full free trade within the EU appeared to be used as a device to persuade French society that the state will not longer be able to intervene, little change has been produced to date, especially in the agriculture sector.

Agriculture: Although agriculture now accounts for less than 5% of the GDP, it remains a central feature of the French economy. France is Europe's single largest farm producer with over 20% of the total European production. Apart from being a major contributor to foreign exchange, agriculture also feeds a dynamic agribusiness sector, which includes a multitude of small and medium-sized companies but also major players such as Danone, making France the world's second largest processed-food exporter in value. Nonetheless, French agriculture relies heavily on subsidies from the government and the EU, estimated at over US$10 billion a year, and France remains the largest recipient of subsidies under the European Common Agriculture Policy. French agriculture, however, has undergone a drastic transformation, as the number of holdings has halved since the 1970s while their average size has increased.

High-tech Industry: France's breakthrough in fields such as aerospace, nuclear energy and inland transport, in which the government, through public procurement, has played a decisive role, can be largely attributed to the specific features of the French innovation system (OECD, 1999).

Domestic expenditure on R&D (GERD) in France amounted to FF 182 billion in 1996, i.e. 21 per cent of the EU. In France, as in other major EU countries, research expenditure has tended to level off since the beginning of the 1990s, reflecting, inter-

alia, the economic slowdown, high real interest rates and the stabilisation of or cutbacks in public expending on defence research (OECD, 1999). However, the slowdown came after more than ten years during which expenditure had risen steadily, more rapidly than the GDP. In France, spending levelled out somewhat later, though for a longer period, than in other countries.

Half of the French manufacturing industry's R&D expenditure is in the high-tech sector, as is the case in the USA and the UK. In France, this expenditure centres mainly on the aerospace industry and particularly the telecommunications equipment and electronic component industries (OECD, 1999). Finally, in France, as elsewhere, few people with a stable job in public research or the private sector would be willing to leave it for a young, innovative company if the expected gains were not commensurate to the risk. Stock options are a way of remunerating highly qualified employees-researchers and managers for the risk they run, and of making young innovative companies competitive in the labour market (OECD, 1999).

Aerospace: The aerospace sector is one of the most successful facets of France's high-tech sector, employing close to 100,000 people and generating over FRF130 billion ($21 billion) in consolidated revenues (Datamonitor France, 2003). Although the industry includes a multitude of small and medium-sized companies, large corporations such as Aerospatiale Matra, Thompson and Dassault are the major players. Previously a showcase of French economic interventionism, the aerospace industry has undergone drastic changes over the past few years. The government now only holds minority stakes in Thompson and Aerospatiale. Aerospatiale Matra, created from the merger of Aerospatiale with Matra's defense division, has joined forces with Germany's Daimler-Chrysler Aerospace (Dasa) and Spain's Construcciones Aeronaúticas (Casa) to create the European Aeronautic Defence and Space Company (EADS), now the third largest aerospace group in the world (Datamonitor France 2003: 30; INSEE, 2003). The French aerospace industry is a also a major driving force in European consortiums such as Airbus Industry, owned by EADS and British Aerospace, and the satellite launch company Arianespace (Datamonitor France, 2003).

3.5.2 England

England is the second largest member of the EU and the world's fourth largest economy, and remains a significant economic and political force. Relative economic decline throughout most of the twentieth century has been reversed in recent years, with the UK expected to record the highest rate of growth of all the Group of Seven (G7) countries in 2002, as it did in 2001. Its membership of the UN Security Council, EU, NATO and G7, continuing strong links with its former colonies through the Commonwealth, and strong cultural, security and economic ties with the US place it in a unique position within the world community. However, a number of potential pitfalls for the administration remain. These include the apparent poor state of public services and finding a means of funding improvements, the question of Euro membership and low-level rumblings about 'baseness' in public office. Any one of these, or some as yet uncharted obstacle, could potentially resurrect the dormant Conservatives and knock the government off course.

Politics: There is increasing disquiet at the perceived inferiority of the UK's public services to those of its continental neighbours. At the same time, as the 2000 fuel protests indicated, there is little tolerance for higher taxes to pay for the necessary public investment. The government is putting its faith in an increased public sector performance through more innovative management and performance targeting, in conjunction with higher borrowing over the short term, as a means of increasing public sector performance in time for the next general election (Datamonitor UK, 2003: 6).

Economy: The UK's economic performance has been extremely robust, emerging from the recession of the early 1990s, with a real GDP growth of 2.9% per annum over the 1993-2001 period (Datamonitor UK, 2003). The ongoing economic expansion has led to a sustained improvement in labour market performance, with unemployment falling to a 25-year low. Inflation has also been kept low through a combination of low world inflation and a transparent, coherent monetary policy.

However, a number of troubling aspects of the UK's performance remain. Economic growth has displayed distinct regional and sectors imbalances. The South East has seen a particularly strong economic expansion, driven by the vibrant financial and

business services sector centred in London. Other areas of the country, particularly the North East of England, have witnessed a more sluggish growth profile, with higher levels of unemployment and poverty as a result. Much of this imbalance is caused by the strength of the sterling, particularly against the Euro, which has led to the stagnation of manufacturing exports. Regional imbalances also reflect longer-term structural problems in parts of the country, with pockets of high unemployment, low educational attainment and poor health outcomes creating cycles of deprivation and damaging economic performance. Finally, in spite of its superior economic growth performance in recent years, the UK's productivity gap with respect to other advanced industrial nations remains (Datamonitor UK, 2003).

Key Industries: England started the first industrial revolution in textile, food and steel because of its high productivity in agriculture, its advanced technical skills, and the resources and markets that opened up through its extensive colonial empire (Calori *et al.*, 1997).

Nevertheless, thanks to the dexterity of the London-based financial community, the City seems to have hung onto its dominant position in the foreign exchange markets, and its lucrative slice of corporate finance, equities and bond business. However, there are signs of change. In September 2000, the London Stock Exchange cancelled merger plans with the Frankfurt Stock Exchange to focus on defending itself from a hostile bid from OM Gruppen. The hostile bid failed but the Swedish Stock Exchange operator has announced plans to try again with a friendly offer.

England's own banks, once proud operators on the global scene, are now a sorry bunch: aside from Lloyds-TSB, which sticks to retail banking, the other large banks are reckoned to be ripe takeover targets. For decades, London was pre-eminent because it had the entire requisite infrastructure for a financial sector: now that finance is supposedly shifting more into cyberspace, there is nothing stopping business from migrating overseas. The sheer expense of setting up a dedicated finance operation in the British capital is already forcing some to look at cheaper alternatives (Datamonitor UK, 2003).

On the basis of a historical analysis of industrial development in England, it is shown that British companies are mainly geared to manufacture comparatively cheap mass production (van de Klink and Mulder, 1995). Highly standardised production processes have severely shrunk the demand for skilled employees. Although forms of vocational training have been and are still being developed, companies make relatively little use of the professional skills of school leavers as a consequence of the nature of the production process and the Taylorist division of labour. British companies have not been keen to invest in human resource development (ibid). This practice has, over the decades, resulted in a shortage of well-qualified all-round employees. The consequences of this shortage are now being felt, as companies come under increasing pressure from the marketplace to develop advanced production techniques and more flexible work structures (ibid).

Tourism: England may not like it, but it has become dependent on tourism. The travel industry is now second only to finance as a money-earner and England receives twenty-six million visitors a year, who spend around $1,000 each, making it the sixth biggest tourist destination in the world. The main challenge that this industry faces is the transportation infrastructure, which is barely capable of carrying Londoners around, let alone visitors.

High-tech Industry: Britons invented everything from the steam engine and the power loom to the worldwide web, and they are very proud of it. But there is a downside to all this: although the British have the ideas, they are bad at making them pay - most of their ideas only become commercial in the hands of foreign companies. Psion made a GBP13-million loss for the first half of fiscal 2001 and has pulled out of the market for handheld computers in the face of fierce competition from Palm and HP-Compaq. England's success in the tech-business niche may remain just that - a niche.

The UK is still one of the five leading innovating countries in the world and in some areas, such as tobacco-processing, pharmaceuticals and aircraft, it has registered an above average number of patents (Cantwell, 1989; Hudson and Allan, 1989), even though its share of the patents registered in the top five countries had dropped to under

4 per cent by the late 1980s (Hood and Young, 1997). However, the UK was the only industrialised country to have a smaller proportion of its GDP devoted to R&D in 1991 than it did in 1981.

3.6 French Educational System

In France, much weight is attached to young people receiving a broad social education, which means that part of the educational period is set aside for social training (van der Klink and Mulder, 1995: 162). In France for historical reasons the basic role assigned to schools has been to educate and integrate citizens into society rather than to train the labour force. The French education system was developed in order to educate French people, regardless of their social origins, by providing for education at every level (Jefferson, 1964: 349; OECD, 1992). The aim has been to bring all the members of a given age group up to at least the level of the *certificate d'aptitude professionnelle* (CAP- vocational education certificate) or Brevet *d'études professionnelles* (BEP – technical certificate).

The French education system has some original features: it has an important private sector, especially at the primary and secondary levels and for certain kinds of higher education. It provides pre-elementary schooling (the so-called *maternelle*) with a view to promoting equality of opportunity. Higher education is open and heterogeneous. First, there are state universities for which the tuition fees are negligible; any student who has the *baccalauréat* can get into them. Alongside these is a sector that practices selection for study courses, which are either short (upper-level technical courses in *Instituts Universitaires* de Technologies –IUT) or long, in business and engineering schools- *grandes écoles*, which are under the jurisdiction of local chambers of commerce, private boards of directors, or other ministries, who guard their independence (Ambler, 1987; OECD, 1992). The creation in the nineteenth century of the hierarchical system of higher education, consisting of '*grandes écoles*' and the universities, were designed to separate, and then train, the nation's best students so that they could become the future leaders in science, engineering, administration and business. The universities were thus relegated to educating the other (about 90%) students who were denied entry to the '*grandes écoles*' (Calori *et al.*, 1997). French universities have a surprisingly low status in the eyes of prospective students and

employers. Neither the civil service nor top management recruit regularly from the universities. Those who aspire to top management and commercial jobs bypass the university, and go into the competitive-entry technical and business schools which are exceedingly numerous in France.

French education has traditionally been a politically charged issue, perhaps more so than in other countries. Since the 1880's France's Ministry of National Education has maintained a tight control over most aspects of its primary and secondary school systems. The Ministry oversees the hiring and evaluation of most of the nation's teachers. Additionally, the French government retains an impressive formal power over funding, curriculum, pedagogical methods, and even the textbooks to be used in all public schools (Ambler, 1987; Calori *et al.*, 1997).

Nonetheless, as table 3.2 shows the French education system has expanded very rapidly in recent decades. This trend reflects, in part at least, the rising demand for skilled labour by employers faced with an increased capital intensity in their production (implying a smaller but better-trained workforce due to the obvious complement between tangible and human capital). The difficulties involved in successfully forecasting the nature of their medium-term manpower needs has probably led firms, or at least the largest of them, to raise their educational requirements, as seen by the heightened demand for workers having at least two years of education beyond the *baccalauréat.* The trend also results from families' attitudes, due to their awareness of the impact that a better education has on easing labour-market entry and on minimising the risk of unemployment (OEDC, 1992).

Table 3.2: Young people leaving the education system[1] Per cent of total (France)

	1973	1980	1985	1990	1993
Levels I, II and III Higher education with diploma or postgraduate studies	15.9	19.3	21.8	31.2	37.7
Level IV Baccalauréat level with or without diploma or first cycle of higher education without diploma	17.4	17.4	17.8	21.3	27.9
Level V CAP or BEP diploma or secondary school education without diploma	39.9	47.5	45.2	35.5	26.1
Level VI Primary or lower secondary school education, no diploma	26.8	15.8	15.2	12.0	8.3

1. Training levels and diplomas as used in the National Education Service. Source: OECD 1997

3.7 British Educational System

The British school system is less centralised (in comparison with France's system) and less egalitarian or, in Hofstede's (1991) term, it is more 'individualistic' than the French system. Until the late 1980s, the responsibility for most educational decisions rested with each of the one hundred and fifty local education authorities, each loosely coordinated by the British government into four groups, one each from England, Scotland, Wales, and Northern Ireland. Headmasters at each school were free to make their own hiring decisions and define their own programs (Leclercq and Rault, 1990). While the New Education Reform Act of 1988 increased coordination and control at the national level, the British education system remains relatively decentralised (OECD, 1992). This is not to say that the British government is uninvolved with the curriculum and pedagogy of its schools. Rather, the government has historically tolerated more local variations of its dominant view than has the French government.

On the other hand, the British government had no pragmatic vision for its business education institutions, and thus made no formal attempts to stratify them. This is not to say that higher education in England was not stratified and elitist. Furthermore, entry into the prestigious British universities (e.g. Oxford and Cambridge) was mostly influenced by class difference (wealth), in contrast to the more 'egalitarian' *Grande Écoles* where intellectual achievement is the primary entry criterion (Calori *et al.*, 1997).

There is a long-standing perception that the UK has suffered from a history of inadequate education and training. In particular, critics felt that the education system was excessively oriented to ensuring high academic standards for the elite, while standards for the majority were more variable and vocational training was undervalued. These shortcomings are often cited as a reason for England's relative economic decline after 1945 (OECD, 1995).

In the late Eighties the UK Government took a number of initiatives to improve vocational education, training and manpower policies over the past few years (OECD, 1991). These reforms aimed at making the educational and training systems more responsive to the needs of employers. The Education Reform Act of 1988 introduced a

national curriculum, along with a system of testing at ages seven, eleven, fourteen and sixteen. These reforms aim at improving educational standards and raising the UK's low participation rate in education after the compulsory school leaving age. The Youth Training Scheme has been revised to provide more specific skills training. The National Restart Programme (1986) was introduced to bring the long-term unemployed back into the labour force. The Education and Training White Paper published on 20 May 1991 proposes the progressive introduction of training credits for every sixteen and seventeen year old leaving full-time education (OECD, 1991).

Although many of these reforms are still very recent, they appear to have contributed to a significant change in participation in education. The proportion of young people staying on in full-time education for at least one more year after the end of compulsory schooling has risen from 47.8% in 1983/84 to 72.5% in 1993/94. The proportion entering higher education has risen from 14% in 1987 to 31% in 1993. Participation in job training has also grown significantly. These trends have been reflected in increased levels of achievement: between 1987 and 1994 the number of people in the workforce with a qualification rose by over four million (OECD, 1995).

Prior to the 1980s, schooling in the UK arguably failed to supply a good grounding in workplace skills, severely restricting the potential scope for productivity growth (OECD, 1996). Higher education was world-class, but a majority of young people left compulsory education at age 16 with few or no formal qualifications for work (ibid). However, according to the National Statistics Census 2001, the population in England has increased by just 1.5 million people since 1991. Nearly 30% of adults aged 16-74 in England and Wales have no qualifications. In the North East this reaches 34.7% and in the West Midlands borough of Sandwell it is 45.5%. London, the South East and the South West have the fewest with no qualifications (26% or less). London has 31% with degree level or higher. However, the North East has just 15% and Corby in Northamptonshire is the lowest district with 8.5%.

Despite this progress, it is recognised that trends in international trade and technology imply that it is imperative to maintain and improve the skills of the workforce necessary for an economy to remain competitive in high productivity industries. The

UK faces three challenges: (1) to ensure that skill levels rise sufficiently to prevent the re-emergence of skill shortage, which contributed to the deterioration in productivity growth, inflation and the trade balance at the end of the 1980s. (2) To ensure that improvement in education and training contribute to a high quality workforce, in order to reduce the 'productivity gap'. Anderton *et al.,* (1995) estimate that labour productivity in the business sector in the UK in 1990 was more than 10% lower than in the USA, France, Canada, Germany and Italy, but higher than in Japan. (3) To ensure that popular attitudes to education and training, and business values and strategies both change sufficiently to allow the UK to break out permanently from what some commentators have describe as a 'low skills equilibrium'. The UK lagged behind many other advanced economies on some indicators of education performance in the late 1980s and early 1990s.

The evidence that skill levels have increased over the past few decades in England is tenuous, but the evidence that skills need to change from more narrowly craft-based manual skills toward broader and more intellectual skills is compelling. Michael Cross has argued persuasively that the 'single trade base' of British craft workers is a limiting factor during a period of change because their core knowledge and understanding bear less and less relation to the requirements of new and emerging jobs (Cross, 1988).

The British economy is in danger of losing jobs to lower-wage countries like China and the Czech Republic because too many British teenagers struggle to write and add (Fleming, 2004). Of the 30 nations in the Organisation for Economic Cooperation and Development, Britain ranks above only Turkey, Greece and Mexico in education participation at the age of 17, according to OECD statistics for 2001 (ibid). Alan Wood, chief executive of Siemens in Britain, said "quite a large proportion" of the school dropouts his company tries to recruit "do not have basic reading, writing and arithmetic skills or the behaviour skills needed" (ibid).

3.8 Difference between France and England

3.8.1 Educational System

France and England have shown an inherent complexity and relative autonomy of educational institutions, which have created a particularly strong resistance to change (Ambler, 1987). In France, formal qualifications are common in both small and large firms, while in England there are very few formally qualified workers in small plants (Senker, 1992: 99).

In England, education is still primarily a function of local education authorities and self-governing universities, while in France, despite the limited decentralisation of universities in 1968 and the further efforts of the Socialist governments, final authority over funding and curriculum is still concentrated in the ministry of national education (Ambler, 1987).

A relatively recent report by the OECD (1992) found French schools to be excessive in their emphasis on deduction and abstraction. In contrast, British pragmatism is a less analytical, more inductive, and more action-oriented way of thinking about cause and effect that encourages individuals to search for solutions outside the dominant paradigm, reflecting a greater willingness to accept, rather than avoid, uncertainty (Lessem and Neubauer, 1994).

Additionally, Calori *et al.*, (1997) findings support the argument that science and social values that are explicitly and implicitly communicated at school in France (pre-school through early secondary school) are different from that which is communicated at comparable British schools. Specifically, the French learn to construct reality in terms of orderly hierarchies, while the British learn to do so in a less controlling, more individualistic way (ibid: 687).

Regarding social values, French instructors implicitly communicate a high level of power distance by virtue of the pedagogical methods and attitudes that they use in the classroom, while the British instructors implicitly communicate a low level of power distance (Calori *et al.*, 1997). In France, lecturing is the preferred style of instruction (Jallade 1991), and there is often a wide physical and status gap between the teacher

and the student, with little to no personal interaction. In England, 'tutoring' is the preferred method of teaching. Classes are organised in relatively small groups and individual participation is viewed as important (ibid). Indeed, the way the English and French systems have gradually become increasingly similar is attributed to the pressures of modern democracy (Zeldin, 1980).

The French and British school systems have persisted in teaching mainly the history of their own countries. They have failed dismally in spreading knowledge even of each other's countries (Zeldin, 1980). For example, as late as 1962 only twelve thousand British school children took Advanced Level in French and in 1952 the Sorbonne had only 1400 students of English. It was not thanks to the schools that the old aristocracies knew each other's languages (ibid) and the 'recent' vast improvement in this sphere has been due to cheap and easy travel, more than to education.

3.8.2 Economic and technological development

The GPD in France increased at a compound annual growth rate of 1.7% between 1990 and 2000. The strongest growth was in the year 1998, when the GDP grew by 3.48%. Although data is unavailable for 2001, real GDP growth for this year can be expected to be slower as a result of the global downturn in the technology and telecomm sectors. On the contrary, in the UK the GDP increased at a compound annual growth rate of 2.31% between 1990 and 2001. Its strongest growth came in 1994, when the GDP grew by 4.65%. Additionally, table 3.3 also shows the trend of R&D as a percentage of GDP for France and the UK over the time period from 1992 to 2000. The GERD ratio has been fairly constant over said time for these countries; however, overall France shows higher figures than the UK. Only HERD presents similar figures in France and England.

In France, as elsewhere, technical progress is often seen as a threat to the employment of unskilled people (OECD 1997). France increased between 1975 and 1985 its Gross Domestic Expenditure on R&D (GERD), which has stagnated since the late 1980s accounting for 2.34% of GDP in 1994 (OECD 1997). On the other hand, R&D financing by the enterprise sector (BERD) has always accounted for a lower

percentage in France (ibid). In both the UK and France the electronics industry has been dominated by the presence of the state as a purchaser.

By several criteria, British performance in high technology overall is better than the French. In 1984, the UK's share of world exports in 'high R&D' products was 8.3% against France's 6.9%. An index of 'revealed comparative advantage' also shows that the UK is ahead of France in R&D-intensive products. The 'technological balance of payments' (e.g. royalties received minus royalties paid) has been in most recent years positive for the UK but negative for France (data from OECD, 1998; 1999).

Table 3.3: OECD Science and Technology Indicators Gross Expenditure on R&D: France and UK Comparison, 1992-2000

	GDP[2] Gross Domestic Product		GERD Gross Expenditure on R&D		GERD As a percentage of GDP		BERD Business Enterprises on R&D (as a percentage of GDP)		GOVERD Government on R&D (as a percentage of GDP)		HERD Higher Education Expenditure on R&D (as a percentage of GDP)	
Year	**France**	**UK**	**France**	**UK**	**France**	**UK**	**France**	**UK**	**France**	**UK**	**France**	**UK**
1992	683.7	615.4	16.3	12.4	2.38	2.01	1.49	1.33	0.50	0.30	0.36	0.35
1993	700.7	653.6	16.8	13.2	2.40	2.02	1.48	1.33	0.51	0.30	0.38	0.35
1994	731.0	690.6	17.1	13.7	2.34	1.98	1.45	1.28	0.48	0.30	0.38	0.38
1995	784.7	729.0	18.1	14.0	2.31	1.93	1.41	1.25	0.48	0.28	0.39	0.37
1996	779.2	772.9	17.9	14.3	2.30	1.85	1.41	1.20	0.47	0.27	0.39	0.36
1997	794.4	824.4	17.6	14.7	2.22	1.78	1.39	1.16	0.41	0.24	0.39	0.35
1998	854.5	868.8	18.5	15.5	2.17	1.78	1.35	1.17	0.40	0.24	0.38	0.35
1999	902.7	914.7	19.7	16.9	2.19	1.85	1.38	1.24	0.40	0.23	0.38	0.36
2000	946.9	956.3	20.3	17.5	--	1.83	1.37(p)	1.20	0.38(p)	0.22	0.36(p)	0.38

Source: OECD (2002); Morgan (2002)

Notes:

1. *France presents breaks in series for all data between 1996 and 1997.*
2. *The measure of GDP used is at market prices.*
3. *GDP and GERD present figures shown in £ billion sterling pounds, using the purchasing power parities (ppp) developed by the OECD.*
4. *(p) = Provisional.*

3.8.3 Discussion

In the past few decades, the gap between France and England in education has shown sings of narrowing, because both societies are suffering similar strains within a civilisation of increasing uniformity (Mayeur, 1980). Furthermore, France has not been made into a more 'intellectual' country, even though its intellectuals are supposed to be so influential. As a whole, the French do not read more books than the English. They have always published fewer new books, and they have always had far

fewer libraries (Zeldin, 1980: 214). What is distinctive about them is that they have a small group of people, one or two per cent of the total, who do read a very great deal indeed, and it is their intellectual activity that has given their country its reputation (ibid). As for newspapers, the English have also always read more of them. So if one wants to compare the culture of the two countries, one must look not only at the schools, but also at the ordinary man in the street, for whom schooldays are merely an unhappy memory (Zeldin, 1980).

A plausible conclusion to be drawn from the industrial and educational development of France and England is that firms located in both countries require an upgrading of employees' skills. Indeed, the general perception of most of the firms located around the world is that skilled employees have become one of the most valuable assets for a company. Nonetheless, in England, forces pushing in this direction, such as competitive pressure, have often been counteracted by powerful conservative forces - in particular by the negative attitudes of many British managers towards the training needed to introduce potential new technologies (Senker, 1992: 90). Furthermore, the UK, in contrast to France, is typically seen as inherently non-interventionist.

However, in terms of education the number of young people in France obtaining a diploma and the average length of study has risen sharply since the 1980s. This rise in schooling is likely to reflect two tendencies: on the one hand, given bleak job prospects, young people stay in school as long as possible (education is largely free), but on the other hand, a high level of qualification is one of the best insurances against unemployment (OECD, 1997). The average duration of studies after age five has risen sharply since 1982, reaching 15.9 years in 1991, whereas in the UK it is fourteen years (OECD, 1997). The percentage of the population aged from sixteen to eighteen, who are engaged in full-time education is 87% for France, while for the UK it is 43% (OECD, 1999).

Although the British and French governments have developed different policies in their education and economic systems, to some extent they have applied similar practices. For example, the French *Institut de Développent Industriel* in the 1960s copied the UK's Industrial Reconstruction Corporation and the British 'planning

agreements' borrowed the *'contrats de plan'* from the French. And finally, privatisation in France was heavily influenced, even directly inspired, by Thatcherism. The Thatcher government continued with a small number of the 1970s' programmes, particular those on new technologies, but wound down general industrial subsidies. Furthermore, the Chirac government began a privatisation programme intending to sell off virtually all state holdings in the productive market sector of the economy. Significantly, his government did not propose privatising public utilities. It is arguable that the firms Chirac did sell (including *St-Gobain and Compagnie Générale d'Electricité* CGE) had no permanent place in a public sector (Holmes and Sharp, 1989: 5). On the contrary, in the UK, the government helped to promote mergers, which created ICL (computing), GEC (electronics) and British Leyland (cars). In both countries it was argued that home markets were too small to support more than one firm in each sector given the up-front R&D and investment necessary to compete against US-based multinationals (ibid).

The huge waves of public investment in telecommunications, nuclear energy and TGV high-speed trains insulated French industry against the rigours of the first oil shock after 1973 (ibid). Moreover, ever since de Gaulle, technology has assumed a special place in French aspirations. Businessmen and civil servants share a fear of technological dependence (Holmes and Sharp 1989). The largest single spender on R&D was naturally the defence ministry, but PTT (French Ministry of Post and Communications) dominated all other government spending agencies. The ties between the private and state R&D sector have worked best when linked to the *'grands programmes'*, where the aim has been to develop technology not for the market but for use by the state, as happened with telecommunications in the 1970s. France secured a world market opening for digital switchgear (Holmes and Sharp, 1989). It might therefore be suggested that the French state has not only sought to act as a surrogate 'City' for French business, but it has also attempted to create the R&D base which firms may use if they wish.

3.9 Researches in Anglo-French management studies

At this point, the contingency and divergence theories have been discussed through the technology and educational variables. In this way, the neo-contingency perspective has

emerged. On the other hand, academic literature presents different Anglo-French management studies that have taken either the contingency or divergence approach. This section will discuss these studies and their direct implications for this thesis.

The sociologist Michael Crozier (1964) developed management studies based on: culture, political, societal and anthropological traits. Crozier's thesis sustains that large-scale organisations will continue to exist in modern societies and that they will possess certain characteristics which are labelled as bureaucratic. His arguments follow the logic of formal organisations. Crozier's work was mainly based on the French society, where he concluded that France is essentially a country of households containing the major unit of all social strategies -the family. This has a strong hold over its members and possesses a negative attitude to the collective action of outsiders. Crozier's second conclusion states that France is typified by isolated strata, which constrain the individual. Within any strata there are strong norms of equality and liberty, but the strata compete with each another to achieve greater privileges. The French societal structure, which is family oriented, tends to impose the patterns on national institutions and businesses. Also, it shapes the educational system. Crozier found the French education system is centralised with strict control processes. Further, Crozier argues that this trait may be discovered in all areas of French life. The implication of these conclusions to management is that family patterns and social classes could be seen in French companies. He concluded that France is conceived as the reflection of the firms, i.e. relatively bureaucratic and centralised domination, which is typical for the day-to-day functioning of French organisations. Following Crozier's conclusions, it could be argued that internally French organisations might present the same pattern of bureaucracy and centralisation. The implication to this thesis is that HRMPP in French organisations might present this pattern. Although Crozier does not present an empirical Anglo-French comparative study particularly on HRM, his theoretical research is one of the first to introduce the concepts of centralisation and bureaucracy at the macro level of French organisations.

On the other hand, Duncan Gallie (1978) studied four French and British oil refineries were he examined the implications of advanced automation for the social integration of the workforce within capitalist enterprise, for the structure of managerial power and

for the nature of trade unionism. Gallie's main findings challenge the contingency theory, which follows a similar path as Crozier's conclusions. Gallie concluded that 'technology per se has, at most, very little importance' for organisations' management practices (pp: 295). Furthermore, Gallie highlighted that from his data he could not conclude that the advanced technology found in oil refineries had any effect whatsoever on the degree of social integration in the firm. Gallie concludes that although the critical determinant of work attitudes clearly lies elsewhere, it might nonetheless be the case that technology has some influence within a specific national context. Additionally, Gallie argues that given the high degree of polarisation that he found between the attitudes of the French and British workers, it is improbable that the characteristics of advanced technology are of any substantial importance in explaining the degree of social integration of workers within the enterprise. In his empirical evidence, he found indications of the critical importance of the wider cultural and social structural patterns of specific societies for determining the nature of social interaction within the industrial sectors.

Gallie found substantial contrast in the attitude of employees and their relations with management. In Gallie's view, the key to understanding the differences between the British and French worker's attitudes and degrees of integration into the company lies in factors which are nationally specific: (1) the prevailing style and ideology of management which in France is paternalistic and insistent on the preservation of managerial prerogatives compared to the British equivalent; (2) the distribution of power within social institutions which is less diffused in France and which thus encourages a hostile and alienated attitude among employees; and (3) the ideology and mode of action of the trade union movements in each country. Additionally, Gallie's research demonstrates how institutions are said 'to be moulded in significant ways by the values and beliefs of those in key positions' in them, and 'they will embody the strategies by which these groups seek to obtain their goals' (Gallie, 1978: 36). This evidence can be interpreted as supportive to the divergence-type approach. Indeed, it could be argued that firms' internal organisation is moulded by the national institutions where such firms operate, which confirms Crozier's empirical research. In addition, the protagonists, in this context HR managers, are socialised into 'the more enduring cultural traditions of the wider social groups to which they belong'. 'Both

values and institutions are seen as having been shaped by broader patterns of historical/societal development' (ibid), that is to say the culture that differentiates one country from another. Gallie's research found that the institutional structure itself reflected French managers' commitment to a paternalistic strategy for securing the allegiance of the work force, in contrast to the semi-constitutional strategy that had been adopted in England. As discussed earlier, this conclusion can be analysed through the differences between France and England's educational systems. The evidence given previously shows how France tends to value formal education more than England. For example, the percentage of the population aged from sixteen to eighteen engaged in full-time education is 87% for France, while for the UK it is 43% (OECD, 1999). Therefore, the conclusions made by Gallie could be a reflection of the stronger value given to education in France in comparison to England. The most important divergence data in the Gallie study can be stated in the following assertion: French workers regarded the formal structure of power in the firm as illegitimate, whereas the British workers regarded it as legitimate. Further, British workers appeared to show a higher level of identification with the underlying objectives of management -a commitment to increased rationalisation and efficiency. In France, in contrast, the workers' were mainly concerned with the way managers exercised authority, and how it affected the worker's identity. French managers appeared to show a higher degree of social distance, and were fundamentally uninterested in the workers as human beings. This conclusion has a direct connection to the education system discussed earlier. Tight control of the French education system and the high-power distance from lecturers to students, unlike in England, supports Gallie's findings. This pattern tends to reflect French managers' behaviour. The most immediate implication of Gallie's (1978) conclusions to this thesis is that HRMPP cannot be analysed by taking only the technology variable into consideration. In order to analyse HR management practices, the national institutions where a firm operates must also be analysed. Therefore, Gallie's research has a direct inference to the 'neo-contingency' perspective proposed here.

In the same line of investigation, Peter Clark (1979) developed a research model which stressed the divergence-type approach by studying one industry. Clark analysed three French tobacco firms operating in England and in this case he controlled the

technology variable. His analysis was based on (1) published reports and researches, and (2) an empirical study of the social structures of the three factories. The major findings of Clark's study can be summarised as follows: (1) Authority in England is delegated a great deal more than in France and there are a variety of centres for decision-making. This finding reflects the autocratic and power-distance observed in France as opposed to England, reported in the two previous studies. Also, this finding could reflect how the education system is internalised and put into practice by French and British managers. (2) The British cigarette industry is similar in the routine nature of its technology to that of the French industry, but it is dissimilar in its approach to social change and the logic of decision-making. According to the OECD (1996) technology classification, the tobacco industry is classed as a low-tech industry. Therefore, the similar routine nature of the British and French tobacco firms is not surprising. However, the factors of social change and decision-making echo the divergence-type argument that confirms Crozier's studies. France and England are culturally, institutionally and societally different. The implication of Clark's findings for the present research is that HR managers within the same industry in France and England would show the same pattern of management practices and; (3) British tobacco factories are not characterised by the pathological features evident in French state-run enterprise (higher level of bureaucratisation and control). Therefore, the differences found between the French and British tobacco industries can be explained by cultural differences. Here again the divergence-type approach is supported. It seems that the contingency variable technology does not have much effect on the different patterns of behaviour in France and England. As explained earlier, it could be argued that the firms studied clearly fall into the low-tech classification and that in both countries they present the same pattern. The alternative in explaining the difference between France and England is based on the cultural traits. This thesis seeks to explore this argument, but in a multi-industry sample. The challenge would be to correctly classify firms both in France and England according to their level of technology. This thesis offers a technology classification ranging from low-, mid- to high-tech firms. In so doing, the problems of the contingency theory could be diminished.

Marc Maurice and colleagues (e.g. 1980, 1986, and 1990), who belong to the Aix-en-Provence Group, investigated the production departments of manufacturing plants in

France, England and Germany (at that time West-Germany). Their research study was based on firms of similar size making an identical product. The concepts introduced earlier were assessed in their study. For example, they found that Crozier's bureaucratisation concept, centralisation and tight control appear to be more notable in France than in England. This finding is shown as the proportion of supervisors to total work personnel, which appears to be notably heavy in French plants compared to their British and German counterparts. Thus, Crozier's empirical conclusion is confirmed by the Aix-en-Provence Group.

On the other hand, the study of this group of researchers strongly supports the educational approach given in this thesis. For example, they found that French middle management grades are generally recruited from the higher levels of general academic education which then is customised in the firms as a *formation maison*. Higher managers possessing diplomas from the elite engineering schools *grandes écoles* may well be capable of deploying their abstract expertise with brilliance to those problems reserved for their attention. As discussed earlier, in general the French value formal education more than the British. The figure presented earlier shows the proportion of formal education attendance to be higher in France than in England. Furthermore, it could be argued that the stronger value given to formal education in France is a reflection of the French employment system. It is shaped by the practice of defining 'skill' as a technical property inherent in the individual work-task, rather than as an ability acquired by workers by virtue of their training and experience, as in England and Germany.

On the other hand, according to the Aix-en-Provence Group, each job is graded according to its 'skill demand', in a hierarchy tied directly to rewards. Across an industry, all jobs are classified within a common 'grill'. It is thus extremely difficult to adjust the content of an existing task, since workers (and unions certainly) will demand a review of the affected post; which may produce similar demands for other posts graded in relation to it. This limits the ability of French firms to introduce 're-skilling' or genuine operator versatility among manual workers. French foremen are typically promoted from the ranks on the basis of their 'ability to command' and not primarily of their technical distinction. Promotion to supervision in France is

determined partly by seniority and partly by presumed loyalty to the firm -age or length of service being taken not merely as a mark of sufficient technical experience to provide credibility, but no less important, also as a warrant of acceptance of the firm's values, as well as of adequate occupational socialisation. Rather than preceding promotion, the *contremaître's* training for supervisory tasks follows it. The *maîtrise* spends far more time dealing with administrative paperwork or industrial relations issues and far less on technical matters, which are handled by specialists from technical or production-planning departments. This distinctive French promotion system observed by the Aix-en Provance Group is not found in British and Germans firms.

On the other hand, enterprise is built up in each society on the basis of particular conditions for mobilising people within societal spaces. French and German firms in the same industry not only do not have a similar structure, but also the normative, relational and institutional environments in which they operate *exclude* any such possibility (Maurice *et al.*, 1980: 14). Whether or not the 'educative' and 'organisational' relationships actually do determine the 'industrial relationships', it is incontestable that German unions help to nurture the *leistungsprinzip* (a value that stresses personal involvement and productivity), while in France the unions, despite their feeble overall membership figures, seek to mobilise the workforce as a whole against the employer, at times in a spirit of quasi-insurrectional opposition. In other words, both employers' and employees' (trade unions) strategies do not spring simply from obvious material interests, even as they are represented in socially influential definitions of the situation, but are shaped by the social-cultural environment.

Although the Aix-en-Provence Group research was based on one industry, their results have direct implication to this thesis. This research analysed different aspects of the divergence-type approach that this thesis aims to address in a multi-industry sample. One of the objectives of this thesis is to test empirically the influence of technology and national institutions on certain HRMPP. This approach was not directly investigated by the Aix-en-Provence Group.

Relatively recently, Shackleton and Newell (1991) developed an Anglo-French study; which was based on comparing the methods used to select managers in seventy-three British and fifty-two French organisations. They found that the utilisation of assessment centres for selection purposes was greater in England than in France. 58.9% of the British sample reported using them, as opposed to 18.8% in France. Another finding was the common use of interviews (93.2% in England and 94.3% in France) and the inclusion of line managers in these interviews. In France, 92.4% of the respondents say that they resort to more than one interview, compared with 60.3% in England. There is a stronger tendency to use the one-on-one interview in France than in England. Thus, to be seen by more than one person in France, and hence to spread the responsibility of the decision, candidates have to attend a number of interviews. In England by comparison, there is a greater tendency to use panel interviews so that one interview permits the candidate to be seen by all concerned. In France, panel interviews are restricted in use to very large companies. In England, panel interviews are not only used more, but are used by medium-sized companies as well as large ones. These results reflect societal differences between France and England. Also, they show patterns of centralisation and control of the French industry in comparison to the British firms, giving support to Crozier's research.

Michael Lubatkin (1998) and colleagues explored the relationship between the French and the British in one specific type of administrative heritage, the headquarters-subsidiary control practices used by acquiring firms during the integration process of a merger or acquisition. They studied thirty-five French and forty-eight British acquired firms. According to their findings the French firms are more inclined than the British to exercise direct forms of control, similar to the routine-control used to establish tight control over state-owned firms. French acquiring firms will be more inclined to transfer managers to key staff positions in the acquired firm than British acquiring firms. French acquiring firms will rely on higher levels of centralised system controls than their British counterparts. The differences found between British and French firms were generally consistent with the institutional heritage differences between the two nations. The explanation given by Lubatkin (1998) and colleagues to their findings were related to the differences between France and England's social factors, which they argue shape firms' internal organisations. Their findings are supportive of

Crozier's early work with regards to bureaucratisation and the Aix-en-Provence research group of the explanation of their findings based on differences between France and England in educational institutions, which shape firms' internal organisation.

Graham Winch and colleagues (2000) developed a research model to study five leading French and five British construction corporations based on organisational behaviour. They studied these groups between 1987 and 1993 during the construction of the Channel Tunnel: the Transmanche-Link (TML) project. Their findings present a mixture of contradictions and support for the Anglo-French research presented in this section. For example, with regard to work organisation Winch *et al.,* (2000) found that the French have more autonomy and control over their work. They found that the French rely much less than the British upon systems and procedures. The French were more *fonceur* (action-oriented) than their procedural British colleagues. This conclusion supports the earlier findings of Pugh *et al.,* (1969) on the work co-ordination component, that is the standardisation and formalisation dimensions. British managers relied upon much greater co-ordination through both procedures and mutual adjustment than the French (Winch *et al.*, 2000). Support for this finding also comes from comparative research in other industries; for example, D'Iribarne's (1989) study on the American aluminium industry. He found that the French are much less procedural than the Americans, who rely upon precisely codified rules and procedures in managerial procedures.

In terms of group behaviour, the French were found to be more much more competitive (Winch *et al.,* 2000); they competed more with each other at work. This finding is supportive of the differences in the education system between France and England discussed earlier. For example, French students compete for a place at the most prestigious French schools (*grandes écoles*). They take an entrance exam. The British, on the other hand, were found more collegial (Winch *et al.,* 2000). They were more satisfied with the behaviour of their colleagues, and relied more on them for motivation, and tended to use more mutual adjustment to co-ordinate the work than the French (ibid: 676). This conclusion gives support to the individualistic behaviour pattern within the group on the French side. On the contrary, the British group was

found to be more supportive (ibid). The British were also more involved in their work, placing an emotional value on work performance and relationships that the more distanced French did not display. This is supportive of the stress that French workers presented, which is greater in comparison with their British counterparts.

Winch *et al.,* (2000) have discussed their findings based on the distinctive forms of the social regulations of technical expertise between France and England. They argue that this perspective is prior to the national education system in the sense that the principal institution for the production and reproduction of technical expertise were founded before formal national education systems were developed in the two countries, and have shaped those education systems. On the one hand, the principal French institution for social technical expertise is the *Corps* (ibid). The *Corps des Ponts et Chaussées*, founded in France in 1747. On the other, in England it is the profession (ibid). The Institution of Civil Engineers (ICE), which was founded in 1818. However, this thesis does not intend to study one particular scientific discipline. In contrast to the Winch *et al.,* (2000) study that focused on one particular research project and discipline (Construction of the Tunnel Channel and Civil Engineers), this thesis aims to compare different industrial sectors and scientific disciplines and their implications for HRMPP.

3.10 Conclusions

The prospect of a truly unified Europe today acts as a catalyst, which will bring an ever-greater convergence between the economic systems of France and the UK (Holmes and Sharp, 1989). However, it seems that the French and British educational systems and their economic development are important aspects that shape divergence distinctions between the two countries.

Furthermore, a comparison of the French and British and their specific employment relationship can be legitimately conducted only as a whole. Comparison in terms of similarities and differences over a lengthy schedule of variables, one by one, is therefore to be regarded, in a sense, as inherently inconsistent with this holistic approach. Yet if each whole is to be made visible, there is no real alternative to regarding each dimension -educational, organisational, industrial- as separable,

initially, from the others, with comparison taking its usual form of the 'one to one' matching of the bearing of individual proprieties upon each major dimension (Rose, 1985: 74).

The conclusions of the critical scope and theoretical potential of the societal analysis proposed in this thesis attempt to supply the concerns in three main types of problems: (1) the reconciliation of the contingency and divergence theories, so that the neo-contingency perspective could emerge; (2) the mutual influences between system and actors within societies; and (3) the comparison of societies as institutional wholes.

CHAPTER FOUR: Human Resource Management and Hypotheses

4.1 Introduction

The analysis provided in the previous chapters suggests that firms' internal organisation are never culture free. Indeed, the 'neo-contingency' theoretical perspective together with the Anglo-French researchers presented, give evidence of the influence of technology and national institutions on shaping the actors in firms' management practices. The question remains as to what extent culture and technology shape firms' internal organisation. For example, what would be the operation of HRMPP in two firms of comparable size using the same level of technology operating in two different countries? Would differences or similarities in the operation of HRMPP be implied? As discussed before, the differences could be explained by national distinctions, for example, hierarchical structures (Maurice *et al.*, 1986). On the other hand, similarities and differences in HRMPP operation could be derived from the contingency perspective –technology among other variables. One of the key questions of this thesis is to investigate how HR managers are socially constructed along with their spheres of action, which are dependent on the social system. If the 'neo-contingency' approach could help to explain the way in which HR managers in technology intensive (high & mid) and low-tech industries operate HRMPP, this would lead to the suggestion of the most appropriate way to design HRMPP for firms located in France and England according to their level of technology.

However, before moving on to this level of analysis, it is important to analyse how (1) recruitment and selection, (2) training, (3) organisation, and (4) compensation are moulded by the influence of cultural and technological aspects. In the path of this analysis, this chapter contrasts personnel management vs. HRM. It suggests a close relation between personnel management and low-tech firms. On the contrary, HRM could be related to technology intensive firms. For each HRM functions a contingence and divergence hypothesis is presented. These hypotheses guided the path to postulate a general neo-contingency hypothesis.

4.2 Theoretical framework

The previous chapters discussed that the scientific management movement gave way to the personnel management and human relations evolution during the 1920s and 1930s. This chapter does not seek to give a full account of the transition from scientific management to personnel management/human relations and nowadays human resource management/knowledge management (e.g. Young, 1931; Legge, 1995; Abrahamson, 1997). Rather, the discussion that this chapter presents is directed to studying the influence of technology on certain HRMPP. This influence will be complemented with the cultural and institutional perspective discussed previously. The combination of these two perspectives would eventually lead to the neo-contingency theory proposed in this thesis.

Chapter two has discussed the technology concept at the firms' level of analysis. However, technology as a tool in management practices has revolutionised the workplace and exerted a significant impact on HRMPP, and its value added to a firm. Nonetheless, one key theme of today's thinking about HRMPP is the recognition that an organisation's unique competitive advantage lies in its people (e.g. Pfeffer, 1994); as opposed to technology's contribution (either as a tool or defining technology at the firms' level as presented in chapter two). Inherent in this belief is the realisation that it is inevitably more difficult to control, manage, and predict the behaviour of an organisation's human component relative to its technological one (Guest, 1987). Nonetheless, this chapter does not intend to discuss whether technology or people are the organisations' competitive advantage. Rather the discussion is based on how HRMPP would be shaped by the level of technology that a firm has and by cultural factors.

4.2.1 HRM vs. Personnel Management

In order to begin discussing the different approaches to HRM, it is important to give an account first to management and then to HRM. In general, management could be seen as an art. In modern societies management is becoming a complex function due to the competitive environment in which firms operate and compete. Brech (1964) defines management as follows: "A social process entailing responsibility for the effective (or efficient) planning and regulation of the operations of an enterprise, such

responsibility involving (a) the installation and maintenance of proper procedures to ensure adherence to plans; and (b) the guidance, integration and supervision of the personnel comprising the enterprise and carrying out its operations". This definition presents a holistic view of management which embraces the basic HRM functions (recruitment and selection and training). Moreover, an *effective* or *efficient* operation of these HRMPP and other management functions would lead to firms' performance (e.g. Huselid, 1995).

The early development of personnel management and then HRM covers the emergence of welfare at the work-place. Employers sought to increase employees' welfare and output, and shape their values (Young, 1930). It is clear that 'technology' is bound to affect the HR management just as it affects all other phases of management (ibid). However, according to the institutional theory, variation of HRM is closely related to the cultural environment where the firm is located (e.g. Gooderham *et al.*, 1999). On the other hand, the changes from industrial management to personnel management and then HRM function have emerged in parallel with the economic shift from agrarian to manufacturing to services –and now to information" (Beatty *et al.*, 2003: 107).

The term HRM can be traced back to the attempt to draw a line between HRM and personnel management. The debate of the origins and nature of the term HRM is well documented in management literature (e.g. Young, 1930; Guest, 1987; Brewster and Bournois, 1991; Boxall, 1995; Legge, 1995; Budhwar and Debrah, 2001; Weber, W. *et al.*, 2002). However, this debate continues today, in an attempt to incorporate industrial relations into HRM, as well as to examine the integration of HRM into the business' strategies, development of HRM to the line managers and the extent to which HRM can act as a key means to achieving a competitive advantage in organisations (Budhwar and Debrah, 2001: 498).

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(ibid). However, according to the institutional theory variation of HRM is closed related to the cultural environment where the firm is located (e.g. Gooderham *et al.*, 1999). On the other hand, the changes from industrial management to personnel management and then HRM function have emerged in parallel with the economic shift from agrarian to manufacturing to services –and now to information" (Beatty *et al.*, 2003: 107). One factor in changing HRM's role is the increased reliance on knowledge workers (ibid). Under this perspective HRM involves a series of organised activities, conducted within a specified time and designed to produce behavioural change. Within HRM the most common activities are recruitment and selection, training (learning for the present job) and education (learning for the future job), and organisation. HRM includes other dimensions of personnel activities such as health and safety, compensation and incentives, and performance evaluation, as well as staffing, career development and internal communication (Nadler, 1994).

This definition illustrates the differences between personnel management and HRM. Some of the immediate distinctions that emerge from them are: (a) HRM consists of planned activities in order to produce behavioural changes and, (b) personnel management has the connotation of an exploitative manager vs. employee relationship. On the other hand, the term and practice of HRM originated in the United States of America in the 1960s and 1970s (Brewster and Bournois, 1991; Towers, 1992; Legge, 1995). Nonetheless, this practice has been embraced by many of the world's industrialised societies. In terms of cross-national research in HRM, it is important to distinguish if the Anglo-Saxon models of HRM are applicable in different parts of the world (Mayrhofer *et al.*, 2000). As companies all over the world struggle to gain a competitive advantage in the global marketplace, designing and implementing effective HRMPP has never been more crucial (Beatty *et al.*, 2003). Table 4.1 presents some other differences between HRM and personnel management found in academic literature.

In short, the transition from industrial management to personnel management and HRM implies that the time has surely come when all phases of business administration must accept broader responsibilities. Managers are needed to formulate new sets of values called for by the new business environments.

Table 4.1: Differences between HRM and Personnel Management

Dimensions	HRM Approach	Personnel Management
Employment planning	Long-term focus with a close link to business strategy.	Short-term, reactive.
Recruitment and selection	Integrate, key task.	Separate, marginal task.
Assumptions of contract	Aim to go 'beyond contract'.	Careful delineation of written contracts.
Training	Learning companies	Controlled access to course.
Employee development	From individual skills to longer-term employment capabilities.	Short-term approach
Job design	Teamwork	Division of labour
Job categories and grades	Few	Many
Compensation	Performance-related, contingent compensation practices, knowledge-based structure, based team productivity.	Job evaluation (fixed grades).

Source: Beatty et al, 2003; Brewster and Bournois, 1991; Guest, 1987; Storey, 1992; and own adaptation

Another perspective for the analysis of the evolution of HRM, could take the course of the technology examination presented in chapter two. Technology was assessed through its elements: technoware, humanware, inforware and orgaware, which provided a different view of the work-unit. Indeed, work-units with a higher task specification and variability would require the skilled use of advanced technology. Thus, these jobs would require a higher development of the four elements of technology, as opposed to labour or craft activities. It also would imply a different form of administrating human capital; one possibility could be HRM. Indeed, the human resources function is a dynamic management function that could present a different configuration according to the environment and business demands. HRM could be liberated from administrative shackles and able to focus more on developing intellectual capital, social capital, and managing knowledge to improve an organisation's competitive advantage (e.g. Lengnick-Hall, M and Lengnick-Hall, C., 2003). Changing technology has created a new perspective in management practices. The HR function has changed in different directions, for example, *e*-HR. The term *e*-HR was first used in the 1990s when "*e*-commerce" (or electronic commerce) was sweeping the business world. Like *e*-commerce, *e*-HR referred to conducting business transactions – in this case human resources management functions using the information technology. *e*-HR also provides the HR function with the opportunity to create new avenues for contributing to organisational effectiveness through such

means as knowledge management and the creation of intellectual and social capital. In short, *e*-HR is defined as: "the application of conventional, web, and voice technology to improve HR administration, transactions and process performance" (Kettley and Reilly, 2003: 3).

The technology developments such as *e*-HR will generate a more strategic/managing role rather than an administrative one. Time previously spent on administrative issues will be replaced with time spent on firms' competitiveness issues (Cober *et al.*, 2004; Buckley, *et al.*, 2004). Additionally, the human resources function will be able to create new paths to add value to organisation. Thus, the traditional notion of HRM is changing towards a strategy management function. This implies that the HRM activities could embrace a different degree of importance, according to the firms' business plan (e.g. Kettley and Reilly, 2003; Lengnick-Hall, M and Lengnick-Hall, C., 2003).

The management literature has presented another distinction of HRM that focuses on the 'perfect' bundle of HRMPP, which would lead to firms' performance. Pfeffer (1996: 26) has studied the 'best' bundle of the HRM. He presents eight HRMPP that according to him constitute a high commitment or high performance management: (1) Contingent compensation, (2) Highly selective recruitment, (3) Substantial investment in training (4) Suggestion systems, quality circles, or other forms of employee participation, (5) Paying higher wages, (6) Employment security, (7) Sharing information; and (8) Reducing status difference. These eight practices are remarkably consistent across various academic studies (e.g. Schuler and Jackson, 1987; Arthur, 1994; MacDuffie, 1995; Youndt *et al.*, 1996; Bélanger *et al.*, 1999; Purcell, 1999; Ramsay *et al.*, 2000; Marchington and Grugulis, 2000; among others).

The primary goal of examining the 'best practices' in this thesis is to determine whether and under what conditions there might be an identifiable set of 'best international HRM practices' within certain organisational and societal contextual conditions, which might be applied across different national settings. Additionally, by 'best practices' it is also meant that practices facilitate effectiveness within the specific organisational and societal context in which a company operates (Geringer *et al.*,

2002: 6). Therefore, international HRM practices should be considered within a number of the major societal (educational institutions) and organisational context factors (technology) that have been discussed. This view belongs to the neo-contingency approach, in which the specific bundle of HRM practices would vary by sectors and business' strategy and cultural settings. The neo-contingency view to HRMPP contradicts the universalistic, one-style-fits-all view which belongs to the 'traditional organisation theory' into which personnel management falls. Furthermore, under the neo-contingency view proposed here, it is important to analyse whether this 'perfect' HRM bundle is only suggestive of increased profits irrespective of organisational, industrial, or national context; or whether this HRM arrangement has a direct link to firms' performance. The traditional analysis between HRMPP and firms' performance has been researched by quite a number of academics (e.g. Arthur, 1994; Youndt *et al.*, 1996; Delery and Doty, 1996; Huselid, *et al*, 1997; Wood, 1999; Guest, 1997; Cully *et al.*, 1999; Ramsay *et al.*, 2000, among others). However, the neo-contingency approach proposes to link HRMPP to firms' financial performance. Although there are a considerable number of studies which link performance to HRM practices, they do not agree on a consistent measure of performance. As Becker *et al.*, (1997: 2) points out "the analysis of performance does not provide direct evidence of how such a system creates that value… there is very little research that "peels back the onion".

Taking into consideration the notion of 'best' HRMPP and firms' levels of technology, it is also important to emphasise the cross-national aspect (divergence). This thesis sought to empirically test whether HRM practices and policies would fall into the following three categories: context-free, context-specific and context-dependent:

1. Context-free implies that some HRM practices (e.g. training in teamwork, selecting employees based on their fit with the company's culture) may generally be applicable and effective across different nations, regardless of the social and organisational contextual conditions (Geringer *et al.*, 2002: 7).
2. Context-specific indicates that the HRM practices found to be effective in one country's contextual setting might be able to be transferred successfully to another country with a similar contextual back-ground. For example, the use of seniority-based promotions may be effective in many countries which share a

common cultural orientation of high power distance and collectivism (Geringer *et al.*, 2002: 8).

3. Context-dependent HRM practices imply that societal and organisational conditions are so important that the HRM practices cannot be effectively replicated in other countries. For example, certain training in the US (e.g. sexual harassment or diversity) may only be effective in their present manner in the US, due to its particular legal, social, and cultural contextual orientation.

Different studies call for the universal application of the best practices model. This implies one HRM model for all firms (Wood S., 1995; Huselid, 1995; Wood and Albanese, 1995). However, recently authors have been more careful in their claims of universal applicability but press to show that 'good' practice in HRM has bottom-line benefits leading to the optimistic reporting of research data in the professional HRM press (Purcell, 1999: 26). For example, Brewster and Bournois (1991) present a European HRM model. They argue that European organisations operate with restricted autonomy: (1) because of the national culture and its manifestations such as national institutions and, (2) as the European Union regulates work and employment relations.

The European model shows an interaction and close relationship between HRM strategies, business strategy and HRM practice and their interaction with an external environment - national culture and institutions, history, employing organisations. However, an important aspect of the European model is that 'there is an identifiable difference between the way in which HRM is conducted in Europe and the situation in the United States of America; a difference which makes it possible to speak of a European form of HRM and to question the appropriateness of the HRM concepts as defined in the USA' (Brewster and Bournois, 1991: 11). If the term HRM and practice of HRM started in the USA and was then adopted by different European firms, especially from England, then the term European HRM model would imply a cultural effect on HRMPP, as Brewster and Bournois (1991) suggest. Although the term and practice of HRM tend to be standardised by the EU conventions, they also imply that the culture of each member of the EU influences putting HRM agreements into practice. These arguments suggest that country has a significant influence on HR practices and variations among them at the European level. The following sections will

present 1) a specific analysis of the country influence in management between France and England and 2) a discussion of the technology influence on HRMPP. These two analyses seek to support theoretically the neo-contingency perspective suggested in this thesis.

Chapter two has analysed and discussed the technology variable. The suggestion derived from this discussion is to classify firms into three technology levels. In this way the understanding of a firm could be reached. The discussion of chapter three is based on the influence of cultural factors shaping management behaviours. The complete analysis of levels of technology and cultural factors is integrated into this chapter focusing on the different approaches to HRMPP in these two areas.

4.3 Management in France and England

Management as a discipline, with its set of techniques, practices and values, was introduced in France and England, between the two World Wars (Naulleau and Harper, 1993). For the British *élite* managing a business has always been perceived as secondary to other more valued activities (Naulleau and Harper, 1993). Compared to the British *élite*, the French ruling class did not react unfavourably to the introduction of management practices and managerial ethos (ibid).

Table 4.2 describes a series of historical and cultural differences between French and British managers in terms of the relative hierarchy given to management functions, access to top management, the education and training of managers, the patterns of leadership and authority, and the patterns of communication and management style. These dimensions would need to be taken into account when designing and implementing managing developing programmes in each country (Naulleau and Harper, 1993: 21). Additionally, these differences to some extent support the national institutional differences between France and England discussed previously such as the educational system.

The model proposed in this thesis takes into account not only the organisation-specific influences (a firm's level of technology), but also includes country specific influences arising from the educational system.

Table 4.2: A Comparison of British and French Management Cultures

England	France
1. The hierarchy of managerial function	
The most valued functions are finance, accountancy and law.	There is no strict hierarchy of functions.
The status of production management and R&D are lower.	In most traditional French companies, R&D and production management are, however, the valued functions.
Principally, functions with a professional status outside company are the most valued.	Principally, functions with high intellectual content are the most valued.
The Principal Criteria are:	
The 'right' social network.	Diplomas usually from *Grandes Écoles.*
Practical achievements and job performance.	Importance of the 'old boy' network.
Social skills.	Political skills.
Accountancy or legal qualifications are an asset.	
Management with technical qualifications are under-represented in senior management positions.	In larges companies, appointing of management coming from the civil service ('*pantouflage*').
3. Education and training of managers	
Not of primary importance.	Considered as very important.
Emphasis is on pragmatism and learning by doing.	Strong emphasis on analytical and deductive qualities.
Training might be seen as a sign of weakness.	Low training in social skills.
Empirical approach values.	Theoretical approach valued.
Low status attached to applied studies, for example in engineering and technology.	High status attached to engineering, technology and those subjects taught in the *Grandes Écoles.*
4. Leadership and patterns of authority	
Paternalistic attitudes are common. Consensus is important for decision making.	'Autocratic' attitudes are common. Reduce participation of intermediate and low management in decision making. Consensus is not the point in decision making.
Fragile nature of the top manager's authority since it is derived from his social position rather than based on merit or technical competence.	Authority from top management is not challenged.

England	France
4. Leadership and patterns of authority	
Leadership style is more orientated towards people than towards tasks.	Leadership style is more directed towards tasks than people.
Conflict avoidance is prevalent.	Conflict avoidance is prevalent.
Pseudo participative attitudes are common in decision making, often coloured with manipulative overtones.	Fragile nature of the authority of intermediate management.
5. Communication patterns and styles	
Oral communication preferred, with a high premium placed on face-to-face interpersonal relationships.	Written communication preferred. Face-to-face interpersonal relations are difficult.
Communication is pragmatic and non-didactic.	Communication is abstract and didactic.
Informality is strong, e.g. use of first names, and a general informality of manner.	Formality is strong, for example the use if family names, and a general formality of manner. Strong perception of 'power distance' (Hofstede, 1980). Hierarchical bypass is common.

Source: Naulleau and Harper (1993: 21-23).

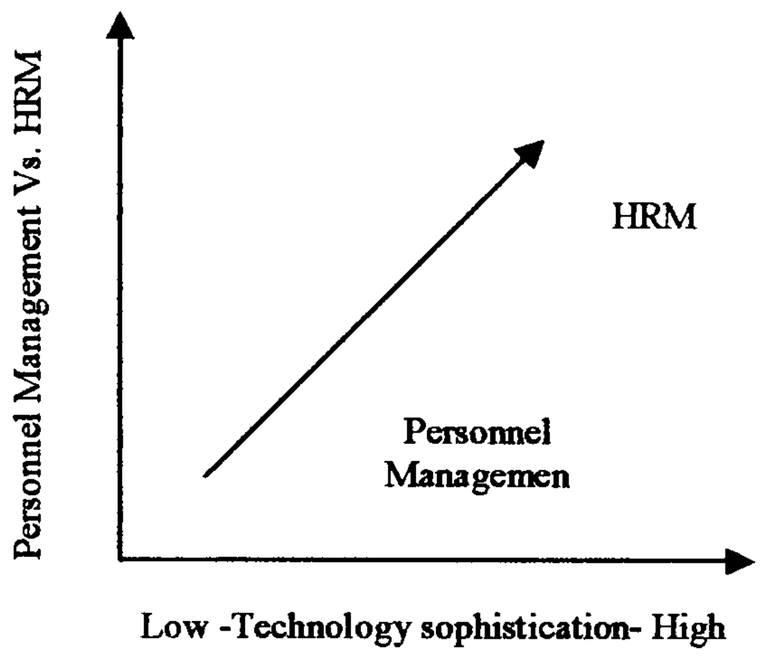
4.3.1 Different approaches to HRM: Culture and Technology Hypotheses

The eight 'best' HRM policies and practices presented earlier are regrouped into four broad categories: (1) Recruitment and Selection, (2) Training, (3) Organisation and (4) Compensation, which are discussed below, emphasising their different approaches in relation to firms' location and technology intensity.

Having made a distinction between technology intensive firms (high and mid tech) and low-tech firms in Chapter Two, it is plausible to argue that the dimensions of the structural and process patterns in HRMPP would also present different sets of arrangements in its structure. The following sections investigate the relationship between the level of technology that a firm has and the technoware level of sophistication. This relationship might imply that HRMPP are closely related to the personnel management approach. On the contrary, high- and mid-tech firms, which present a high level of technoware sophistication, presuppose a HRM practices and policies arrangement like the HRM approach presented in figure 4.1. Thus, following the discussion of cultural differences between France and England, personnel

management, and HRMPP, all these variables can now be linked. The next sections illustrate how France and England differ in the four broad HRM categories mentioned above. Also, evidence of how technology tends to shape these HRM practices is presented. The objective is to link the different approaches found in academic literature of the effect of cultural and technological factors on the four HRMPP, in order to generate the hypotheses to be tested in this thesis.

Figure 4.1: Relation between HRM and Technology



Source: Own adaptation

Recruitment and Selection: "*The critical need is to attract suitable highly-talented employees or knowledge* workers *throughout the organisation*" *(Kleingartner and Anderson 1987: 117).*

An important aspect of personnel management is 'staffing'. In its restricted meaning, the term refers to the measures, instruments and facilities used by a company to recruit the most suitable workers for every job. In a wider sense, staffing not only covers the recruitment and selection of personnel, but also personnel and career development (van der Klink and Mulder, 1995). Recruitment is the process of generating a pool of qualified candidates for a particular job. Its objective is to increase the success rate of the selection process by reducing the percentage of applicants who are either poorly qualified or have the wrong skills (Gatewood and Feild, 1994; Gomez-Mejia *et al.*, 1998). This definition illustrates that recruitment and selection are one of the most important HRM processes. In other words, these processes highlight the firm's strategies to attract and then decide to 'hire' or 'not hire' a potential candidate. Furthermore, employee selection is a fundamental aspect of HRM and assumes that individual differences make a meaningful difference in job performance. What is

needed to maximise performance is a good match between personal characteristics and job requirements (Cardy and Krzystofiak, 1991). Thus, an analysis of the job is required to rationally identify tests that may be predictive of job performance (e.g. Schuler and Jackson, 1987). After the domain of performance is examined, the type of personal characteristics that might tap these characteristics must be identified.

On the other hand, selecting the most qualified persons to fill job vacancies seems to be a universal goal for both human-resource and line managers around the world, as a mismatch between jobs and people could dramatically reduce the effectiveness of other HRM functions (Huo *et al.,* 2002). One might wonder whether people agree that there are some universally desirable selection criteria that can be used, for example recruiting new employees, in any country. Indeed, the methodology of personnel selection has never been uniform around the world (Sparrow and Hiltrop, 1994). Chapter Three has presented and discussed how past researchers have demonstrated the differences in management practices between France and England (e.g. Gallie, 1978; Maurice *et al.,* 1980). However, an important topic to consider when discussing the nature of recruitment and selection systems between France and England is the significant feature of the legislation context. England is unique in the developed world for having a system of HRM which remains largely unregulated by legal requirements (Brewster *et al.,* 1993) relying instead on a tradition of 'voluntarism'. On the contrary France is renowned for their high levels of public domain legislation or collective agreement in the recruitment sphere (Sparrow and Hiltrop, 1994; Barsoux and Lawrence, 1997). For example, in France HR managers need to be aware of a remarkable range of collective agreements –which may exist at a national or industrial level. These typically require organisations to follow a certain set procedures, or limit what they can and cannot do in recruitment process (Sparrow and Hiltrop, 1994).

Another aspect to consider in recruitment and selection processes is the different range of tools for selecting the 'best' candidate. For example, as presented in Chapter Three, Shackleton and Newell (1991) developed an Anglo-French study; which was based on comparing the methods used to select managers in seventy-three British and fifty-two French organisations. They found that the utilisation of assessment centres for selection purposes was greater in England than in France (58.9% and 18.8%

respectively). Another finding was the common use of interviews (93.2% in England and 94.3% in France) and the inclusion of line managers in these interviews. In France, 92.4% of the respondents say that they resort to more than one interview, compared with 60.3% in England. There is a stronger tendency to use several sets of one-on-one interviews in France than in England, and hence to spread the responsibility of the decision for selection purposes. In contrast, in England there is a greater tendency to use panel interviews so that one interview permits the candidate to be seen by all concerned. In France, panel interviews are restricted in use to very large companies. In England, panel interviews are not only used more, but are used by medium-sized companies as well as large ones. These results reflect societal differences between France and England. The French preference for using more than one interview could be linked to Hofstede's (1980) analysis of national culture. The higher scores on uncertainty avoidance found in French managers is reflected in a preference to have their own views supported by views from their colleagues (Sparrow and Hiltrop, 1994). Also, these results show patterns of centralisation and control of the French and British, giving support to Crozier's (1964) research.

The empirical tradition in Anglo-Saxon countries has shaped the nature of selection research, reflected in the relative higher use of the more valid and reliable selection techniques in England in comparison to many European countries (Sparrow and Hiltrop, 1994). For example, the French attitude to selection tends towards a more intuitive, interpretative and clinical model, and as such encourages wider use of the personality questionnaire, multiple one-to-one interviews and graphology (Barsoux and Lawrence, 1997). French selection research is more concerned with the process of selection than its outcome. The idea is more important than hard confirmed evidence. However, if the international mobility of managers does increase, then the 'cultural fingerprint' of national selection systems will be more widely felt (Sparrow and Hiltrop, 1994). On the contrary, British managers feel rather aggrieved at losing their job because of their handwriting, and French managers bemused by the impersonal nature of cognitive tests and biodata, and the time-consuming rigor of assessment centres (Shackleton and Newell, 1991). The British system emphasises empirical thinking in the recruitment and selection processes. It also places a premium on personal experience rather than the codified judgments of previous generations. British

managers tend to emphasise self-regulation in all things, rather than statutory control; the preferred mechanism of control is a liberal education with less emphasis on vocational skills (Sparrow and Hiltrop, 1994).

Another aspect to consider in the recruitment and selection processes is the candidates' curricula. For example, in France it is important for recruits to have not only a technical degree, but also a general management postgraduate training. Indeed, in France it is common to see advertisements which specify a particular type of education identified by the number of years the course lasts after the *baccalauréat*. On the contrary the British advertisements tend to be vague calling for 'graduates' (or 'graduate preferred'); a general education is the favoured profile (Bournois and Chauchat, 1990). As presented in Chapter Three, the French have a long traditional respect for diplomas. The French educational system is built around the principle of equal access to all citizens and meritocratic competitive exams, which has had a strong influence on managers' behaviour (Naulleau and Harper, 1993). Furthermore, as Lawrence (1993: 19) states *'In France the emphasis is on formal learning, the development of educational cleverness, numeracy, literacy and a stylish competence with the French language, together with a high level of formal reasoning ability and 'culture générale'. All this fits very nicely in a milieu that conceives management as being about ordering and deciding on the basis of analysis and synthesis, rather than about interpersonal manoeuvring, motivating and implementing'*. In fact, this tendency can be seen in the French job advertisements which reflects this strong education pattern by asking candidates with qualities of *réception*, *la rigueur* and *l'espirit de systhèse* (i.e. powers of analysis, synthesis, evaluation, articulation and mental agility); (Barsoux and Lawrence, 1997). In France managers are selected more on the basis of their intelligence, which commonly is attached to the academic qualifications such as the *grande école* diploma. This qualification gives a path for gaining a *cadre* (manager) status, which in France is difficult to attain (Sparrow and Hiltrop, 1994). However, if the manager does not meet the academic requirements, his/her company experience and the skills he/she has demonstrated may in some cases be accepted as being of equivalent value (seniority is very important under such conditions) (Bournois and Chauchat, 1990). On the contrary, in England jobs advertisements stress drive, enthusiasm, pragmaticism, team orientation, and social

skills (Barsoux and Lawrence, 1997. These two patterns in the French and British preferred profile support the OECD (1997) report, which argues that French schools tend to be excessive in their emphasis on deduction and abstraction. In contrast, British pragmatism is a less analytical, more inductive, and more action-oriented way of thinking about cause and effect that encourages individuals to search for solutions outside the dominant paradigm, reflecting a greater willingness to accept, rather than avoid, uncertainty (Lessem and Palsule, 1999). Finally, besides the differences in the profiles posted in job advertisements, the French job adverts are vague on material rewards, and most of the time will say 'appropriate salary' while in England the salary will be stated.

These differences between France and England in the recruitment and selection processes denote the fairly strong influence of national institutions in the operation of this management practice in both countries. A clear illustration of these differences is the national education systems, which differ between France and England. Chapter Three has presented and discussed the broader influence of educational systems in management practices in both countries. In this Chapter, a close relation of the impact of educational systems on recruitment and selection in France and England has put been forward.

Besides the cultural impact on recruitment and selection processes, it is important to reconsider that the level of technology that a firm has; which also impacts this HRM practice. In the following section a distinction is made between the different configurations that recruitment and selection could present according to firms' level of technology.

Employee profiles: According to academic literature, employee profiles is characterised by three key differences between high- and mid-tech and low-tech firms. The first, intangible skills, refers to a workforce with tacit or difficult to measure capabilities, such as the ability to work in a team-based system, innovation, flexibility, problem solving capability and good interpersonal relations (Cutcher-Gershenfeld *et al.*, 1998). The second global scope stresses the importance of the recruitment of the *'suitable'* employee for the job, without any differentiation based on his or her

nationality. A major premise supporting international recruitment is that technology-oriented firms tend to hire employees with the desirable capabilities related to the specific job's description. A direct result of this practice is that the importance of employees' nationality diminishes while merits increase (Jolly and Roche, 1999). The last key difference is age. According to field literature, technology-oriented firms tend to hire new employees who are under thirty-five years old (Bowman and Farr, 2000). According to field literature, technology-oriented firms tend to hire new employees who are under thirty-five years old (Bowman and Farr, 2000). These employees' profile characteristics seem to be important in high-technology environments. In fact, R&D employees are crucial to the survival and competitive positioning of most high-technology firms because these companies depend to a great extent on creating knowledge and technological breakthroughs (Coombs and Gomez-Mejia, 1991: 40).

Recruitment and selection tools: Methods of recruiting employees can be a good indicator of management style and, at the very least, can tell us something about the formality of the employment relationship (Cully *et al.*, 1999: 60). Therefore, in terms of recruitment tools, the Internet and assessment centres were the primary means analysed. The Internet was chosen because it has become a leading recruitment tool for potential employees and employers searching for high-technology positions within the industry (Denis, 2000). At the same time, traditional assessment centres have also proven to be a suitable tool for evaluating candidates' personality and job skills (Coombs and Rosse, 1992). From the above arguments the following hypotheses are be derived:

Hypothesis 1 Culture:

There is a difference between France and England in their recruitment and selection processes. France will present more centralisation and control than England.

Hypothesis 2 Technology:

There is difference between technology-oriented firms and low-tech firms in their recruitment and selection processes. Technology intensive firms will recruit employees with a more sophisticated profile and tools than low-tech firms.

Organisation:

"The need to work closely with line managers to shape and to maintain organisation conditions that support innovation, change and employees' continued high performance, as well as organisation learning" (Kleingartner and Anderson, 1987: 117).

The organisational system defines occupational categories through structure, employment patterns and hierarchy systems (Gatley *et al.*, 1996: 70). Within the organisation system the socialisation process is found, which aims to immerse the employee in the culture, rules, procedures and practices of the organisation.

This section theoretically analyses two features of the organisation system: (1) structure, which is analysed through the variable: (a) flat structure; and (2) jobs' characteristics that are analysed through the variables: (a) team-work design, (b) empowerment, (c) non-intellectual work process, (d) supervision and (e) complexity in job definition. These features were included in the present study because the organisational conditions that shape firms' ability to achieve their objectives and respond to a changing environment, generally include organisational variables, among others (Kleingartner and Anderson, 1987).

France has a long tradition of centralisation of hierarchical rigidity and of individual respect for authority (Barsoux and Lawrence, 1997). French company law resembles the country's constitution in conferring considerable power on a single person (ibid: 161). Indeed, France has a very bureaucratic work system with many layers of hierarchy in the organisation, more supervision and less autonomy than British firms (Sparrow and Hiltrop, 1994). The tall vertical structures in French organisations have led to an internal market-based labour system (ibid). On the contrary, Lane (1988) has argued that British industry is structured in relation to its educational system, and that it has a managerial culture based on a highly individualistic university education system, relatively narrow access to top quality education, which emphasises theoretical disciplines such as pure sciences, little on-the-job training or education, a narrow definition of job responsibilities, relatively short-term minded management caused by greater shareholder interest. There is a clear connection between the intellectual leader and organisational centralisation. As discussed earlier, senior executives in France believe they owe their high positions to their intelligence and

clarity of vision (Barsoux and Lawrence, 1997); this could be attributed to their high qualifications obtained at the *grandes écoles*. Indeed, as discussed here, diplomas have been, and still are, a basic requisite for legitimacy and authority in the large French organisations (ibid). Managers are collectively known by the term '*cadres*' –legally recognized as *'grande-école'* or university graduates with five years study after the *Baccalauréat* or A level, holding a position from which they can exercise authority over subordinates which is delegated by his employer (Bournois and Chauchat, 1990). The arguments presented give evidence of the country context on firms' internal organisation.

Additionally, it is also important to analyse the influence of the level of technology that a firm has on the two organisational features presented previously. The following sections will present evidence in this respect.

Structure: Perrow (1967) suggested that a view of organisations as technological systems offers a better basis for comparing and comprehending them. Furthermore, Woodward (1965) claimed that only differences in technology and not in other variables, such as size or historical background, were related to structural differences. Moreover, Woodward's work demonstrated that the number of levels of authority in an organisation rose in relation to an increasing technical complexity.

Job organisation: (a) team-work design, (b) empowerment, (c) non-intellectual work process, (d) supervision, and (e) complexity in job definition. Technology intensive firms tend to delegate to their employees a high degree of autonomy and empowerment in daily management work (Frerichs, 1998). At the same time, managerial skill and style tend to involve employee participation, with considerable efforts devoted to a team-based work structure (Cutcher-Gershenfeld *et al*, 1998). Another organisational characteristic is that technology intensive firms tend to have jobs that are in a constant state of flux and cannot be easily defined (McGovern, 1998). On the contrary, low-tech jobs do not require substantial operational changes but call for much more employee supervision and control (Stuart and Quinn, 1992). Additionally, in a low-tech environment work-units are a systematised mode, which is a programme for efficiently organising and managing repetitive tasks that are

generally well understood (Drazin and Van de Ven, 1985). Work roles are specialised, highly codified, and standardised so that employees who frequently have lower expertise (knowledge of work content) and do not exercise much discretion, can perform them effectively. Supervisors deal with problems and exceptions, and minimal co-ordination is required among unit members (ibid: 524), for example, assembly line workers.

On the contrary, typical tasks or work in high- and mid-tech environments are only partly codified and require a greater level of expertise to accommodate the necessary decision making and information processing. As the number and difficulty of exceptions increases, more information flows between members of the unit and more interdependence develops (Drazin and Van de Ven, 1985). This environment encourages members of organisations to exchange ideas, and work-related problems and solutions in the course of the daily work-unit activities. The structure and process of this kind of work-unit are characterised by low levels of standardisation but high levels of (1) employee discretion, (2) interdependence and (3) communication (ibid). The discretionary mode might be present in work-units, such as middle-managers, technicians and assembly line technicians and engineers. Additionally, in technology intensive (high- and mid-tech) environments, employees such as engineers working on R&D projects or top-level managers and consultants are more likely to be found than in low-tech firms. Finally, sophisticated work-units are faced with a discretionary program which provides procedures, rules and norms. As task uncertainty increases, unit structure and process change to match this uncertainty. Specialisation, personnel expertise, and employee discretion increase, while standardisation and supervisory discretion decrease (Drazin and Van de Ven, 1985). The following hypotheses are postulated from above arguments:

Hypothesis 3 Culture:

There is a difference between France and England in firms' internal organisation. French firms will present a more structured internal organisation than in England.

Hypothesis 4 Technology:

There is a difference in firms' internal organisation between technology intensive firms and low-tech firms. Technology intensive firms will present a more dynamic internal organisation than low-tech firms.

Training:

"Training and development -the requirement for firms to continually upgrade- broadens and deepens the technical skills of knowledge workers" (Kleingartner and Anderson, 1987: 117).

Training focuses on providing, maintaining, upgrading and expanding employees' specific skills or helping them to correct deficiencies in their performance. The main objective of training is to continually improve employees' skills in a deliberate, planned, comprehensive and timely manner (Kleingartner and Anderson, 1987).

The content of training is clearly important. For instance, initiatives such as total quality management require people to be trained in so-called 'soft' skills rather than technical skills (Collinson *et al.,* 1998). Indeed, perhaps one of the biggest factors influencing training and development is the labour market in which organisations operate and the level of training and skills available in that market (Tregaskis and Dany, 1996). For example, France and England differ markedly (e.g. Maurice, *et al.,* 1980; 1986). As discussed previously, different educational systems play an important role in the shaping of training and development systems besides the economic and market aspects (e.g. Bournois and Chauchat, 1990). Furthermore, it is argued that educational systems shape the skills and knowledge of the workforce, who in turn shape the training systems as a result of the requirements for training and their career aspirations (Tregaskis and Dany, 1996). Evidence of the educational institution influence can be seen in France, which, from its roots, has the view that organisations should be staffed by a bright '*cadre*' of experts and managed by the application of rationality (Naulleau and Harper, 1993). The education system in France has apparently provided for these characteristics in managers.

Another aspect to consider in training and development is the approach that employees take in their own development. For example, in England managers are expected to assess their own training needs and seek out training opportunities. The British system encourages employees to develop a portfolio of skills that will enhance their 'employability'. Employees respond because they understand that they cannot expect to remain in the same job, function or even the company for long (Barsoux and Lawrence, 1997). However, French employees are less accustomed to taking

responsibility for their own development. An explanation to this pattern is the 'moral' contract that has prevailed in France based on long-term employment in exchange for loyalty, and where career progress was more predictable, based essentially on educational credentials (ibid). However, in recent years this model of employees' development has been impacted by the economic slowdown that firms around the world are facing. Nowadays, the French and British face downsizing and restructuring activities that have weakened this French notion of 'moral contract'.

According to Sparrow and Hiltrop (1994), France has mandatory levies to ensure that the minimum levels of training are complied with. Furthermore, the state has little direct influence on vocational education and apprenticeship, but imposes laws on organisations such as 1.2 per cent of wages must be spent on training (ibid). This evidence demonstrates the high level of Governmental influence in HRM practices in France. In England the internal labour-market has been highly structured. One implication is that British managers, especially in manufacturing, have been unable to maximise the returns from training (Sisson, 1989).

Another important aspect of the comparison between France and England is the emphasis given to the design of training programmes. For example, British employees may be easily frustrated by what appears to be abstract ideas and theories, while French participants might see the non-systematic and non-formalized approaches as a waste of their time (Naulleau and Harper, 1993).

Furthermore, less is known about the training situation in UK companies. In here only a few important aspects are mentioned. The government has adopted an exceptionally restrained policy on this point, leaving it to businesses to take the initiative. They in turn generally do not view training and education as their responsibility. As a result, less internal mobility is found in British companies. The fact that training is considered less important and companies have implemented a rather rigid division of labour has resulted in a very modest development of competencies in companies. Qualitative upgrading of the workforce is mainly realised by dismissing employees and recruiting adequately trained personnel from outside the company (Van Ruysseveldt, 1991). Thus, thanks to the government's policy and the position taken by

the business community, compared to France little progress has been in the British training sector (van Klink and Mulder, 1995).

On the other hand, technology intensive firms tend to be proactive for training purposes; they try to anticipate the training needs for their workforce (Cascio, 1990). High- and mid-tech firms commonly view training as employees' development and personal growth (ibid). Training programmes in high-tech environments tend to focus on problem solving, communication, technical skills, job rotation and mentoring relationships (Lepak and Snell, 1999; Cutcher-Gershenfeld *et al.*, 1998).

On the contrary, employees in low-tech environments do not receive much training, because the skills and abilities that they need to perform their daily repetitive activities are not unique to a particular firm but are public knowledge (Lepak and Snell, 1999). Therefore, low-tech firms tend to develop training programmes for a specific task, or even just to complete legal requirements (Towers, 1992). For manual workers, on-the-job training is the most important form of training. This is partly due to the lack of other training instruments (Onstenk, *forthcoming*). The following hypotheses are derived from the above logic:

Hypothesis 5 Culture:

There is a difference between France and England in training practices. France will present more structured training programmes than England.

Hypothesis 6 Technology:

There is a difference in the training practices between technology intensive firms and low-tech firms. Technology intensive firms will place more emphasis on soft-skill training than low-tech firms.

Compensation:

"The critical aspect of these unique characteristics of the workforce compensation system may need to be different from traditional firms" (Kleingartner and Anderson, 1987).

Employees' total compensation is the package of quantifiable rewards employees receive for their labour. This concept includes three elements: (1) basic compensation, the fixed pay that employees receive on a regular basis, either in the form of a salary or as an hourly wage basis; (2) pay incentive programs, designed to reward employees

for good performance; and (3) benefits, which includes a wide variety of programs - health insurance and vacations, among others (Gomez-Mejia *et al.*, 1998: 298).

However, the best method of managing people who work by the day 'consists of paying people and not positions'. In this way employees' wages are fixed as far as possible according to their skills and the energy with which they perform their work, and not according to their work position. As Thompson (1914: 8) states: "every endeavour is made to stimulate each man's personal ambition". Furthermore, Cully and colleagues (1999) point out that at its heart 'the employment relationship is an exchange of effort for earning'. The methods and processes by which these earnings are determined has historically been the most important source of conflict in the relationship. While economists have tended to focus on skills and qualifications (human capital) as the root of differences in pay across individuals, others have highlighted the importance of institutions and the scope for variation from one employer to the next for work of a similar kind (Cully *et al.*, 1999).

Another characteristic is that the compensation system tends to be flexible and adaptable. Under the flexible pay system, firms select a position in the market relative to their competitors for critical skill groups (Gomez-Mejia *et al.*, 1990). Thus, in high-tech firms the pay rate for a particular scientist or engineer is based more closely on his or her individual strategic importance than on "equitable" comparison with the overall workforce (Gomez-Mejia *et al.*, 1990; Balkin and Gomez-Mejia, 1992; Jolly and Therin, 1996; Stuart and Quinn, 1992). This flexible compensation system would be in the following form: sign-on bonuses. This can take the form of cash bonus for inventors who receive a patent on a commercial product which is given "after the fact" in recognition of an outstanding contribution; stock options, or a combination of both (Gomez-Mejia *et al.*, 1990). Additionally, it could take the form of profit sharing. In England there is a law that obligates the employer to share returns with an employed inventor in production to the commercial return of the patented invention, and special relocation benefits to bring technical employees on board (ibid).

Furthermore, in Anglo-Saxon countries (especially in England), the salary tends to relate closely to the nature of the job, its responsibilities and the results obtained.

Therefore, the use of pay systems related to individual and organisational performance: merit pay, profit-sharing share-ownership show considerable growth in England (Edwards *et al.,* 1992). The explanation for this pattern is the Hofstede-type argument (1980) of high-individualism in England. The dominant characteristics of this pattern are: personal accomplishment, independence, individual attitudes and utilitarian contractual relationship. On the contrary, France is linked to a high-power distance (Hofstede, 1980), which suggests a hierarchical compensation strategy. In this scenario differences in pay and benefits reflect job and status differences. Also, large differences between upper and lower echelons could be found (Sparrow and Hiltrop, 1994). In addition to this, the French compensation system has more to do with the individual's credentials, in particular his or her qualifications, but also age, experience and even contacts (Barsoux and Lawrence, 1997).

These culturalist patterns are not the sole influence on compensation systems. The level of technology that a firm has seems to be another predictor in shaping compensation policies and practices. High-tech firms tend to determine wages based on skills, personal attributes and contributions to the firm, rather than job evaluation procedures, which focus on daily work tasks, a strong tendency seen in low-tech firms (Gomez-Mejia *et al.,* 1990; Saura Díaz and Gomez-Mejia, 1997). Additionally, low-tech firms design their compensation systems in such a way that they rely heavily on traditional job evaluation procedures. For example, the payroll assigned to security employees is just short-term oriented. (Balkin and Gomez-Mejia, 1992; Saura Díaz and Gomez-Mejia, 1997).

Another focus is the R&D group incentive compensation. High-tech employees are younger, more fluid and more likely to be compensated with stock rather than cash. High-tech organisations offer this benefit in order to ensure that their employees become real stockholders in the company they work in (Saura Díaz and Gomez-Mejia, 1997). Indeed, R&D personnel have been described as risk takers, tolerant of ambiguity and uncertainty, and independent. The R&D pay system, emphasising variable compensation, is partially predicated on those personal characteristics (Coombs and Gomez-Mejia, 1991: 46). However, according to Gomez-Mejia and colleagues (1990) technical employees in high-tech environments feel that the

contributions they provide for their company are not adequately rewarded or recognised. For example, a research scientist does not receive a salary equivalent to that of the top-managers of a company. They receive a much higher compensation. Indeed, an innovative way of rewarding scientists and engineers should be based on a strategic approach to pay systems (ibid). There is an effort from organisations around the world to diminish the compensation differences between managers and scientific (engineering) employees (Ramirez, 2001).

Balkin and Gomez-Mejia (1984; 1992) have reported studies where they have found that the typical compensation package for R&D workers is characterised by shared ownership, use of customised pay plans, avoidance of mechanistic pay approaches (e.g. job evaluation), few written policies/procedures as tools to control behaviour, aggregate rewards to promote cooperation and team cohesiveness, rewards to promote entrepreneurship (e.g. availability of company funds to start new projects or ventures with compensation linked to their eventual outcome), long-term incentives to tie employees to the firm, front-end hiring bonuses, key contributor awards, frequent external equity adjustments, and professional perks (e.g. paid sabbaticals) (Coombs and Gomez-Mejia, 1991).

Another focus is the R&D group incentive compensation. High-tech employees are younger, more fluid and more likely to be compensated with stock rather than cash. High-tech organisations offer this benefit in order to ensure that their employees become real stockholders in the company they work in (Saura Díaz and Gomez-Mejia, 1997). In this scheme, high-tech firms are likely to implement a budgetary discretion compensation system which focuses on a given special budget over which managers have discretion outside of normal accounting control. For example, to compensate the R&D group that has made a special contribution to the firm's development. In this way, managers could grant salary increases to support staff and colleagues who may have contributed to the firms' success (Gomez-Mejia *et al.*, 1990).

Gomez-Mejia and colleagues (1990) give a list of suggestions for the compensation system that managers in high-tech environments could implement in order to meet the technical reward systems:

1. Price the person, not the job, when rewarding a technical employee.
2. Provide a menu of pay incentives so that the total reward system for technical employees complements the goals and objectives of the organisation.
3. Remove the professional reward system from the hierarchical structure.
4. Integrate the pay system for technical employees with the pay system for other employee groups.

Some influences to managers and in general to employees are the extent to which HR managers are comfortable, capable or skilled in handling individual reward negotiations; the benchmark pay comparators and the value or industry-specific skills in the labour market; the centrality of short-term and hard contractual financial incentives or longer term, non-monetary and implicit rewards. In these scheme, high-tech firms are likely to implement a budgetary discretion compensation system which focuses on given special budget over which managers have discretion outside of normal accounting control. For example, to compensate the R&D group that has made a special contribution to the firm's development. In this way, managers could grant salary increase to support staff and colleagues who may have contributed to the firms' success (Gomez-Mejia *et al.*, 1990).

Coombs and Gomez-Mejia (1991) argue that there is very little empirical evidence about the relative effectiveness of various compensations strategies in high-tech environments. They suggest to a number of alternatives to be examined:

1. Offer rewards based on the performance of cross-functional team.
2. Use performance indicators that reflect the contribution that those in all the functional areas make toward meeting organisational objectives.

Additionally, Balkin and colleagues (2000) suggest that CEO innovation efforts in high-technology firms needs to be rewarded using short-term pay (to support continuous self-transformation) and long-term compensation (to nurture and develop the core competencies that result in enduring uniqueness and value in order to outrun the competition). Balkin and colleagues (2000) found empirical support for the link between innovation and short-term pay for executives; which consists of the base salary and short-term bonus tied to performance objectives of one year or less and is

paid in the form of cash. Balkin and colleagues (2000), however, found mixed support for long-term pay for executives; which consists primary of stock options and other forms of equity-based compensation tied to achieving objectives over periods ranging from three to five years (ibid: 1120).

An study developed by Shaw and colleagues (2001) in 141 plant managers facilities of the American Concrete Pipe Association in the USA and Canada; they found that effectiveness of skill-based pay is enhanced when couple coupled with actions, policies, or programs that promote joint activities and interdependence such as TQM (ibid: 382). Indeed, skill-based pay encourages employees to be multi-skilled and promotes a systematic focus (Gupta and Shaw, 2000 in Shaw *et al.*, 2001). The following hypotheses are derived from the above arguments:

Hypothesis 7 Culture:

There is a difference between France and England in the compensation system. France will present higher levels of hierarchical differences in the compensation system than England.

Hypothesis 8 Technology:

There is a difference in the compensation system between technology intensive firms and low-tech firms. Technology intensive firms will present a more strategic approach to the compensation system than low-tech firms.

4.4 Neo-Contingence Hypothesis

The theoretical examination of the different HRM policies and practices (recruitment and selection, training, organisation) under the culturalist/institution and technology perspectives support the notion that HRMPP are shaped by both cultural factors as well as technological. This theoretical analysis derives the following general hypothesis to be tested in this thesis:

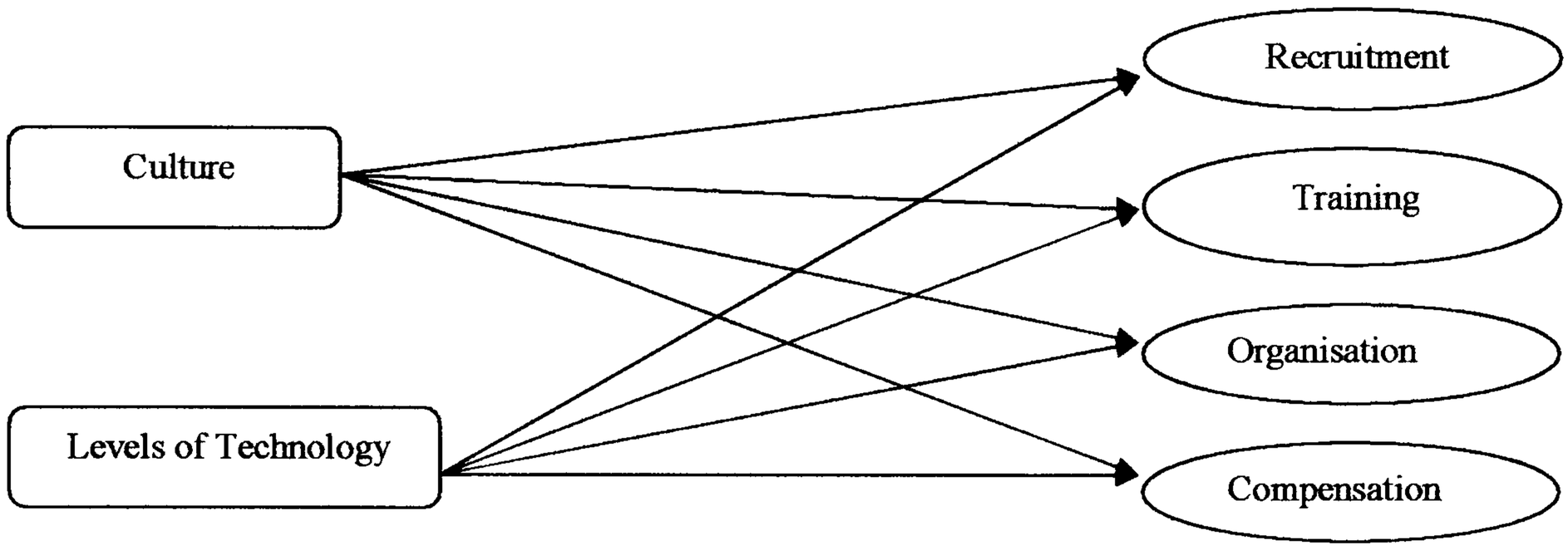
Neo-contingency hypothesis:

HRMPP are shaped by the level of technology that a firm has and by the country factors where the firm is operating.

This signifies that an understanding of HRMPP will be accomplished by analysing the country and technological factors. Additionally, this is the general hypothesis to be tested in this thesis. This thesis does not intend to claim primacy for either the

contingency or the divergence approaches. It claims that in order to understand the different forms of HRMPP configurations, it is necessary to analyse together the culturalist/institutions and technology factors. The following figure shows graphically this perspective which will be tested in France and England in firms operating in different industrial sectors and levels of technology.

Figure 4.2: Neo-Contingence Approach



4.5 Conclusions

The discussion developed in this chapter has studied the effect of cultural and technological aspects in shaping the operation of certain HRMPP. Although a large degree of contingency variables remain to be examined (e.g. organisations' size, strategy, ownership, etc), the scope of this thesis stresses technology and some cultural aspects in shaping managers behaviour. As stated before, this thesis does not offer evidence in which the cultural strand could be measured. The educational system stressed here, functions only as an illustration of the differences found in literature between France and England. However, one way of accounting for national differences would be to argue that each industrial system is developed socially and historically. This signifies that there is a tendency for the division of labour to develop in certain ways, associated with certain types of technology, and thus to stamp both practices and ideology in each country with certain specific traits (Maurice *et al.*, 1980; Maurice, 2000). Although this chapter gives special emphasis to technology and educational systems for explaining management practices, this does not mean that technology and education are the sole determinants for the differences between firms

with different levels of technologies. Technology invariably leaves some room for manoeuvre in this regards, as the national educational differences between France and England summarised indicate.

This chapter also presented a comparison between personnel management and HRM. The debate of trying to differentiate between these concepts continues today. However, here it is suggested that low-tech firms tend to approach the personnel-management style, whereas high- and mid-tech firms the HRM.

Chapter Five: Design of the Study: Methodology

5.1 Introduction

The theoretical perspective discussed in the previous chapters provided evidence of the social and technological factors that have shown an influence on certain HRMPP. In order to test empirically the neo-contingency theory it is important to give an analytical account of the methods that could assist in resolving the research questions in this thesis. It is also important to clarify which is the appropriate way to analyse the relationship between the factors and the system established here. For example, how should the relations between an organisation and its environment be analysed? One cannot study variations in firms' internal operation in relation to the social environment without considering how social relations are shaped in a society. These kinds of differences cannot be reduced to simple quantitative measurements; interpretation is required. Indeed, Nath (1988) has argued that research using only one tool is insufficient for real understanding, because statistical reliability sacrifices human values. Therefore, it was decided to select tools of varying specifications to deal with the aspects of this particular study: managerial belief and behaviour shaped by the influence of the cultural setting and firms' technology specification. These factors entail the study of the relationship between the actors and the system or between the organisation and the society. However, conducting this kind of research requires a realistic methodology that would lead to answering the research questions and testing the hypotheses.

This chapter examines two main aspects of the design of this study: (1) how the quantitative and qualitative methods were developed; and (2) presentation of the statistical approach in analysing the quantitative data.

5.2 Research Methodology

One of the most important parts of cross-national studies is the gathering of large amounts of information. Quantitative methods in the form of questionnaires are appropriate for measuring differences in HRM for large samples (Oppenheim, 1992). Indeed as Cully *et al.*, (1999: 2) states: "Questionnaires are an essential part of social

enquiry, capable of generating new insights and validating old ones, as well as providing a focus for future case studies".

Different researchers have said that the development of new measuring devices, such as a questionnaire, is a very difficult exercise (e.g. Brislin, 1986; Nath, 1988; Sheatsley, 1983). Moreover, designing a questionnaire for a cross-national research project poses several problems, primarily because two or more cultures are involved. Therefore, the use of different languages is inevitably necessary. Research instruments such as questionnaires need to be translated; therefore, frequently problems of equivalence in idioms, concepts and grammar are encountered.

On the other hand, according to Campbell 1968: 255, researchers should not feel that questionnaires found in academic literature or in the market are well constructed just because they have been expensively conceived, referred to and used too frequently. The methodology in questionnaire construction is in such a constant state of change that any well-trained graduate student today can construct a better questionnaire for cross-national research. A well-designed questionnaire should: 1. Meet the objectives of the research; 2. Obtain the most complete and accurate information possible; and 3. Do this within the limit of variables, time and resources (Sheatsley, 1993). Cross-national researchers need to deal carefully with the issues that are discussed as follows.

5.2.1 Design of the questionnaire

According to Shackleton and Newell (1991), questionnaires should be simple, intelligible and clear, although sometimes this is not the case and therefore they are difficult for the respondents to understand and to answer. In order to keep questionnaire simple, questions should be clear and use uncomplicated language. "Questions should be kept short and confusing questions should be avoided" (ibid).

Using a combination of deductive and inductive methods, a questionnaire for this project has been developed. An extensive review of the literature on HRM, technological and cultural differences between France and England was conducted in order to identify important aspects of these disciplines, which have been recognised in

the past as important for this particular research. Additionally, some other aspects are considered in questionnaire development:

What is being measured by the questionnaire?

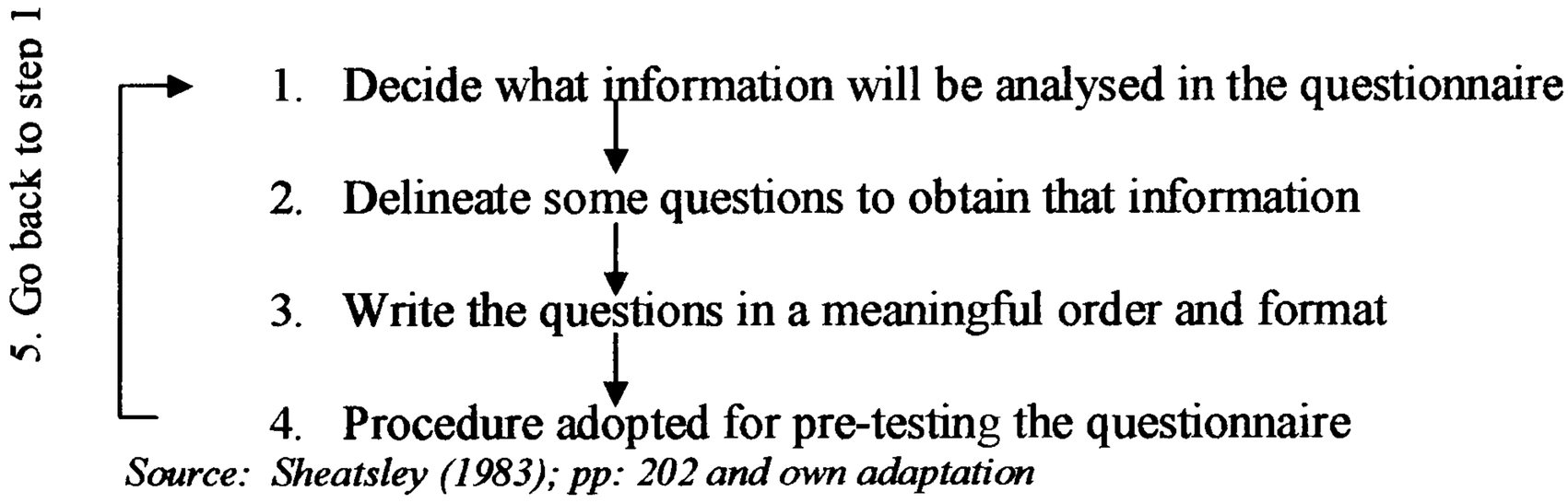
1. Different approaches to HRM between *high and mid-tech* vs. *low-tech* firms operating in England and France. An exploratory analysis.

The purpose of the questionnaire:

1. To classify French and British companies as high, mid or low-tech organisations.
2. To establish the different approaches to HRMPP among French and British organisations operating in different industrial and cultural settings.

The questionnaire was designed in English taking into consideration its future translation into French. There are a number of different approaches in designing the content of a questionnaire. According to Sheatsley (1983), there are five steps that are generally applicable (diagram 5.1). These five steps were followed for designing the first draft of the questionnaire.

Diagram 5.1: Process Adopted for Designing the Questionnaire



Source: Sheatsley (1983); pp: 202 and own adaptation

Decide what information will be analysed in the questionnaire: The information required to develop a questionnaire can be obtained from literature. Alternatively, an instrument, which has already been developed, can be used (Yu and Cooper, 1983). Although the academic literature presents different research projects in the area of HRM, which have developed and tested HRM measure scales (e.g. Huselid, 1995), it was decided to design a new measurement scale for this research. Two fundamental reasons support this decision:

1. HRM measurement scales found in the academic literature do not investigate specifically the different approaches to HRM in firms with different levels of technology operating in different cultures. One option would have been to select certain questions from researchers that investigate the different areas of this thesis and cluster them into one questionnaire. However, this procedure could not be the most appropriate because the settings of those researchers are not country-indigenous to England and France. Thus, cultural differences could lead to misleading conclusions.
2. Obtaining a doctorate degree implies different challenges. Doctorate students working for their degree have the opportunity to discover and learn different research methodologies that could be applied in their future professional activities. Therefore, it was decided to develop a scale for this research because it is an opportunity to learn about a fundamental tool in research activities.

Delineated some questions to that information: The cross-national approach to the research project demands a translated research instrument, in this case a questionnaire. Several considerations were kept in mind while designing the first draft of the questionnaire (in English). For example, special attention was given to the number and kind of items (questions) chosen for the questionnaire, because the items in a questionnaire constitute the operational instrument of concept definition (Brislin, 1986). Citing Brislin again (1986: 148) with reference to specific terms, "a benefit of this concern with specific questions is that researchers have to do great amounts of reading, pre-testing, and listening to people before they are able to formulate specific questions. Such efforts prior to instrument development will surely benefit the growth of cross-national research". A clear communication of concepts is essential in order to approach efficiently the HR specialists and managers to whom the questionnaire is directed. In addition to this, the suggested rules for writing translatable English questions by Brislin 1976a were followed (table 5.1).

For example, the active voice and nouns instead of pronouns were employed in all the questions (see appendix 2: Measurements and General Testing Approach). According to Brislin (1986), it is wise to use sentences shorter than sixteen words in length. However, some of the items in the questionnaire involve concepts that are difficult to

understand. Knowing that the questionnaire would be translated into French, and that it would be sent by post to different firms in England and France, it was decided to provide redundancy to the questions. As Brislin (1986) points out, "add sentences that provide redundancy". This rule suggests that longer items and questions can be used. Additionally, metaphors and colloquialisms were avoided, because such phrases are least likely to have equivalents in the target language, as well as the subjunctive mood (e.g., verb forms with could and would). Specific rather than general terms (e.g., engineers, managers, etc., rather than the general term, professionals) were utilised. Finally, words indicating vagueness regarding some event or thing were avoided (e.g., probably and frequently).

Table 5.1: Rules for Writing Translatable English Questions

Brislin's (1976a) Rules
1. Employ active rather than passive words.
2. Repeat nouns instead of using pronouns.
3. Avoid metaphor and colloquialism. Such phrases are least likely to have equivalents in the target language.
4. Avoid the subjunctive mood (e.g. verb forms with could, would).
5. Avoid adverbs and prepositions telling where or when (e.g. frequent, beyond, upper).
6. Avoid possessive forms wherever possible.
7. Add sentences that provide redundancy. This rule suggests that longer items and questions can be used. There is no contradiction with guideline number 1 on sentence length since items can have several sentences.
8. Use specific rather than general terms (e.g., the specific animal such as cows, chickens, pigs, rather than the general term, livestock). Another benefit of this concern with specific questions is that researchers have to do great amounts of reading, pre-testing, and listening to people before they are able to formulate specific questions. Such efforts prior to instrument development will surely benefit the growth of cross-national research (Brislin 1986: 148).
9. Avoid words indicating vagueness regarding some event or thing (e.g. probably and frequently).
10. Use wording familiar to the translators wherever possible.
11. Avoid sentences with two different verbs if the verbs suggest two different actions.

Finally, given the specialisation of this research project, it was decided to base the information needed to delineate the questions on the chapters discussed previously, as

well as on the working paper Ramirez (2001) Groupe ESC Grenoble, Spring 2001, Grenoble, France.

Write the questions in a meaningful order and format (questionnaire content): The questionnaire is designed to research information from each firm in two areas. The first area concerns information on the organisations' profile; the independent variable. This section can be called background information which enquires about firms' basic demographic information. Items included in this section were: location, industrial sector –SIC number (Standard Industrial Classification), number of employees and the organisational structure of the firm. A final set of questions in this section addressed contextual factors which may influence HRMPP (technology in terms of R&D). The following items were selected: whether the organisation had a technology area and the number of engineers working in it; the percentage of 'turnover' spent on R&D; and the number of employees working in R&D along with their educational backgrounds.

The second area of the questionnaire is divided into four sections which concentrate on the HRM processes (dependent variable). The dependent variables are: (1) recruitment and selection (seven items), (2) training (five items), (3) organisation (seven items) and (4) compensation (six items). A five-point Likert scale (*1. Strongly disagree - 5. Strongly agree*), was used for these sections. A five-point scale provides flexibility, in that "the research can look at all five groups in the total sample, but can easily combine the two agree positions and/or the two disagree positions when wanting to look at subgroups of smaller size" (Rossi, *et al.,* 1983: 209). Furthermore, a score out of five fits neatly with the five statements on the semantic scale, which ranges from very good to very poor, and it yields a good distribution of response and enables researchers to easily pick out differences in opinion (Hague, 1983: 55). However, the questionnaire has two open-ended questions. Open-ended questions are designed to obtain an extended picture by obtaining as much information as possible (Oppenheim, 1966).

As shown in appendix 2, the questionnaire included the following major sections:

1. Company's organisational information.

2. R&D technical data
3. HRM practices (dependent variables)

a. Recruitment and Selection (7 items)

i. Recruitment system with a global scope.
ii. Tendency to employ a workforce with intangible skills.
iii. Net-recruitment.
iv. Percentage of employees recruited through the Internet.
v. Use of Assessment Centres in the selection process.
vi. Preference for employing a workforce younger than 35 years old.
vii. Attributes for an ideal job candidate.

b. Training (6 items)

i. Training programs being designed by focusing on the development of soft-skills/capabilities.
ii. Training as an integral part of the employee's career development.
iii. Firm provides all its employees with career development plans.
iv. Training programs being designed to follow strict operational procedures.
v. Firm provides international training.
vi. Firm provides its employees with opportunities to learn new skills from other departments.

c. Organisation (8 items)

i. Commitment to team-based work design.
ii. Importance of empowerment practice.
iii. Flat firm structure.
iv. Non-intellectual work process.
v. Importance of employee supervision.
vi. Classification of firms' structure.
vii. Opinion of firms' structure classification.
viii. Difficulty of defining jobs because they are in a constant state of change.

d. Compensation (6 items)

i. Scientific employee working in R&D area could have a salary scale equivalent to that of a manager.
ii. Compensation system based on individual performance.
iii. Importance of employee's capabilities for the compensation system.
iv. Freedom for the personnel staff to develop, for their units, their own payment system.
v. Compensation system based on employee's short-term accomplishment.
vi. Flexibility of the compensation system.

Procedure adopted for pre-testing the questionnaire: Questionnaire testing was conducted in order to ensure that the questionnaire designed for the cross-national research project would accomplish its objective. Two steps were followed to test the questionnaire: First, the questionnaire was revised by staff at the Newcastle School of Management in Newcastle upon Tyne, England. Two professors from that School made some corrections to the first draft of the questionnaire. Additionally, a statistics expert reviewed the questionnaire in order to ensure that it did not have errors in variables per item. In addition to this, Professor McLoughlin in from the Newcastle School of Management made a special revision of the questionnaire. He made corrections to improve the English, as well as of the questions that would be problematic in any language –concept operation per question.

Revisions of the questionnaire by academic professors are helpful; however, they are not exhaustive. Sheatsley (1993) gives one reason why so many questionnaires are unintelligible: "...because questionnaires are usually written by educated persons who have a special interest in and understanding of the topic of their inquiry, and because these people usually consult with other educated and concerned persons, it is more common for questionnaires to be overwritten, over complicated and too demanding of the respondent than they are to be simpleminded, superficial and not demanding enough".

Thus, following the revision by the staff at the Newcastle upon Tyne School of Management, the questionnaire was tested with the HR managers. A package which contained the questionnaire, an instruction letter and a pre-paid enveloped was sent by normal post on August 2000 to the HR manager in ten companies located in the area of Newcastle upon Tyne, England. A 90% response rate was achieved.

Testing results: This analysis can be viewed in appendix 2: Measurements and General Testing Approach. This appendix discusses the corrections made on language (English/France). On the other hand, the validity of a questionnaire is a fundamental aspect to consider. An extended discussion of the questionnaire's validation is given in chapter eight.

Go back to step 1: This step is an ongoing process through the questionnaire's construction. It was necessary to go back to the first step (diagram 5.1.) of the questionnaire design (as explained in appendix 2), after revising each questionnaire. However, the back-translation process was one of the most critical processes in the questionnaire design, which is explained as follows.

5.2.2 Language considerations: The back-translation process adopted

Translation is "probably the most complex type of event yet produced in the evolution of the cosmos" (Richards, 1953: 250). Richards defines translations in the general term as "the transfer of thoughts and ideas from one language (source) to another (target), whether the languages are in written or oral form; whether the languages have established orthographies or do not have such standardisation; or whether one or both languages is based on signs, as with sign languages of the deaf (Brislin, 1976b:1).

Furthermore, the translation of a questionnaire for cross-national research poses several challenges. Problems of equivalence in idioms, grammar and syntax may be important, but equivalence in terms of concepts is probably the most important of all. As mentioned previously, translation has different problems that could be difficult to target. However, these problems can be minimised when the following steps are completed: (1) A careful design of the questionnaire to be translated (Adelheid and Penny, 1999), (2) An accurate back-translation process (ibid), (3) Testing (e.g. Sechrest *et al.,* 1972; Sheatsley, 1983) and (4) Re-writing (ibid).

Once the questionnaire in its original version (English) was tested and rewritten, the translation process into French was developed in Grenoble, France (July, 2001). Although the writer of this thesis speaks the target language (French) well enough to do his own translation, further revisions of the translation process were conducted in order to ensure that there were no translation errors in the French version of the questionnaire, due to the fact that the writer of this thesis is not a native French or English speaker. Indeed, "even researchers who are native speakers rarely know the target language well enough to do their own translation" (Brislin 1976a: 162). One of the reasons for this phenomenon is the large number of years that researchers have

devoted to their formal education; consequently they may use phrases which are unfamiliar to the sample of respondents.

The first revision of the questionnaire's French version was carried out by Dominique Jolly, professor at the Grenoble School of Management, France. He made several changes in idioms, grammar and especially in concepts that were not well translated into French. However, further revision of the questionnaire's French version was developed utilising the back-translation technique. The translation and back-translation process by native professors and MBA students facilitates conceptual equivalence in addition to retention of meaning, due to their familiarity with the local culture and language. This process is fully detailed in the appendix 2.

5.3 Design of the semi-structured interviews

Managerial beliefs and behaviours are an amalgam of the managers' past and present job experience. These areas can perhaps be best investigated through semi-structure interviews (Graves, 1973). Therefore, different sets of interviews are planned to be developed in France and England as the second tool for testing the 'neo-contingency' approach.

The objective of the semi-structure interviews is to complement the information to be gathered by the questionnaire. In this way, a holistic view of each firm could be gained. The plan is to hold semi-structure interviews with HR managers as well as employees. The aim is to acquire information on how HRMPP are applied and perceived from both sides of the spectrum (HR managers and employees).

The interview process is designed to analyse each person in two aspects (1) Background information: each person would be asked to provide additional information on any aspects of the organisation about which he/she is particularly knowledgeable. Before doing this, he/she will be asked to explain some background about himself/herself, specifically his/her current position and employment history, such as training, job content and promotion prospects. This background information is useful in putting into perspective what is said about the organisation and the way the HRM questionnaire is answered by the HR manager. It would also provide some

interesting material about management procedure and firms' current challenges. (2) HRMPP: following the background section, the HRM-questionnaire will be reviewed with: (1) the HR managers, who will be asked to explain the way they answered each item of the questionnaire, and (2) employees in management positions and R&D departments, in order to obtain further information with reference to their experience in how the HR practices are operated in the firm.

5.4 Statistical approach

This section presents the statistical procedures developed for analysing the HRM questionnaire.

5.4.1 Independent and dependent variables

Dependent variables: The different HRMPP were conceptualised and measured in a questionnaire using five a point Likert-type scale ranging from 'Strongly Disagree' to 'Strongly Agree'. The items in the questionnaire cover several dimensions of HRMPP on the following topics. For each HRMPP a list of items was established based on the literature review presented in Chapter Four. Items are listed fully in the appendix 2.

Independent variables: The HRMPP were assessed under the analysis of two independent variables: (1) country, which was defined as a dichotomy variable 1= France and 2= England; and (2) levels of technology, which was defined as a nominal variable 1=low-tech, 2=mid-tech and 3=high-tech, as discussed previously. The classification of the three levels of technology is based on three criteria: (1) Industrial Sector, (2) Turnover spent on R&D and, (3) Organisational structure, number of engineers and technicians in relation to the overall number of employees in the organisation. It is important to highlight that the technology variable is integrated from a nominal variable: industrial sector and a continuous variable: R&D expenditure and organisational structure. Taking into account these two factors, the variable levels of technology studied here cannot be defined as a continuous scale variable.

5.4.2 Methods adopted for the statistical analysis

There are different statistical approaches that could guide the testing of the neo-contingency theory proposed in this thesis. Taking into consideration the different

dimensions studied in this research: theoretical background, research setting and variables, among others factors, it was decided to combine different statistical analyses at the different stages that this project presents. The following section discusses the statistical approaches selected to be developed for each stage of this project.

Stage One: Principal Component Analysis -Factor Analysis

Principal component analysis is a statistical method that could help to identify the factors that might cluster the different HRMPP dependent variables studied in this chapter. Additionally, this process will lead to testing the validity of the instrument developed. Principal component analysis will facilitate the understanding of the relationship of cultural and technological variables in the selected HRMPP. Therefore, levels of technology and country will be analysed together. It is important to highlight that this thesis will not provide data to measure national institutional variables directly, especially the educational institutions. Therefore, the educational institution will be delineated through the description of the salient characteristics of the French and British systems. The educational institutional description is used as a foundation for country-specific predictions of firms' adoption of the HRMPP studied in this thesis.

Stage Two: Multiple Analysis of Variance (MANOVA)

MANOVA will be performed in order to test the global influence of the independent variables (levels of technology and country) on the HRMPP factors.

Stage Three: Univariate Analysis of Variance (ANOVA)

In order to test the hypotheses presented in chapter four, an analysis of variance (ANOVA) test will be performed. This test will compare the effects of two variables: level of technology and country on the factors obtained from the principal component analysis. This is the first method for assessing the 'neo-contingence' approach. The ANOVA test is used because the sample accepts the assumptions of the analysis of variance test (Cooper and Schindler, 2001; Toothaker, 1993):

(1) *K* independent samples:

The sample involves three levels of technology in two countries.

(2) Data measurement:

a. Dependent variables are measured on an interval-ratio scale (five-point Likert-type items).
b. Independent variables are measured in nominal variables.

The purpose of the ANOVA test is to examine the applicability of the neo-contingency approach in management studies. In order to validate this approach, it is necessary to test statistically the significant differences between the means of the dependent variables in the different groups of independent variables. Different cases could occur, for example if an interaction between levels of technology and country is found; it would imply that the impact of levels of technology is different in the two countries. Interaction supports the divergence-type approach, which states that national culture and national institutions mould HRMPP differently in the two countries. Whereas non-interaction supports the contingence-type-theory, which states that the contingent variable: level of technology, shapes HRMPP irrespective of the country. Additionally, if the only variable a country presents is a significant statistical difference, this means that France and England are different regardless of technology. Thus, it would signify that the divergence theory is supported.

The ANOVA test uses square deviations of the variance; therefore computation of distances of the individual data points from their own mean or from the grand mean can be summed. In the ANOVA test, each group has its own mean and standard deviation values. Similarly, all the data points from all of the groups produce an overall grand mean. The total deviation is the sum of the squared differences between each data point and the overall grand mean (Cooper and Schindler, 2001).

The test statistic for ANOVA is the ***F* ratio**. It compares the variance from the last two sources:

$$F = \frac{\text{Between-groups variance}}{\text{Within-groups variance}} = \frac{\text{Mean squares}_{\text{between}}}{\text{Mean squares}_{\text{within}}}$$

Where

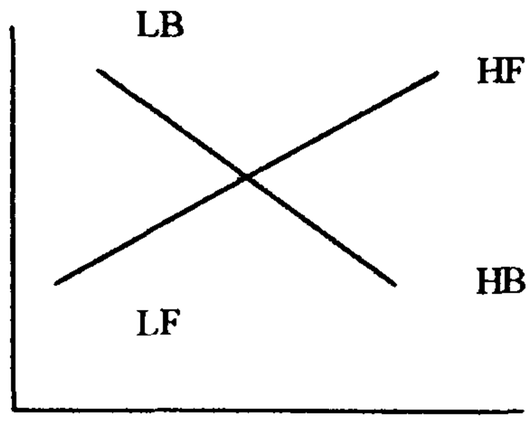
$$\text{Mean square}_{\text{between}} = \frac{\text{Sum of squares}_{\text{between}}}{\text{Degrees of freedom}_{\text{between}}}$$

$$\text{Mean square}_{\text{within}} = \frac{\text{Sum of squares}_{\text{within}}}{\text{Degrees of freedom}_{\text{within}}}$$

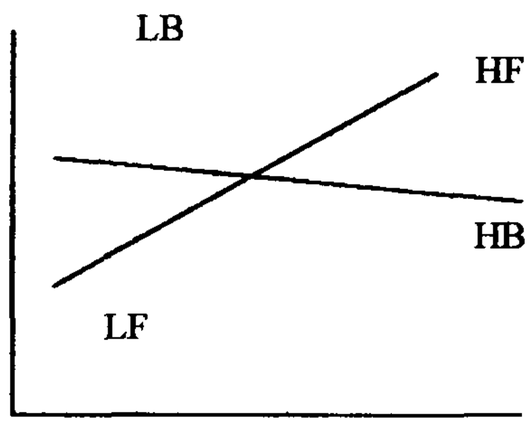
More specifically, the data could present the following sub-sets of interactions between the country and the levels of technology:

Figure 5.1: Significant statistical interaction:

Case 1



Case 2



Notes: *LE: Low-tech in England*
LF: Low-tech in France
HE: High-tech in England
HF: High-tech in France

Statistical significant interaction: Figure 5.1, case 1 shows the following possibility:

Significant interaction (country * levels of technology):

a. Country: significant statistical difference.
b. Levels of technology: significant statistical difference in the two countries.

Table 5.2: Significant Statistical Interaction Case 1

Effect	
Interaction (levels of technology * Country)	*S*
Level of technology in each country	*S*

Note: S=Significant

Figure 5.1 presents a case where countries and levels of technology are different. Therefore, France and England need to be analysed separately in their three levels of technology with the purpose of validating the hypotheses.

On analysing the two countries separately, it was found that the divergence approach is supported because France and England exhibit differences in degree and direction in their three levels of technology. However, only France confirms the contingent theory, because higher mean scores are presented in high and mid-tech. On the contrary, England presents higher mean scores for the low-tech firms which contradict the

contingency approach. These results signify that the variable levels of technology shape the HRMPP differently in France and England.

Figure 5.1, case 2 shows the following results: Significant interaction (country * levels of technology):

a. Country: Significant statistical difference.
b. Levels of technology: Significant statistical difference only in France.

There is a significant statistical difference in the variable country, as presented in the first case here in which the two countries are examined separately, in order to validate the hypotheses. On analysing each country it was found that only France supports the hypotheses. England does not present significant statistical differences in its three levels of technology.

Significant non-statistical interaction: Non-interaction between the country and levels of technology signifies that the graphic would exhibit parallel lines between the two countries. Also, non-interaction could present three different cases as shown in the figure 5.2.

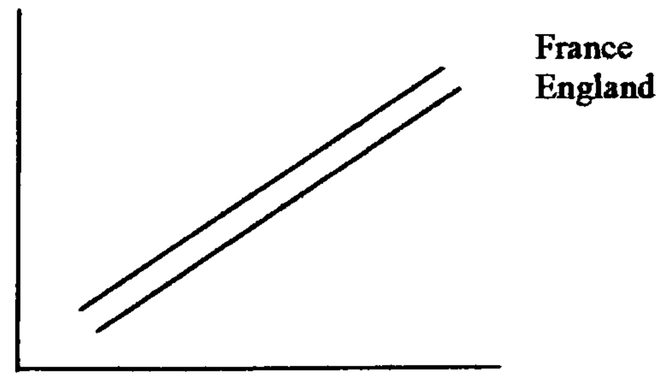
Table 5.3: Significant Non-statistical Interaction

Effect		
Interaction (level of technology * Country)	*NS*	*NS*
Country	*NS*	*S*
Level of technology	*S*	*NS*

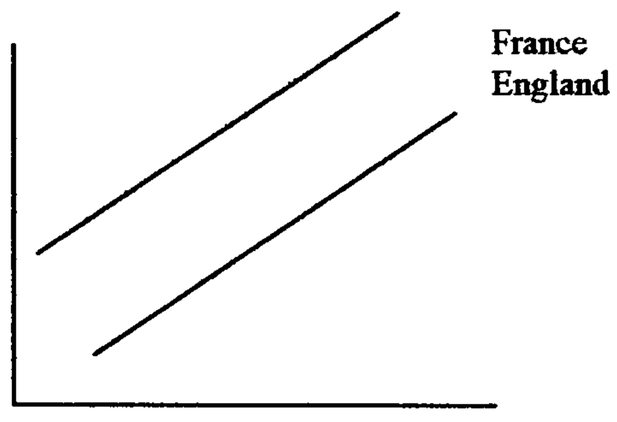
Note: S=Significant, NS= non-significant

Figure 5.3: Significant Non-statistical Interaction:

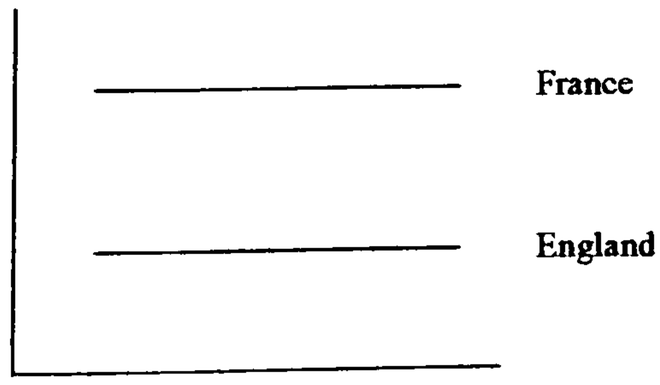
Case 1



Case 2



Case 3



Case 1 shows the following possibility:

a. Levels of technology: Significant different
b. Country: Non-significant different

The first case presents two parallel lines, which implies that the variable levels of technology has the same influence on the three levels of technology and presents the same tendency in both countries. An interesting figure is that the two countries have the same influence from the level of technology; there is not a significant statistical difference between France and England with respect to their levels of technology. Thus, the hypothesis is supported in both countries.

Case 2 shows the following possibility:

a. Levels of technology: Significant difference
b. Country: Significant difference

This case implies that the variable levels of technology has the same effect in the two countries; high-tech firms tend to present higher mean scores than low-tech in both countries. The hypotheses are supported both in France and England. Nevertheless, one of the countries presents overall higher means scores for the three levels of technology than the other. In this example, France presents higher scores, which indicates that France tends to agree more in the HRM practice under study than England.

Case 3: Figure 5.3 shows the following possibility:

a. Levels of technology: Significant difference.
b. Country: Non-significant difference.

The difference between this case and the previous one is that the two countries present the same tendency in their three levels of technology. In other words, the effect of the variable levels of technology has the same influence in both France and England. The hypotheses are not supported because the variable levels of technology does not present significant statistical differences.

On the contrary, the divergence approach is confirmed. There is a significant statistical difference between France and England in the HRM practice under analysis. National institutions and culture might have an influence on the dependent variable.

Table 5.4: Effect Case 3

Effect	
Interaction (level of technology * Country)	*NS*
Country	*S*
Level of technology	*NS*

Note: S=Significant, NS= non-significant

Multiple comparison test: Post hoc tests or pair-wise multiple comparison procedures will be developed in the cases in which the independent variable levels of technology presented a significant statistical difference. Multiple comparison tests are developed in order to determine which level of technology is different with respect to the other.

There are more than a dozen post hoc tests with different optimising goals: maximum number of comparisons, unequal cell size compensation, cell homogeneity, Type I or Type II error reduction, and so forth. Because of the particular characteristics of the different sub-sets of the sample that this study presents: different number of observations by groups, three statistical post hoc tests have been selected: (1) Scheffé's S which is a conservative test and is resistant to violations of assumptions (Toothaker, 1993, SPSS, 1998). The Scheffé's S test is often more conservative than other tests, which means that a large difference between means is required for significance (SPSS, 1998). Further, this test has a constant critical value for all comparisons on *J* means; therefore, Scheffé's method is appropriate for all possible comparisons, not just the pair-wise comparisons (Toothaker, 1993). (2) The Bonferroni test, which is more powerful for a small number of pairs (ibid), and (3) The Gabriel test. Gabriel's pair-wise comparison test uses the studentized maximum modulus and is generally more powerful than Hochberg's GTé when the cell size is unequal. Also, Gabriel's test may become liberal when the cell size varies greatly (SPSS, 1998).

Alternative Statistical Analysis: Linear Regression and ANOVA Analyses Compared

The result from the principal component analysis –factor analysis- can be analysed through different approaches. The ANOVA test has been discussed as the most

suitable approach for testing the neo-contingency theory. However, there are other statistical models that could be considered. The linear regression analysis is one option. Nonetheless, this section discusses why the ANOVA test is more suitable in testing the neo-contingency theory than the linear regression analysis. This position is taken after analysing one of the HRMPP factors with the linear regression and the ANOVA tests separately. The example is fully analysed in the appendix. This section presents the main conclusions.

Although the linear regression and ANOVA analyses present the same kind of results (please see the example in the appendix), the calculation and presentation of their results are different in each test. Five specific differences were found between the two statistical approaches:

a) In the ANOVA test is not necessary to create more than one dummy variable when the factor (or independent variable) has more than two levels. For example, the independent variable levels of technology has three levels (low, mid and high). In this case it is necessary to create more than one dummy variable. In order to create the dummy variable, it is necessary to select a control group (or reference group) which is not pertinent for the variable levels of technology. Creating the control group signifies that the reference group variable will not be tested against the other variables.

b) In the ANOVA test is not necessary to create new variables in order to test the interaction between the independent variables. The interaction test is one option in the SPSS ANOVA program. On the contrary, in order to perform interaction in the linear regression analysis, it is necessary to create new variables.

c) The SPSS ANOVA gives the option of generating automatically the means for each category of the different independent variables and of generating two levels of multiple comparisons by the post hoc test. This would not be possible with the SPSS linear regression analysis.

d) The SPSS ANOVA offers the option of making a graph to see the differences between the categories of the independent variables, showing the error bars. This would not be possible with the SPSS linear regression analysis.

e) The MANOVA Model (Multivariate ANOVA) provides the possibility of testing the global effect of the independent variables on the combined set of HRM dependent variables.

These differences discussed previously led to the conclusion that the ANOVA test is more suitable for validating the neo-contingency theory than the linear regression model. Finally, the ANOVA analysis is friendlier than the linear regression model, because it is possible to see graphically the different approaches to the HRM factors analysed between France and England in the different levels of technology. Thus, the resulting interaction effects provide a straightforward interpretation. The appendix section 2: General Testing Approach presents an example that illustrates the differences between the ANOVA and linear regression tests.

Table 5.5: Linear Regression and ANOVA Analyses Compared

	Linear Regression	ANOVA
Dummy Variable	**Necessary to create dummy variables**	**It is not necessary**
Interactions	**For testing an interaction, it is necessary to create interaction variables.**	**The model generates the interaction without creating a control variable.**
Graphics	**It is not possible to generate.**	**It is possible to generate graphics.**
Multiple two levels comparison	**It is not possible to test.**	**It is possible to test the differences within the different levels of a independent variable.**

Non-parametric approach: In the event that some of the sub-sets of the sample should present a relatively low number of observations, the non-parametric approach will be used in the statistical analysis. The Kruskal-Wallis non-parametric test is a one-way analysis of variance by ranks. It assumes random selection and independence of samples and an underlying continuous distribution.

5.5 Conclusions

Cross-national research might pose different problems for the researcher. This chapter has analysed the questionnaire design and translation processes as the most

challenging ones in cross-culture research. The discussion presented in this chapter can be of interest to researchers undertaking cross-national projects where two or more cultures are involved. Thus, the use of different languages is inevitably necessary.

The translation of a questionnaire for cross-national research could present several challenges. Problems of equivalence in idioms, grammar and syntax may be important, but equivalence in terms of concepts is probably the most important of all. Nonetheless, this chapter discussed some of the guidelines in the construction of a questionnaire for its future translation. The importance of a well-constructed questionnaire and its testing has been rediscovered. For example, (1) a careful design of the questionnaire to be translated has taken place as well as, (2) an accurate back-translation process, (3) testing and (4) re-writing of the questionnaire in order to avoid some of the translation problems of equivalencies in: idioms, vocabulary and concepts.

Along with the questionnaire construction explained here, the interview process has also been presented. The aim is to validate the quantitative data with the results of the interviews with HR managers and employees. In this way, a stronger argument for the neo-contingency approach could be put forward.

Finally, this chapter presents the statistical approach in analysing quantitative data. Factor analysis, together with MANOVA and ANOVA tests will assess the influence of the level of technology and of culture on the selected HRMPP. Correlations will assist to further validate the hypotheses generated in this thesis. In so doing, the neo-contingency approach to management studies could emerge.

Notes:

1. In the correlation model no distinction is made between an independent and dependent variable. Instead, the nature (i.e., positive or negative) and degree of relation between two variables is sought (Pedhazur, 1997:38). Moreover, the Pearson product-moment correlation coefficient measures the degree to which there is a linear functional relation between the variables (Siegel and Castellan, 1988: 225).
2. With small samples, the computation of nonparametric measures of association and test of significance (Spearman r_s) is no harder and often is easier than the computation of the Pearson r (Siegel and Castellan, 1988: 225).

Chapter Six: Database Construction and Data Collection

6.1 Introduction

This chapter discusses two of the fundamental issues in cross-national organisation studies: database construction and data collection. Building a database for cross-national research presents several challenges. However, obtaining valuable and comparable data sets is perhaps one of the most problematic issues in this kind of research. This chapter explains how the complications of collecting quantitative and qualitative data were resolved in this study.

This chapter starts by describing how the database was built, followed by how the questionnaires were sent to firms located in France and England. Additionally, the way in which the databases for interviews were developed is explained. Concluding remarks are presented at the end of this chapter.

6.2 Database construction

The initial intention in this study was to utilise random sampling methods. However, the strict scientific rigor of such an approach can be readily criticised (e.g. Geringer *et al.*, 2002), because entire segments of a population can be excluded in regions that are not prepared for it. Indeed, the initial response rates from this methodology were disappointing in France. A preliminary mailing of the questionnaire in France produced a response rate of about 7.33%, attributable largely to contextual differences (e.g., resistance to a research design not based on strong personal relationships). Therefore, flexibility was mandated, and it was necessary to shift to a quasi-theoretical sampling strategy, including snowball or chain-referral sampling (Milliman *et al.*, 1998). Such a methodology can be context-sensitive, coherent and stable, facilitating identification of the diverse major aspects of surveys conducted in different nations (van Meter, 1990).

Attention was redirected toward the selection of theoretically useful firms for participation in the study. In order to decrease the margin of error when comparing the samples, two independent databases were created based on location (one for France and another for England) and technology levels (high, mid and low). The sample

organisations chosen consisted of the following criteria: (1) they were engaged in manufacturing. The firms which were eventually selected in each country operate in the following industries: chemical, pharmaceuticals, electronics, IT and software, automotive, telecommunications, metal, food and services; (2) they operated in the private sector, however, some R&D centres were selected from the public sector; and (3) size, the average size of the organisations (number of employees) ranged from four hundred to 1000 employees. It has been shown that an organisation's size affects HRM practices (Budhwar and Khatri, 2001). For example, large organisations tend to follow more formal and structured HRM practices (Jackson *et al.*, 1989). Thus, the objective was to select firms with at least five hundred employees, although firms in the high-tech sector tend to have fewer than five hundred employees. Therefore, this criterion was not a definitive one in choosing the databases for France and England. Another aspect, however not critical, was the firms' geographical location. Firms that were located in the British and French high-tech clusters were selected. The M4 corridor from West London to Bristol and into South Wales, Central Scotland, Oxford and Cambridge were the UK locations (Breheny and McQuaid, 1987) and in France, the Paris region, the *Rhône-Alpes* and *Alpes-Maritimes* in Southwest France were preferred (Pottier, 1987). Nevertheless, the firms participating in the project were not always ideal with respect to theoretical usefulness, particularly to the extent that random and non-random factors associated with the sample's composition could introduce confusing effects or other factors inconsistent with easy generalisability. Thus, prudence is required when interpreting results.

6.2.1 Database sources

Different databases in France and England were consulted in the selection of this thesis' database. Nonetheless, the KOMPASS database was the main source of information.

KOMPASS' French version[1] CD-ROM was consulted which has more than 130 000 organisation names. It includes 500 000 names of managers and 50 000 products and services. For the KOMPASS British version, it was possible to access the information through the printed book's 2000 edition, which contains detailed information on 45000 industrial and commercial companies in the UK.

Other local sources in France and England were consulted, such as '*Echos*' (November, 2000), which reports the top five hundred French and European organisations located in France. In the UK, the following sources were consulted: (1) R&D Scoreboard (2001)[2] and (2) 'British Business Ranking' (1995) Vol. 6, published by Key British Enterprises[3].

In order to have a better approach for the databases mentioned above, an evaluation of the different industrial sectors that it would be most appropriate to include in the present research was conducted. Industrial sector selection was developed using two approaches that are explained in the following sections.

6.2.2 Industrial Sectors

Two industrial sectors were assessed in the different databases: (1) high and mid-tech and (2) low-tech. These industrial sectors were analysed through the Scoreboard R&D and OECD classifications that were discussed in chapter three.

6.2.3 Database

Taking into consideration the aforementioned criteria for selecting industries for the database in this research, nineteen industrial sectors and one thousand two hundred companies' names in France and England were randomly selected.

Tables 6.1 to 6.4 present the database breakdown by industrial sector. Some comments on the database are important to mention. Firstly, the discrepancies in the total number of firms in certain industrial sectors are explained in section 6.3. Secondly, the industrial sectors classified as a medium-low-technology by the OECD classification were considered as low-tech industrial sectors in this thesis.

Table 6.1: High-technology Sectors

High-technology	**France**	**High-technology**	**England**
Aerospace	10	Aerospace	5
Pharmaceuticals & Biotechnology	80	Pharmaceuticals & Biotechnology	70
IT & software	30	IT & software	30
Electronic & IT hardware equipment	70	Electronic & IT hardware equipment	75
Total	**190**	**Total**	**180**

Table 6.2: Mid-technology Sectors

Mid-technology	France	Mid-technology	England
Chemical	60	Chemical	45
Electrical machinery	40	Electrical machinery	50
Energy	20	Energy	20
Telecommunications	15	Telecommunications	15
Automotive	20	Automotive	10
Precision Instruments	25	Precision Instruments	50
Total	**180**	**Total**	**190**

Table 6.3: Low-technology Sectors

Low-technology	France	Low-technology	England
Non-metal products	50	Non-metal products	15
Metal products	40	Metal products	20
Machinery	70	Machinery	40
Paper	20	Paper	10
Food	30	Food	20
Service	20	Service	35
Distribution	20	Distribution	15
Printing	15	Printing	10
Textile	15	Textile	15
Total	**280**	**Total**	**180**

Table 6.4: Database

Industrial Sectors	France	England
High-technology	190	180
Mid-technology	180	190
Low-technology	280	180
Total	**650**	**550**

6.3 Sending out Questionnaires and Responses

In an effort to obtain a higher response rate, certain precautions stressed (Yu and Cooper, 1983; Cavusgil and Das, 1997) were taken: (1) personalisation and (2) follow-up procedures. The questionnaires were sent to each potential respondent (HR managers and managing directors) with a cover letter containing the name, position and company name for each potential respondent (for a sample of the cover letter, please see appendix 3: Invitation Letters and Questionnaire). An incentive for the respondent was stated in the cover letter, promising that the survey results would be mailed to the respondents upon his/her request. In addition, confidentiality was assured. In this thesis no reference is made to any individual firm; the results of this study are published in aggregate form.

A total of one thousand two hundred questionnaires were sent out in France and England in two rounds. In France four hundred questionnaires were sent by standard post on the 22nd of October 2001[5]; whereas on the 6th of November, four hundred and fifty questionnaires were sent to firms located in England[6]. In both cases, an A4 envelope was sent containing: (1) a cover letter, (2) a prepaid A4 addressed envelope and (3) the questionnaire (appendix 3), the cover letter stated: '...Even if you are unable to help me, could you please return the questionnaire (with your name and company on the cover) using the prepaid envelope enclosed'. A follow up letter was sent, two weeks after the questionnaires had been posted in France and England (appendix 3).

Until December 2001 the response rate for France was not totally satisfactory, because just thirty-three completed questionnaires out of four hundred (8.25%) were received. On the other hand, sixty eight out of four hundred and fifty questionnaires (15.11%) were received from companies operating in England.

Table 6.5: Responses up to December 2001

Responses	France	England	Total
Completed questionnaires	33	68	101
Declined to participate in the research	25	48	73
Total	**58**	**116**	**174**

Thirty-five firms from England returned the questionnaire without answering. These firms stated that they did not have a policy of answering such questionnaires. Other firms maintained that they did not have time to complete the questionnaire. Thirteen replies 'not able to participate in the research' were received through e-mail messages. However, twenty-one e-mail messages were received from firms located in England requesting another copy of the questionnaire. Five e-mail messages were received from French firms asking for another questionnaire and twenty-five uncompleted questionnaires were returned, in which they declined to participate in the research.

As a result of the response rate received by December 2001, it was decided to expand the database. This is the reason why there is a difference in the number of firms between the French and British databases. The names of the firms that declined to participate in the research from the French and British databases were replaced by new

firms obtained from KOMPASS. Additionally, one hundred and ten new names were included in the French database -ten for the mid-tech and one hundred for the low-tech industrial sectors, the sectors which presented a lack of response. The same criteria mentioned in section 6.2. 'Database construction', was used in selecting the new names for the French and British databases. Additionally, personal contacts including snowball or chain-referral techniques were developed. While recognising the inherent limitations of this approach, it must be borne in mind that collecting information across these two countries, especially from countries like France, is a difficult task (Geringer *et al.*, 2002; Nelson and Gopalan, 2003).

In January 2002, the second round of questionnaires was sent out in France and England. Following the same criteria as the first round (packet and follow up letter), one hundred and seventy questionnaires were sent by standard post to firms located in France and England (one hundred and ten and sixty questionnaires respectively). By April 2002, a total of two hundred and seventy-seven responses had been received from France and England. Table 6.6 shows the total of responses.

Table 6.6: Total of responses up to April 2002

Responses	France	England	Total
Completed questionnaires	76	96	172
Declined to participate in the research	45	60	105
Total	**121**	**156**	**277**

The one hundred and seventy-two responses were classified according to the database criteria, which are the Scoreboard and OECD industrial classifications as high-technology, mid-technology and low-technology. Table 6.7 shows the sample figures.

Table 6.7: Sample

Responses	France	England	Total
High-tech	19	29	48
Mid-tech	18	30	48
Low-tech	39	37	76
Total	**76**	**96**	**172**

6.4 Sample Validity

One of the reasons for sending out the questionnaires a second time was to decrease errors in measurement This kind of 'methodology errors' can be caused by the lack of

equivalence of response. "Low and/or widely divergence response rates in a cross-national study can jeopardise the statistical and external validity of the research, as well as affect comparability across samples" (Cavusgil and Das, 1997: 84).

In terms of sample validation, the proportion of high-tech, mid-tech and low-tech firms from the respondents in relation to the database had to be determined. Tables 6.8 and 6.9 show the samples vs. their databases.

Table 6.8: French Sample vs. Database

France	High-tech	Mid-tech	Low-tech	Total
Sample	19	18	39	76
Database	190	180	280	650

Response rate 11%

Table 6.9: British Sample vs. Database

England	High-tech	Mid-tech	Low-tech	Total
Sample	29	30	37	96
Database	180	190	180	550

Response rate 17%

In the analysis of the sample vs. database, concerns were focused on deciding whether the two independent samples (French and British) could be regarded as having come from the same population (French and British databases). In order to compare the tallies of the categorical responses between the databases and the samples and to calculate the difference between the two proportions, the X^2 test (Khi2)[7] procedure was applied to the samples. This test seeks to equate the proportions, as well as to compare the two samples (Siegel and Castellan, 1988; Hsu, 1999).

6.4.1 French Sample

Table 6.8 shows the relation between the French sample and the database. To test the null hypothesis that the proportions are equal H_0: $P_1 = P_2$ in this case: Sample = Database, against the alternative that the population proportions are not equal H_1 : $P_1 \sim= P_2$, the actual and expected frequencies from table 6.8 are used to compute the X^2 Test (Khi2c) statistic given by its equation[7].

If Khi2c < Khi2I or if p>5% H_0 is accepted, therefore the sample is representative

For the French data in table 6.8, the X^2 test statistic (Khi2c) is 17.9935 which is greater than the critical value[8] (Khi2I) of 5.991476, (or the *p*-value = 0.0000124) at the 0.05 level of significance. Therefore, the null hypothesis which states that the sample is representative is rejected.

At this stage of the present research the alternative for resolving the problem of representativeness was to reduce the French sample. As mentioned earlier, obtaining responses was a challenge; therefore, the minimum number of questionnaires was taken out of the sample. Several Khi2c tests were run to obtain a representative sample. As a result, seven questionnaires from the low-technology category were distracted by a random procedure[9]. Table 6.10 shows the final French sample.

Table 6.10: Final French Sample

France	High-tech	Mid-tech	Low-tech	Total
Sample	19	18	33	70

Another X^2 test statistic (Khi2c) was run with the final French sample, this time the (Khi2c) is 4.3833 which is smaller than the critical value[8] (Khi2I) of 5.991464, and the *p*-value = 0.1117888 at the 0.05 level of significance. Therefore, the null hypothesis which states that the sample is representative was accepted.

6.4.2 British Sample

As occurred in the case of France, the British sample presented problems, though less critical. Table 6.9 shows the relation between the sample vs. database.

From the British data (table 6.9), the X^2 test statistic (Khi2c) is 8.47684 which is greater than the critical value[8] (Khi2I) of 5.991476, (or the *p*-value = 0.01443) at the 0.05 level of significance. Therefore, the null hypothesis that the sample was representative was rejected.

The same procedure as the one conducted in the French case was followed for the British sample. Several Khi2c tests were run until optimum sample sizes were obtained. As a result, three questionnaires from the low-technology category of the sample were discarded by a random procedure[9]. Table 6.11 shows the final British sample:

Table 6.11: Final British Sample

England	High-tech	Mid-tech	Low-tech	Total
Sample	29	30	34	93

Finally, the X^2 test statistic (Khi2c) with the new sample is 3.7091489 which is smaller than the critical value[8] (Khi2I) of 5.9914764, (or the *p*-value = 0.1571201) at the 0.05 level of significance. Therefore, the null hypothesis which holds that the sample is representative is accepted.

6.4.3 Anglo-French Sample

As a result of these changes in the French and British samples, the final sample that was analysed in this thesis is shown in table 6.12.

Table 6.12: Anglo-French Sample

Level of technology	France	England	Total
High	19	29	48
Mid	18	30	48
Low	33	34	67
Total	**70**	**93**	**163**

In order to reconfirm the final sample's representativeness, the X^2 test statistic (Khi2c) with the new French and British sample was run. The (Khi2c) calculated with the data from table 8.12 is 3.89776, which is smaller than the critical value[8] (Khi2I) of 5.9914764, (or the *p*-value = 0.1424335) at the 0.05 level of significance. Therefore, the null hypothesis which states that the sample is representative is accepted.

6.5 Conclusions

This chapter has stressed the means by which the database and the final sample were constructed. Also, it has presented a statistical analysis which assesses the sample representativeness.

The Scoreboard and OECD industrial classifications helped considerably in approaching the technology-oriented sectors, which are the main focus of this thesis. These classifications will be discussed in chapter seven.

Sending a personalised cover letter, as well as the follow up letter, to the potential questionnaire respondents helped in increasing the response rate. However, the first

round of questionnaires did not achieve a sufficient sample number in order to obtain external validity; therefore, a second round was sent out.

The final sample presents one hundred and sixty-three completed questionnaires, which denote the sample's representativeness as shown in the X^2 (Khi2c) tests. All the industrial sectors that were aimed to be analysed are represented in the final sample.

Notes:

1. KOMPASS is a database that provides product, company address, telephone, fax, e-mail and web addresses, managers' names and department contacts, registered company details, corporate structure, financial data, and highly detailed product and service information for 1.7 million companies worldwide. Each company is individually checked by a local KOMPASS office, usually once per year.
2. Published by the *Department of Trade and Industry* (Burchell; Deakin *et al.*; 2003) (web address: innovate.gov.uk). This publication presents information that is extracted from company annual reports and key ratios calculated with some movements over time. Companies are classified by FTSE sectors. 597 UK-based companies (49 from the FTSE 100) are included with R&D investments totalling just under £15bn.
3. The Key British Enterprises covers the 50,000 largest actively traded companies in the UK. These companies are selected from Dun and Brandstreet's database of 1.4 million companies. Companies are ranked by industrial sector; major companies are shown with the ranked list of the leading companies.
4. The ten OECD countries are: the United States, Japan, Germany, France, the United Kingdom, Italy, Canada, Australia, the Netherlands and Denmark.
5. Questionnaires were sent out to HR mangers from the Group ESC Grenoble, France.
6. Questionnaires were sent out either to HR Managers or Managing Directors, from the Newcastle School of Management at Newcastle upon Tyne University in the UK.
7. The equation for the X^2 Test statistic is equal to the squared difference between the observed and expected frequencies, divided by the expected frequency in each cell of the table, summed over all cells of the table (Siegel and Castellan, 1988).

$$X^2 = \Sigma \frac{(Eobs - Eth)^2}{Eth}$$

Where:

Eobs = Observed frequency,

Eth = Theoretical, or expected frequency, *in a particular cell if the null hypothesis is true*

The test X^2 approximately follows a chi-square distribution with 1 degree of freedom.

8. The critical value can be found in the tables' X^2 critical values from the chi-square distribution, which depends on the numbers of degrees of freedom and the level of significance.
9. The random procedure is used to ensure that every element in the population has an equal chance of selection and guards against the possible small bias that might occur if the first or last member in the interval were always selected (Sudman, 1998). This process was achieved using the Data Analysis Random Number Generator (Microsoft Excel, 2000). The elements of the low-tech category were numbered and the selection of the random numbers by the software mentioned was run until the 6 samples from France and 3 from England were reached.

Chapter Seven: Technology Classification

7.1 Introduction

This chapter discusses the technology analysis at the firm level. Each of the one hundred and sixty-three firms from the Anglo-French sample presented in chapter six are assessed individually. The objective of this analysis is to classify each firm as technology intensive (high & mid) or low-tech. This chapter applies empirically the technology concept discussed in chapter two.

The construction of a complete classification of firms according to their technology intensity involves a number of difficulties. The first concerns the criteria for identifying the technology content of an industry. The second deals with the underlying concept. What is a high-tech firm? Is it a firm that produces technology? Is it a firm that intensively uses technology? A third problem is that there is always some degree of arbitration in choosing the cut-off between the classes of technology (OECD, 1996). This difficulty that many contingency researchers have encountered has been largely diminished in this study by analysing the technology components separately. This chapter examines the technoware and humanware components. Technoware is analysed by three factors: (1) industrial sectors, (2) turnover spent on R&D, and (3) structure. This analysis aims to provide elements for the classification of those firms which tend to be the most technology-intensive. Although it is not straightforward to classify some firms in the sample either as high, mid or low tech, on evaluating each of the technology components mentioned it would be enough to draw a line between the three technology classes. On the other hand, humanware is analysed by the relation of the R&D department and the percent of turnover on R&D to the HRMPP as a dependent variable. Nonetheless, this analysis does not show evidence of a clear link of these humanware factors in determining the level of technology that a firm has.

Finally, there is an increased tendency to classify organisations in terms of their technical system. As Charles Perrow (1967: 195) points out: "The perspective holds that technology is a better basis for comparing organisations than the several schemes

which now exist". Therefore, this chapter aims to provide a new perspective in measuring the level of technology that a firm has.

Confidentiality Note: This chapter deals with the sample analysis. Firms' names are omitted. They are referred to by a number and their location: England or France.

7.2 Analysis

Chapter two discussed the concept of technology as a continuous variable: high, mid and low-tech. It also presented the technology components: humanware, technoware, inforware and orgaware. This chapter analyses the technoware and starts analysing the humanware components. However, in-depth discussion of the humanware and the other two components will be presented in the chapters that follow.

Available data from each company on expenditure rates on R&D, and for the proportion of employment in R&D and equivalent areas of activity provided an indication of both variability and complexity in the technological environment in each firm from the sample.

The sophistication in the integration of the technology components, in a given firm, leads one to assume its level of technology intensity. Also, it helps to determine a high-tech definition. However, as mentioned in the previous chapters, the definition of high technology might be subject to a variety of interpretations and definitions. Thus, each of the one hundred and sixty-three firms in the sample was analysed individually in order to assess their technology intensity.

At first glance, the one hundred and sixty-three firms in the sample did not appear to present any complications in classifying them as high, mid or low-technology as shown in table 7.1. However, on examining each firm in more detail, this classification could be controversial. This can be attributed to the criteria used by Scoreboard and the OECD to accomplish industrial sector classification. The former assessed the R&D intensity by analysing five hundred and five UK-based companies, whereas the latter classification was based on direct and indirect R&D intensity, weighted by sectors and ten OECD member countries. Therefore, it was decided to include other factors in analysing the technology intensity of the one hundred sixty-three firms in the sample.

Table 7.1: Sample

Levels of Technology	High-tech	Mid-tech	Low-tech	Total
Sample	48	48	67	163

These factors were the technology components: humanware and technoware. This decision was based on two criteria that Perrow (1967) points out when analysing technology intensity: (1) the degree of complexity of the technology and (2) whether the technology is stable or dynamic. These two dimensions suggest a continuum ranging from stable and relatively simple technology, such as basic-tool, to a dynamic and complex technology. Perrow has proposed a multidimensional model of technology that emphasises the application of knowledge to the problems the organisation faces in performing its transformation functions to the work to be done. Under this view, work-units at the organisation can be evaluated in order to have other criteria for a classification of firms' level of technology.

It is important to recognise that this continuum technology variable considers two primary dimensions. One deals with the degree of complexity of the technology required in the transformation process. The second emphasises the degree of stability in the events, task, or decisions that the organisations faces (Perrow, 1967). Thus, there are a number of possible combinations along this continuum. At the lower left is the organisation that uses very simple and uniform person-tool technology. At the other end is the organisation that handles a dynamic, complex knowledge-based technology, such as an aerospace company, or a research and development laboratory. Obviously, within any complex organisation there may be different departments that are at various positions along this continuum. For example, line employees have uniform procedures and stable technology. However, at the other end of the spectrum, the R&D department functions involve a dynamic, non-uniform technology (Perrow, 1967; Kast and Rosenzweig, 1985).

Nevertheless, it is important to underline that technology accumulates in part through new productive experiences, new skills, know-how, organisational capacity and so forth, but this is in general linked to the installation of new items of capital equipment, without which the flow of intangible improvements would soon slow down. Here is where the integration of technology components become important –technoware,

humanware, orgaware and inforware. The effective use of these components depends on the virtuosity of the orgaware used by the firm (Ramanathan, 1994). Additionally, "technological experience and skills are developed in a particular area of production; existing capital equipment is adapted and updated in accordance" (Cantwell, 1989: 9).

Figure 7.1: Relation of HRM and Technology

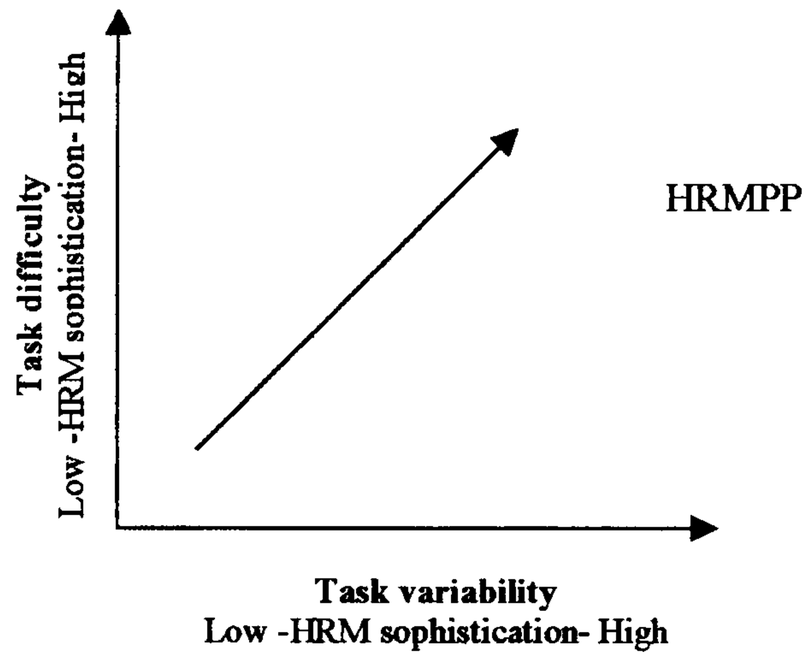


Table 7.2, presents the methodology for approaching this analysis. The following sections put forward the analysis conducted of the humanware and technoware technology components. The first section analyses the technoware factor, which assesses the industrial sector, turnover spent on R&D and the structure of the firm. A correlation analysis between technoware criteria and HR processes are presented in the humanware analysis.

7.2.1 Technoware

This component stresses the transformation processes within the use of technology. The degree of sophistication of the technoware component is closely related to humanware; this relation is that the sophistication of the technoware increases as the employees' capabilities require 'advanced' information and capabilities to operate a mechanical tool.

In an attempt to analyse the degree of technoware sophistication, a descriptive statistical analysis was conducted, which included three factors, as table 7.2 shows.

Table 7.2: Methodology in the Technology Analysis

Technology components	Method of Analysis
TECHNOWARE	Descriptive Statistics 1. Industrial Sectors 2. Turnover spent on R&D 3. Structure
HUMANWARE	Correlations analysis 1. R&D department in relation to the HRM process as dependent variables 2. % of the turnover spent on R&D and the HRM processes as the dependent variables

Industrial sectors: The database was developed according to industrial sector classification (high-tech, mid-tech and low-tech). However, since for this research it has been more important to evaluate the firms within each industrial sector, the main activity of the one hundred and sixty-three firms in the sample has been analysed. This analysis was achieved by looking at the Standard Industrial Classification (SIC) code for companies located in England and, the 'Firm Principal Activity' (APE) code (*Activité Principale de l'entreprise*) for firms located in France. Recently the APE code has been changed to the N.A.F. code (*Nomenclature d'Activité Française*)[1].

The SIC/APE codes provided important information for identifying the firms' principal activity. It relied, of course, on each company responding to the SIC/APE question. However, it was found that relying on this information for identifying the firm's main operations was not enough. The main reason was that replies from some of the firms to this question did not sufficiently clarify the firm's main core activity. For example, a French firm stated its APE code as 741J: Administrative Services: Firm Administration. This firm's 'classification' did not help much in trying to determine the firm's principal activity, which is a nuclear engineering plant.

In order to be 100% sure that the APE/SIC codes corresponded to each firm's main activity, the KOMPASS database (British and French versions) was further reviewed. The objective was to clarify each firm's profile, in particular for those firms that did not state their SIC/APE code or industrial sector. However, some companies were not listed in the KOMPASS' database. Yet, as might be recalled, KOMPASS was not the only source for drawing up the database (please refer to chapter six for details).

Another drawback was that some firms in the KOMPASS British version do not break-down the SIC code into the firm's principal activity. As mentioned previously, in some cases this code does not fully define firms' principal activity, as in the example of the French firm presented earlier. If firms were not found in the KOMPASS database, their web sites were consulted or telephone calls were made in order to have a clear idea of their main activity. This analysis helped to classify the firms into high/mid and low-tech.

High-tech firms: Forty-seven British and French firms from the sample were categorised as high-tech. These are the decisive factors in selecting these 'truly' high-tech firms:

1. Firms engaged in one or more of the high-tech sectors -classified by Scoreboard, OECD and Technology Company Information. It is important to mention that in this analysis each firm's principal activity at its site was considered. Each firm was analysed separately in its APE/SIC code and principal activity, especially those firms whose APE/SIC code was classified as Service or Administration.
2. Firms with an R&D area at the site where the questionnaire was answered.
3. Firms with 3% or more of turnover spent on R&D.

Nevertheless, it was a challenge to assess these technological attributes, because many firm that claimed to have an R&D department at the site where the questionnaire was answered, did not mention the turnover spent on R&D. Also, some firms defined themselves in the questionnaire as R&D firms, implying that 100% of the turnover was spent on R&D activities. Other firms, in the Chemical Industry, mentioned that it is hard to determine the percentage of turnover spent on R&D, either because some of them were at the beginning of their operations (firms of recent creation), or because they do not measure it in percentage terms. Finally, some other firms mentioned that they define the R&D budget according to their research projects.

In conclusion, the criteria turnover spent on R&D was assessed in each firm that answered that question. However, the turnover spent on R&D was not the only criteria used in the cut-off for classifying a firm as a high-technology or mid/low-technology.

Rather a close evaluation of the other two factors mentioned in this section resulted in the high-tech classification. Table 7.3 shows the firms classified as high-tech but that do not meet at least one of the three aforementioned high-tech criteria. The complete high-tech classification can be found in appendix 4: Samples.

It is worth noting that the high-tech industrial sectors presented in table 7.3 differ to some degree from the Scoreboard and OECD classifications. Some of the industries that they classify as mid-tech were included in the high-tech class. These are: the machine equipment, precision instruments, energy and chemical industries. The following sections analyse the firms in these industries with statistical procedures, in order to ensure that they are correctly defined as high-tech firms.

Table 7.3: High-tech firms

FIRM No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
2	31-32 Chemical and Oil Industries	Biotechnology	1	*Not available*	ENGLAND
3	31- 32 Chemical and Oil	Petroleum and Chemicals	1	*Not available*	ENGLAND
4	31-32 Chemical and Oil	Chemical Manufacture for Industry	1	*Not available*	ENGLAND
5	31-32 Chemical and Oil	R&D in Chemical Industry	1	4.00	ENGLAND
6	32 Chemical Industry	Pharmaceutical. To discover and develop prescription medicines to improve the treatment of common illnesses.	1	*Respondent's note: The firm has 17,000 employees in R&D. In the UK, the firm spends £2.4 million on R&D.*	ENGLAND
9	31 Chemical Industry	Pharmaceutical. Company active in R&D of antibody-based therapeutic products.	1	*Respondent's note: This question is not applicable for the firm, as we are not yet profitable. The cash turn is approx. £1.8M per month.*	ENGLAND
10	31-32 Chemical Industry	Biotechnology	1	*Not available*	ENGLAND
11	7430/85 Chemical Industry / Various Services, Research	Analytical Activities in Chemistry and Business	1	3.00	ENGLAND
13	31/38 Chemical Industry/Precision Equipment	Biotechnology materials focus on the application of Phosphorylcholine (PC) Technology in medical devices and bio-materials.	1	35.00	ENGLAND
15	37/39 Electrical, Electronic Equipment, Transport Equipment	37-100 Systems for industrial, construction and railway applications	1	7.00	ENGLAND
16	31/38 Chemical Industry/Precision Equipment	Medical and surgical equipment	1	*Not available*	ENGLAND
18	37 Electrical, Electronic, Data Processing Equipment	Design and manufacturing electronic equipment	1	*Not available*	ENGLAND
22	38 Precision Equipment	Medical and Surgical equipment production. Develops, manufactures and markets sophisticated medical devices.	1	*Not available*	ENGLAND

FIRM NO.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
23	38 Precision Equipment	Develops and manufactures measuring, testing, optical, medical and surgical equipment	1	14.00	ENGLAND
25	31/85 Chemical Industry /Research and Various Services	Provides a wide range of contract, clinical, biological and chemical research services. Drug development.	1	*Not available*	ENGLAND
26	31/84/85 Chemical /Research, Technical Services, Engineering	Research in Chemical Industry	1	*Not available*	ENGLAND
28	311b Electrical electronic equipment	37-550 Fabrication of Electro-medical and biological apparatus.	1	*Not available*	FRANCE
31	321B Electrical, electronic equipment	Active component electronic equipment production	1	5.00	FRANCE
32	403/741J Energy/Services -Administrative-	37-910 Nuclear Engineering plant	1	5.00	FRANCE
33	291A Machines and Equipment	40-010/35-961 Design and manufacture of hydraulic and oleo-hydraulic machines and equipment, water turbines, valves, etc.	1	3.00	FRANCE
34	285C Machines and Equipment Production	45-500 Develop and fabrications of Extraction and Construction Equipment.	1	5.00	FRANCE
35	291D Machines and Special Equipment	40-010 Design Hydraulic and Oleo-hydraulic Machines and Equipment, Water Turbines	1	3.00	FRANCE
36	291H Machines and equipment	Mechanic and equipment production	1	4.00	FRANCE
37	292D Machines, Mechanic and Equipment Production	45-500 Fabrication and maintenance of special purposes equipment - mining, quarry, stone-working, etc.	1	5.00	FRANCE
39	39/272C Transport Equipment/ Metal Industry	39-520 Development of equipment and infrastructure for motor vehicles.	1	6.00	FRANCE
40	331B Precision Equipment	26-440 Medical and Surgical Equipment Production	1	5.00	FRANCE
41	731Z Research and Development	85-100 Research in physics and natural sciences	1	*Not available*	FRANCE
42	731Z Research and Development	85-100 Research in physics and natural sciences	1	*Not available*	FRANCE

Clarification Note: R&D stands for an R&D department[2].

Mid-tech firms: The sample presents some firms that could not easily be coded as high-tech or low-tech. The mid-tech class presented in the database (chapter five) was therefore kept for those firms which were definitely not low-tech but classifying them as high-tech could be controversial. Twenty-seven firms were selected as mid-tech. These firms were selected based on:

1. Firms in one of the 'high-tech' industrial sectors.
2. Firms with an R&D department.
3. Firms that spent 2.99% or less of their turnover on R&D.

Table 7.4 shows firms classified as mid-tech that need further explanation for said classification. For full details of the firms classified as mid-tech, please refer to appendix 4, table 4.2.

Table 7.4: Mid-tech Firms -Special Cases

FIRM No.	APE/SIC CODE	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
3	20 Food Industry / 31 Chemical -Biotechnology	Processes maize to produce glucose syrups and powder for the food, drink, pharmaceutical industries.	1	10.00	ENGLAND
4	20 Food Industry / 31 Chemical -Biotechnology	R&D Company in food industry- Biotechnology.	1	10.00	ENGLAND
5	20 Food Industry / 31 Chemical -Biotechnology	20-480 Food products with an innovation organisation around two areas of activities: Food Science – Development of emulsifiers, textural ingredients, etc. Bioscience –Biotechnology, nutrition, food safety and preservation and the development of enzymes.	1	*Not available*	ENGLAND
7	84 Research, Technical Services, Engineering, Research	Research in civil engineering, mechanical and general public work.	3	*Not available*	ENGLAND
9	82 IT & Wireless services	Services in execution-only stock brooking for private investors in the UK and USA. Includes an online trading service.	3	*Not available*	ENGLAND
10	79 Telecommunication	Telecommunication business, focused on the provision of high-performance Internet protocol and data services to business customers.	3	*Not available*	ENGLAND
12	79 Telecommunication	Telecommunications	1	*Not available*	ENGLAND
25	722Z IT & Software	Providing enterprise software database, tools and application products, along with related consulting, education, and support services.	3	*Not available*	FRANCE
26	79 Telecommunications	Telecommunications (Holding)	3	*Not available*	FRANCE

Case 1: Firms that do not have an R&D department at their sites (R&D =3), therefore, these firms did not report a figure for turnover spent on R&D (Firms No. 7, 9, 10, 25 and 26; firm 12 reported an R&D department but did not report a figure of the turnover spent on R&D, in Table 7.4).

These firms' common feature is that they belong to the high-tech industrial sector, yet they do not have an R&D department at the site where the questionnaire was answered. Two of the criteria for classifying the firms as mid-tech were missing (criterion 2. *firms with an R&D department* and 3. *turnover spent on R&D*). However, these firms' principal activity was further investigated and it was found that they are mainly involved in activities that deal with research, consulting or engineering. This

fact was taken into account for classifying these firms as mid-tech firms. This further research was achieved through three sources (1) KOMPASS database, (2) firms' website and (3) telephone interviews.

Case 2: There are three firms (Firms No. 3, 4 and 5) that the SIC code classifies into the food industry. Contrary to the first case, these firms have an R&D department and two of them reported that they spent 10% of turnover on R&D. Further inquiries were also made about these firms' principal activity (following the same process as in case one), and it was found that these firms' principal activity related to R&D in the food industry: biotechnology. Therefore, it was decided to include them in the mid-tech classification.

Low-tech Firms: Eighty-nine firms in the sample fall into the low-tech classification. These firms' common characteristics are:

1. Firms classified into the low-tech industrial sectors.

It is important to mention that some firms in this low-tech classification belong to the high-tech industrial sectors. However, these firms' principal activity (at the site where the questionnaire was answered) only relates to manufacturing practices.

2. Firms without an R&D department at the site.

There are some firms in this section that reported having an R&D department, however, the principal activity of these firms did not relate to the high-tech classification discussed earlier.

Table 7.5 reports the firms classified as low-tech that either stated that they had an R&D department or gave a figure for the turnover spent on R&D. However, their main activity relates to manufacturing practices. For the list of the eighty-nine low-tech firms please, see appendix 4, table 4.3.

Table 7.5: Special case of firms classified as a low-tech

FIRM NO.	APE/SIC CODES	PRINCIPAL ACTIVITY	R&D	TURNOVER SPEND ON R&D	LOCATION
2	37 Electrical Electronic Equipment	Manufacturing of high precision rotary tables and pallet systems to leading manufacturers in the automotive, power generation, machine industries.	1	2%	ENGLAND
8	20 Food Industry	Food Manufacture	1	4%	ENGLAND
35	80 Services - Administrative-	Personnel Consulting	1	*Not available*	ENGLAND
36	82 Services - Financial and Insurance-	Baking	1	*Not available*	ENGLAND
37	87 Services -Public Administration-	Public Sector	1	*Not available*	ENGLAND
47	23 Textile Industry	Manufacturing	1	1%	ENGLAND
62	159T Food Industry	21-480 Lemonades, aerated waters, soft drinks	1	10%	FRANCE
66	284A Metal Industry	35-010 Forged, stamped and hot pressed metal products.	1	0.50%	FRANCE
67	275E Metal Industry Metallurgy	Molten of light materials	1	2%	FRANCE
74	22C Printing and Publishing	Other Printing	1	5%	FRANCE
88*	*Not available*	*Not available*	1	5%	FRANCE

* Since firm No. 88 reported 5% of turnover spent on R&D, it was decided to classify this firm as low-tech, because it was not possible to determine the firm's principal activity and industrial sector.

7.2.2 Mean of employees' categories

The last analysis of the technoware component was achieved through the breakdown of descriptive statistics. The mean[3] of the firms' employee structure and the % of the turnover spent on R&D were calculated according to the firms' technology classification (high/mid or low-tech), in order to draw conclusions from the differences among them. Tables 7.6 and 7.7 present the results.

Table 7.6: Employee Breakdown at the Firm's Site (in percentages)

Firms	Size Mean	% Directors Mean	% Managers Mean	% Engineers Mean	% Tech. Mean	%Manual Workers Mean	% Others Mean	% Scientists Mean
High-Tech N= 47	778.80	2.64	12.39	19.92	25.37	32.29	13.09	23.02
Mid-Tech N= 27	674.91	3.58	12.56	17.27	15.77	47.75	20.45	16
Low-Tech N= 89	656.75	3.61	11	14.58	13.47	51.95	23.02	0

Table 7.7: Employees Breakdown at the R&D Department

Firms	Ph.D. Mean	Master's Mean	Bachelor's Mean	Engineers Mean	Technicians Mean	Others Mean	%Turnover Mean
High-Tech N= 47	14.77	11.30	39.45	15.55	29.04	6.33	8.12
Mid-Tech N= 27	17.50	10.73	18	7.77	15.33	12	4.35
Low-Tech N= 89	31.75 (N=4)	2 (N=2)	2.25 (N=4)	1.67 (N=3)	3.5 (N=4)	*Not applicable*	3.68 (N=8)

Tables 7.7 and 7.8 clearly show the relation between the technology component technoware and firms' structure. It is important to highlight some figures from the categories presented in these tables. Firstly, one of the high-tech characteristics mentioned in the concept definition section should be noted: *'The proportion of engineers, scientists and technicians in their workforce is higher'*. This fact confirms the technoware element in relation to high-tech firms, which stresses the demand of a high degree of sophistication in the use of machines and equipment in high-tech firms. Therefore, they also demand a high level of sophistication in their employees' capabilities. The high-tech and mid-tech firms present a higher proportion of engineers, technicians and scientists compared to the low-tech firms (table 7.7 and 7.8). Secondly, another figure that is interesting to highlight is that the low-tech firms have a mean of 51.95 for the manual-workers category. This fact is an indication that the manufacturing process is the main activity for the low-tech firms in the sample.

7.2.3 Humanware

The humanware analysis was conducted by correlation tests[3]. The purpose of these correlations was to test the sophistication of the employees' capabilities in relation to the HRMPP[4] as the dependent variables. However, significant non-statistical correlations were found. Further research on the humanware component will be presented in the following chapters.

Representation of the number of R&D employees: Several correlations tests were conducted between the independent variable 'PERRD'[5] and the HRM[4] policies and practices as the dependent variables. Only one correlation is found between the 'PERRD' variable and the dependent variable: net-recruitment (.304 at the significance level of $p<0.05$). This means that the higher the percentage of a firm's employees working in R&D areas, the more this firm utilises net-recruitment.

7.3 Conclusions

This chapter has discussed the approaches used in measuring a firm's level of technology. These approaches helped to classify the one hundred sixty-three firms located in England and France as technology intensive (high-tech and mid-tech) or low-tech firms. It is important to give credit to the technology elements for the evaluation of firms' technology intensity. Additionally, it is important to highlight that technology intensive firms which comprise high- and mid-tech firms, have similar characteristics of the technology concept; however their intensity is different. Therefore, it was decided to keep the high and mid classes in order to have a full understanding of the level of technology that a firm has. Indeed, this chapter gives evidence of the relevance of the technoware component for this purpose.

The evaluation of a firm's level of technology is not a simple exercise of looking at the firm's principal activity and the industrial sector to which the firm belongs. This simplistic technology analysis would lead to a misleading conclusion in studying actors in organisations and the environment where they operate, especially for cross-national research. However, the holistic analysis that this chapter presented on evaluating technoware and humanware components through: (1) firms' principal activity, (2) R&D department, (3) turnover spent on R&D, (4) organisational structure, and (5) HRM activities demonstrated that they are essential for endeavouring to understand firms' technology intensity. Although the humanware analysis did not provide sufficient data to draw conclusions on the influence of this factor on the level of technology that a firm has, it does provide elements for further analysis in future research. Nonetheless, the methodology developed in this chapter has helped to reduce complications in drawing a line between technology intensive firms (high- and mid-tech) and low-tech firms. Thus, a better understanding of the sample being studied has been achieved.

Notes:

1. The N.A.F. corresponds to the Nomenclature of French Activity -main activity of the company. This is a nomenclature in 2 levels -codes in 2 figures and codes in 3 figures and a letter. For example: 2 figures -15 Food Industry and 3 figures plus a letter -151A meat production.

2. The R&D column stands for the question: Does the firm have a Research and Development (R&D) department at this location? 1=Yes, 2=No at this site, but somewhere else and 3=No.
3. The SPSS program was utilised in the mean and correlation analyses.
4. The HR practices tested were twenty-four items from the questionnaire.
5. The variable 'PERRD' states the percentage of employees working in the R&D department in relation to the total workforce. PERRD was calculated by Σ of the R&D employees divided by the total workforce.

Chapter Eight: Results: Instrument Validation and Model Test

8.1 Introduction

Chapter five discussed the instrument used to validate the neo-contingency hypothesis proposed in this thesis. This chapter validates the instrument, which provides the foundation for the statistical analysis of the results obtained.

The results discussed here combine several theoretical and statistical approaches to the comparative study of HRMPP in French and British firms operating with different levels of technology. The perspective in which the discussion of the results is presented is derived from the research questions of this thesis: how are HR managers socially constructed along with their sphere of action and the technology determination that the firm imposes? The results discussed here give evidence that HRMPP are affected in France and England by technology and institutions. Nonetheless, it is important to highlight that these are not the only variables shaping HR managers' behaviours. Indeed, the HR managers who are the actors of these practices are also affected by international commerce pressures and other variables that firms face regardless of their technology intensity and country location.

This chapter starts by presenting the number the firms that were contacted in order to develop semi-structured interviews. These interviews were taken into consideration for the data analysis and interpretation. The following sections of this chapter are divided into three parts. The first section presents the validation of the instrument using principal component analysis which leads to the discussion and interpretation of the factor analysis. The second section presents the model test: MANOVA and ANOVA analyses, which are based on results from the factor analysis. The ANOVA test will help to validate the hypothesis. The third part presents a general discussion of the findings, which lead to suggest further analysis of the neo-contingency approach proposed in this thesis.

Finally, the results that this chapter presents modestly validate the 'neo-contingency' theory of this thesis. They encourage more 'neo-contingency'-type research, which could provide supportive insight into the results discussed here.

8.2 Semi-structured Interviews

The quantitative data collected in this study is complemented with qualitative sources. Five firms in France and three in England were selected to conduct semi-structured interviews. The purpose of the interviews was to complement the quantitative analysis. In this way, the enrichment of the neo-contingency approach could be developed in this thesis. The interviews were conducted in order to accomplish one main objective: To reach a better understanding of the way HR managers responded to the HRM-questionnaire; and secondly to validate these responses with employees. In total, twenty-five interviews with HR managers and employees were conducted between December 2002 and April 2003. Table 8.1 presents the number of interviews by firm and employee position. On the other hand, the sample was chosen to enable the author to observe the effect of the different contexts on HRMPP. The firms which were eventually selected in each country operate in different industries: computer hardware and software, telecommunications, service, chemical and electrical/electronic. Further details of each firm can be consulted in the appendix 4: Samples.

Table 8.1: Interviews

Description: Firms & Interviewee	Firms' level of technology, location & number interviews								
	H France I	H France II	H France III	M France IV	L France V	H Britain VI	L Britain VII	M Britain VIII	Total
Firm's Number	H #30	H #45	H #44	M #26	L #40	H #5	L #5	M #2	--
HR Manager	1	1	-	1	1	1	1	1	7
Engineers (R&D) & Managers	3	2	2	3	1	3	2	2	18
Total	4	3	2	4	2	4	3	3	25

Notes: H= high-tech, M= Mid-tech, L= Low-tech,

8.3 Instrument Validation

The instruments validation process helps to ensure the validity and dependability of the questionnaire developed (see chapter five). Additionally, the validation of the instrument directs the quality of the result that will be discussed in this chapter.

The principal component analysis was developed to group the different HRMPP dependent variables into different factors. The Reliability Coefficient test –Alpha Cronbach was calculated in the obtained factor in order to test its reliability. In other words, to evaluate the internal consistency of each factor based on internal correlation among the average of its inter-elements. The following sections present the results divided into four sections: 1) recruitment and selection, 2) training, 3) organisation, and 4) compensation.

8.3.1 Recruitment and Selection

First a principal component analysis with a varimax rotation was developed. The five recruitment and selection dependent variables are grouped into two orthogonal factors (eigenvalues > 1) that explained 57.037% of the total variance. Each of the variables which integrated the factors has communalities higher than 0.45 and loading factors higher than 0.5. Please refer to table 8.2 for the details.

Factor 1: Technical Profile: The first factor was named Technical Profile because it refers to the technology-oriented capability and skills that employees working in a fast moving industry might require. Global scope signifies that employees in technology intensive sectors (high- and mid-tech firms) required the ability to interact with people from different backgrounds and in different work-related situations. One scenario could be virtual team-work. Therefore, it might be important for these employees to develop the capability to use information technologies (IT) tools such as the Internet. Additionally, soft-skills such as: communication, teamwork and problem-solving, among others could be important for employees working in a virtual teamwork environment. It could be argued that technology intensive firms would look for employees that are capable of working with IT devices and of interacting and teaming up with employees from around the world.

Table 8.2: Factor Analysis Recruitment and Selection

Factor	Eigenvalues	% of cumulated explained Variance	Items	Communalities	Loading Factors	Alpha
Technical Profile	1.803	32.106	Global scope	0.580	0.757	0.5586
			Internet	0.447	0.744	
			Soft-skills	0.558	0.658	
Psychological Tools	1.049	57.037	Age	0.557	0.843	0.3882
			Assessment centres	0.710	0.715	

Factor 2 Psychological Profile: The second recruitment and selection factor was named psychological profile. The variables which integrate this factor are: (1) Age and (2) Assessment Centre. These variables provide a tool for evaluating a young workforce's profile, especially when they do not have work-related experience.

8.3.2 Organisation

A principal component analysis was performed with the seven organisational variables. One organisational item that shown communalities lower than 0.40 was dropped from the principal component analysis. The remained data presented two factors with eigenvalues greater than 1, which explains 54.370 percent of the variance. Each of the items which integrated the factors has communalities higher than 0.40 and loading factors higher than 0.5. The loading factors and communalities for the retained items are shown in table 8.3.

Factor 1 Work-Organisation: The first factor was named work-organisation because it integrates the policies and practices which deal with employees' work-place organisation and commanding. It is interesting to note that the items workforce supervision and non-intellectual work process have negative loading factors. These two items seem to be in opposition to the policy and practice of flat structure and empowerment.

Factor 2 Structure: Team-based job design and the HR managers' opinion of the agreement of the firm's structure integrate the second factor; which was named structure.

Table 8.3: Factor Analysis Organisation

Factor	Eigenvalues	% of cumulated explained variance	Items	Communalities	Loading Factors	Alpha
Work-Organisation	2.057	34.279	Workforce Supervision	0.618	-0.785	-0.2735
			Flat Structure	0.441	0.647	
			Empowerment	0.452	0.629	
			Non-intellectual work process	0.414	-0.589	
Structure	1.205	54.370	Team-based job design	0.752	0.850	0.3962
			Firms' Structure	0.584	0.663	

8.3.3 Training

In the principal component analysis performed with the training variables, the two items that showed communalities lower than 0.40 were dropped from the six original training items. The data was reanalysed and revealed only one factor with an eigenvalue greater than 1, which explains 53.609 percent of the variance. This factor was labelled long-term approach to training because the training practices concerned enhance employees' skills for their career development. The loading factors and communalities for the retained items are shown in table 8.4.

Table 8.4: Factor Analysis Training

Factor	Eigenvalues	% of cumulated explained Variance	Items	Communalities	Loading Factors	Alpha
Long-term approach to training	2.144	53.609	Soft-skills	0.585	0.765	0.6980
			Career development	0.498	0.755	
			Integral career	0.570	0.706	
			International training	0.492	0.701	

8.3.4 Compensation

A principal component analysis was developed for the six compensation items. Three items that show communalities lower than 0.40 were dropped from the analysis. The remaining data was reanalysed and revealed only one factor with an eigenvalue greater than 1, which explains 60.025 percent of the variance. Employees' capabilities and

performance are valuable factors that managers appear to reward in a short period of time. Therefore, this factor was named compensation based on performance. The loading factors and communalities for the retained items are shown in table 8.5.

Table 8.5: Factor Analysis Compensation

Factor	Eigenvalues	% of cumulated explained variance	Items	Commonalities	Loading Factors	Alpha
Compensation based on performance	1.801	60.025	Compensation based on performance	0.754	0.868	0.6310
			Important of capabilities for comp.	0.617	0.786	
			Compensation based on short-term	0.430	0.656	

Six factors were obtained from the principal component analysis. Three factors present an Alpha > than 0.5. 1) Technical Profile (0.5586); 2) Long-term approach to training (0.6980); and 3) Compensation (0.6310). These factors will be analysed in the following section, model test. The remaining factors' drop presents an inter-elements reliability 1) Psychological tools (0.3882), 2) Work-organisation (-0.2735); and 3) Structure (0.3962). Given the fact of lack in validity of these factors, they are excluded from the model test.

8.4 Model Test

The model test presents the MANOVA and ANOVA analyses. These statistical tests that were presented in chapter five assist the testing of the hypotheses proposed in this thesis. The following sections present the results obtained.

8.4.1 Multivariate Analysis of Variance –MANOVA

Table 8.6 shows the combined set of the three factors that are significantly related in the combined set of the two independent variables: country and levels of technology. The multivariate F statistics of that relationship are 20.444 (Country) and 2.057 (technology) significantly at the 0.01 levels using a Lambda Wilks criterion. Additionally, the results present a global interaction between the independent variables

1.807. This interaction signifies that the two countries do not present the same combinative effect of the independent variables on the HRM factors.

Table 8.6: Multivariate tests

Effect	Criterion	Value	*F*
Country	Lambda Wilks	0.515	20.444***
Levels of Technology	Lambda Wilks	0.834	2.057***
Country * Tech Levels	Lambda Wilks	0.852	1.807**

Notes: *p<0.10, ** p<0.05, ***p<0.01, ****p<0.001

Additionally, table 8.7 shows the multivariate analysis of variance test (MANOVA) for each of the three factors; which are statistical significant. 1. Recruitment and Selection, one factor (a) Technical profile; 2. Training, one factor: (a) Long-term approach to training; and 3. Compensation, one factor: (a) Compensation based on performance. Country and levels of technology are the independent variables. The MANOVA test was conducted to examine the main effects of country and levels of technology on the three factors.

Table 8.7: Multivariate Analysis of Variance

Dependent Variable	Multivariate F	R^2
Technical profile	4.406**	0.140
Long-term approach to training	4.656***	0.147
Compensation based on performance	2.283*	0.197

Notes: *p<0.10, ** p<0.05, ***p<0.01, ****p<0.001

8.4.2 ANOVA Test –Hypotheses Validation

Three Univariate analyses of variance tests (ANOVA) were conducted to examine the main effect of country and levels of technology on the three factors; table 8.8 presents the results.

Table 8.8: ANOVA Main Effect

Source	Dependent Variable	Univariate F
Country	Technical profile	1.104
	Long-term approach to training	3.843**
	Compensation based on performance	5.578**
Levels of Technology	Technical profile	8.152****
	Long-term approach to training	11.090****
	Compensation based on performance	1.205
Country * Levels of Technology	Technical profile	3.065**
	Long-term approach to training	3.207**
	Compensation based on performance	0.638

Notes: *p<0.10, ** p<0.05, ***p<0.01, ****p<0.001

Technical Profile

Table 8.8 suggests that there is an interaction between country and levels of technology for the technical profile factor ($p<0.05$). This result indicates that the impact of the levels of technology on the technical profile factor is not the same in France and England. In here the statistical evidence presents a different approach to recruitment and selection in France and England. This result partly supports the hypothesis H1, which states that there is a difference between France and England in their recruitment and selection processes. Therefore, each country is analysed separately. The ANOVA test performed in England does not present sufficient statistical evidence of the impact of the independent variable levels of technology for this factor. Thus, hypothesis H2 that states that technology-oriented firms will recruit employees with a more sophisticated profile and tools than low-tech firms is not supported in England. This result indicates that in England levels of technology does not shape the recruitment and selection policies and practices. Nonetheless, the ANOVA test performed on France presents a statistically significant effect of the levels of technology on the technical profile factor ($p<0.01$). The post hoc Scheffé test shows that high- and mid-tech French firms present higher mean values than low-tech firms ($p<0.05$), table 8.9.

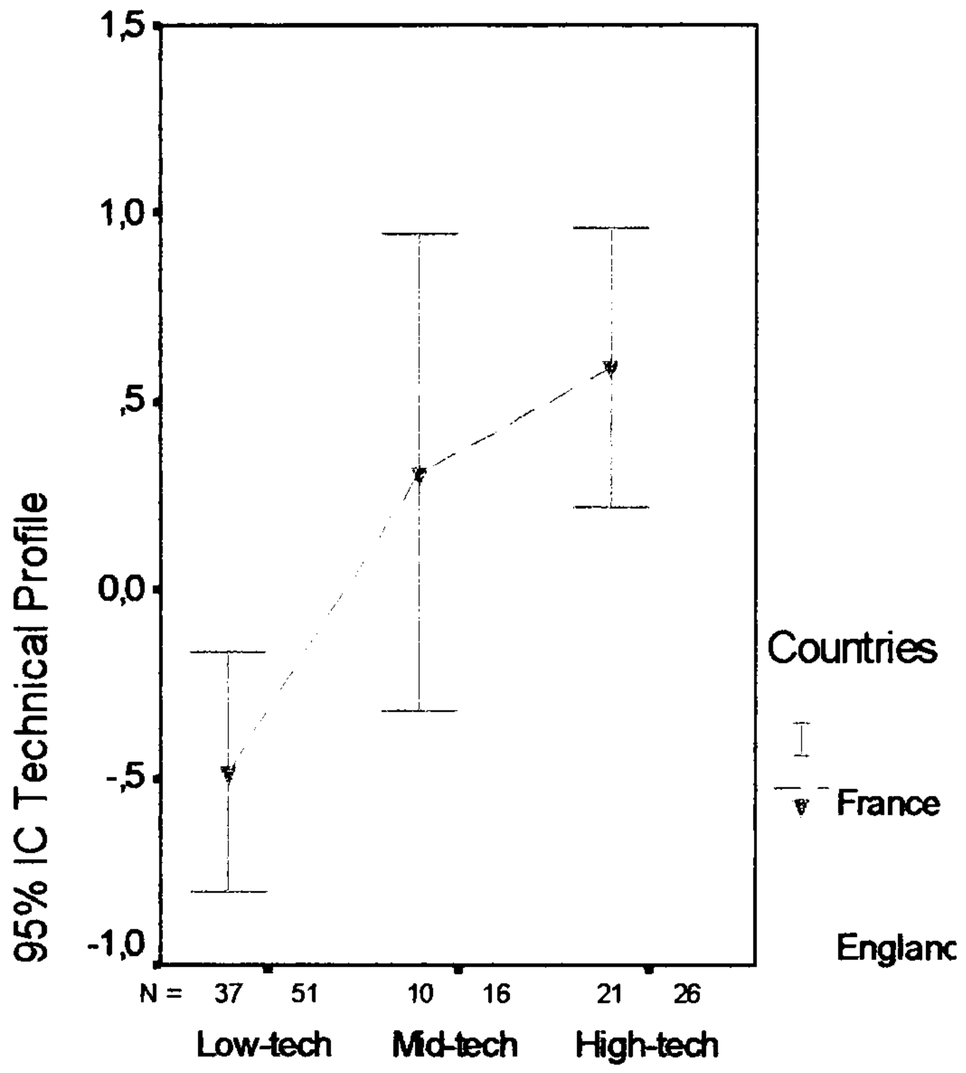
Table 8.9: France Technical Profile
Post Hoc Test Scheffé

(I) Levels of Technology	(J) Levels of Technology	Sig.
Low-tech	Mid-tech	(p= 0.056)*
	High-tech	(p= 0.000)**
Mid-tech	Low-tech	(p= 0.056)*
	High-tech	(p= 0.731)

Notes: *p<0.10, ** p<0.05, ***p<0.01, ****p<0.001

This result indicates that the variable levels of technology mould recruitment and selection in France; therefore hypothesis H2 is supported by the French sample. Figure 8.1 illustrates the results presented.

Figure 8.1: Technical profile factor



Long-term Approach to Training

The factor long-term approach to training presents an interaction between the independent variables country and levels of technology ($p<0.05$) table 8.8. Additionally, this factor presents a statistical difference in the two independent variables: country and levels of technology ($p<0.05$ and $p<0.001$ respectively). Thus, the intensity of the two independent variables (country and levels of technology) is not the same in France and England. This result partly supports hypothesis H5, which states that France and England will present a different approach to training. Therefore, each country was analysed separately. The ANOVA test performed in England presents a statistically significant difference between the three levels of technology ($p<0.01$). Indeed, the post hoc Scheffé presents a statistically significant difference between high-tech and low-tech firms ($p<0.10$), table 8.10 Higher means values can be observed for the high-tech firms, figure 8.2 Thus, the hypothesis H6 which predicts that there is a difference in the training practices between technology intensive firms and low-tech firms is validated in England. In addition, the ANOVA test performed on France shows a statistically significant effect of the levels of technology ($p<0.01$) on

the factor long-term approach to training. The post hoc Scheffé test shows two statistically significant differences: (1) high- and low-tech firms ($p<0.05$); and (b) mid- and low-tech firms ($p<0.05$), table 8.8. Higher means values are observed for the technology oriented firms that low-tech firms. Please refer to figure 8.2 for details. Thus, this result validates hypothesis H6.

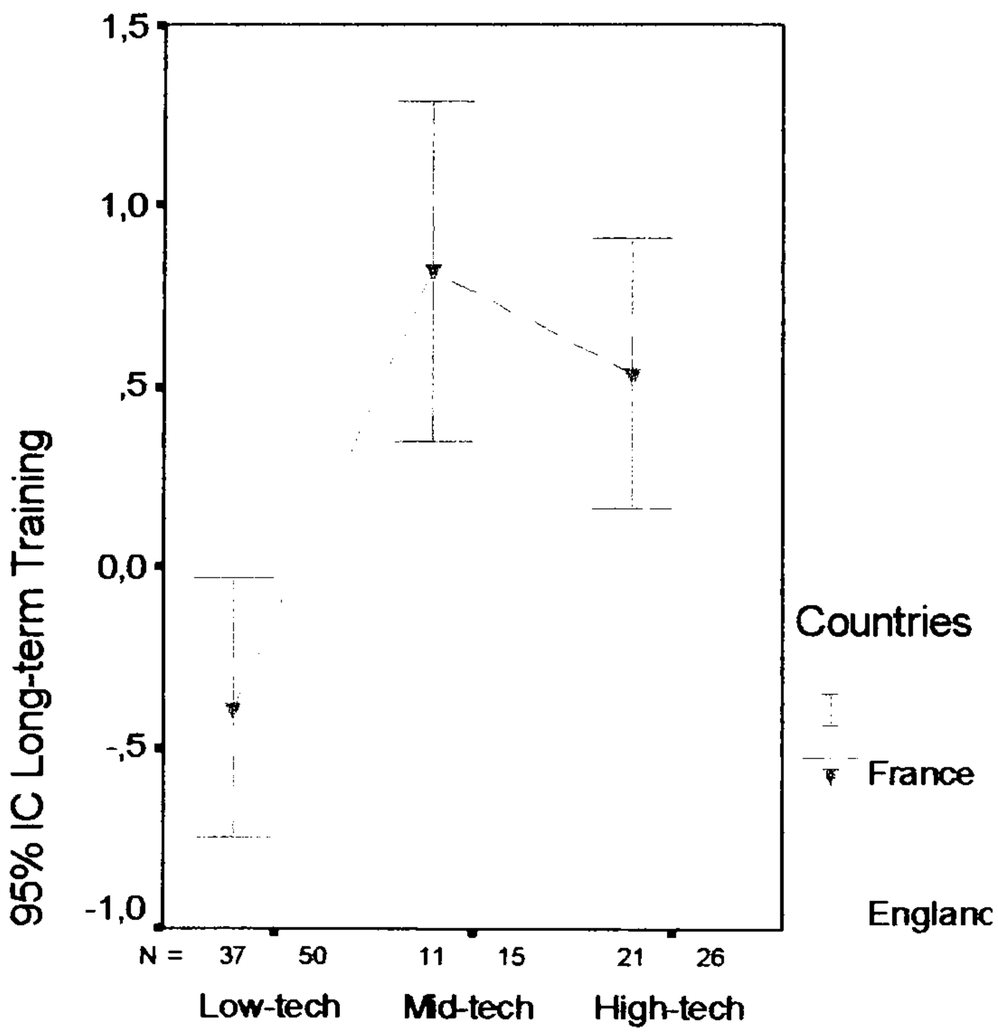
Table 8.10: Factor Long-term approach
Post Hoc Test Scheffé

(I) Levels of Technology	(J) Levels of Technology	France Sig.	England Sig.
Low-tech	Mid-tech	(p= 0.002)**	(p= 0.839)
	High-tech	(p= 0.003)**	(p= 0.078)*
Mid-tech	Low-tech	(p= 0.002)**	(p= 0.839)
	High-tech	(p= 0.721)	(p= 0.507)

Notes: *p<0.10, ** p<0.05, ***p<0.01, ****p<0.001

Furthermore, the factor long-term approach to training also presents a statistical difference in the variable country ($p<0.05$). An ANOVA test was performed for each level of technology. Only mid-tech firms show statistically significant differences between France and England ($p<0.05$). France exhibits higher mean levels than England. France tends to agree more than England on the factor long-term approach to training. This result supports hypothesis H5 which predicts that France presents a more structured training programme than England.

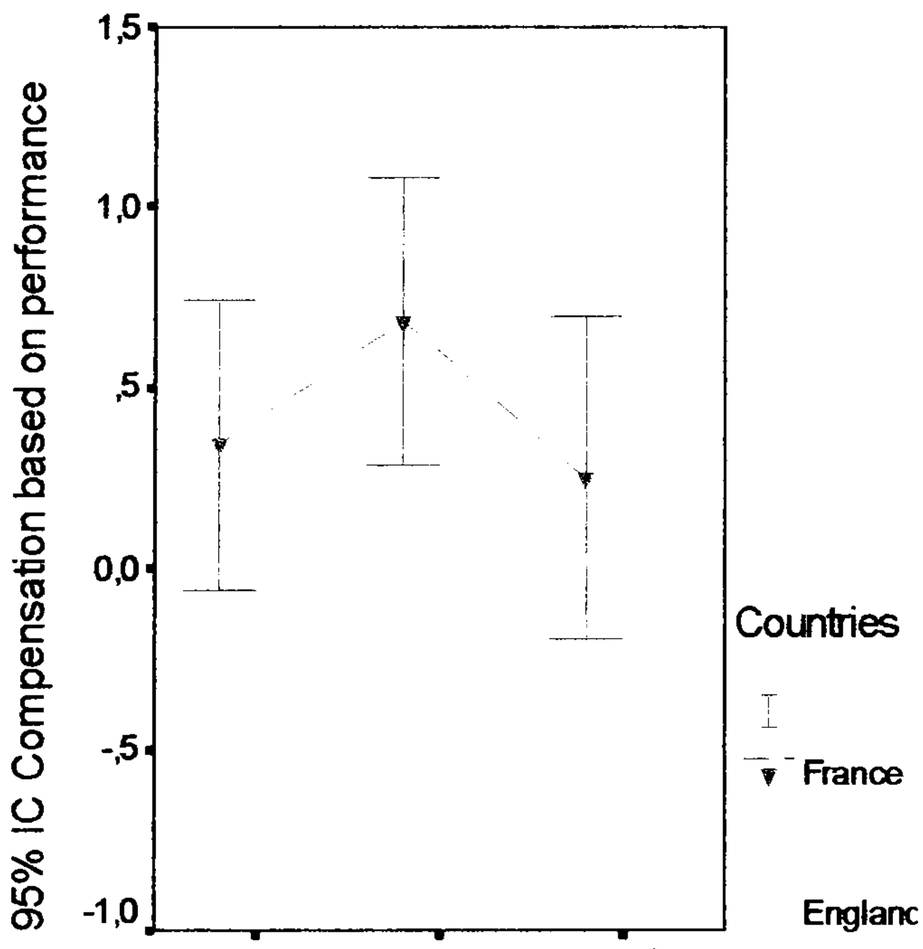
Figure 8.2: Long-term approach to training factor



Compensation Based on Performance

The last factor compensation based on performance does not present a statistical significant interaction (p= 0.628). Additionally, the independent variable levels of technology does not present a statistical significant difference (p= 1.205). Thus hypothesis H8 is not supported. This hypothesis predicts that technology intensive firms will present a more strategic approach to the compensation system than low-tech firms. According to these results, the technology intensive and low-tech firms study in France and England tend to present a similar tendency in the compensation based on performance factors. The technology variable does not totally mould this factor in England and France. The two countries show the same tendency in degree of direction for the factor compensation based on performance. However, the degree of intensity is not the same. Country is statistically significant ($p<0.05$). The ANOVA test performed between the three levels of technology in the sample shows two statistical differences between low-tech and mid-tech firms in France and England ($p<0.05$). France tends to show a higher mean score, see figure 8.3 for details. Therefore, hypothesis H7 which predicts that France would present higher levels of control for the compensation system than England is supported.

Figure 8.3: Compensation based on performance factor



8.5 General Discussion

Two factors have validated the country effect on HRMPP proposed here: 1) long-term approach to training, and 2) compensation based on performance. Hypotheses H5 and H7 are supported. On the other hand, the factor technology profile presents an interaction between France and England, which signifies that the effect of technology and country are different. Indeed, France presents enough statistical evidence to show variance between technological intensive firms and low-tech firms for the factor technological profile. Thus, hypothesis H2 is supported only in France. Finally, France and England present a statistically significant difference between the technological intensive firms and low-tech firms for the factor long-term approach to training; hypothesis H6 is supported.

According to the statistical results presented, both technological and country effect shape managers' behaviour in France and England. It could be argued that the country effect presents a stronger influence than the level of technology that the firm has on the HRM factors studied here. However, this thesis does not seek to claim primacy either for the cultural or technological factors. Rather, the results presented demonstrate how both culture and technology have an influence on managers' behaviour. Thus, the results presented here have modestly validated the neo-contingency hypothesis.

Neo-Contingency Hypothesis: *HRMPP are shaped by the level of technology that a firm has and by the country factors where the firm operates.*

This signifies that the understanding of HRMPP will be accomplished by analysing together country and technological factors. On the other hand, the factor technical profile, which presents statistically significant differences between the levels of technology only in France, supports the interviews developed in both countries. As a French HR manager explained: 'The French are obsessed with examinations'. French students are trained to take tests and the education system seems to support the validity of tests to measure students' capabilities. Thus, it is not surprising that that technological intensive firm will recruit employees with a more sophisticate profile

than low-tech firms is only validated in France. The results suggest that French HR managers agree more than their British counterparts on a 'sophisticated' selection process. These results demonstrate that HR in France present higher levels of centralisation and control in the recruitment and selection process than in England. The differences presented between France and England in their education systems illustrate the differences found between these two countries. This evidence also gives support to the fact that technology intensive firms would place emphasis more on soft-skills training than low-tech firms, which is statistically supported in France and England. An explanation for this evidence is given by Lepak and Snell (1999). He argues that firms in specialised sectors, which are competitive, need to develop strategic career development and training programs in order to build a specialised work-force that could compete in the marketplace with innovative products and services. On the contrary, low-tech firms do not require high levels of investment in these HRMPP because their workers possess a public knowledge that can be purchased in the labour marketplace. Upon developing the interviews in England, it was found that in-house training at the firms is the means used to fill the gap between the low attendance levels of the formal education system by the British. Therefore, for the three levels of technology England-based firms do not present statistical differences for the factor technical profile.

HRM cases dropped from the principal component analysis:

Although the factor analysis helped to reduce the number of HRMPP items which helped to provide a macro-view of the balance between the contingence and divergence approaches studied here, it was necessary to drop six out of twenty-tree HRMPP cases: 1) Operational Procedures, 2) Training within the firm, 3) Complexity in job definition, 4) Equivalent Salary, 5) Freedom for the staff to develop a compensation system, and 6) Flexibility of the compensation system. Additionally, three factors were not included in the model test due to a lack of internal reliability: 1) Psychological profile, 2) Work-organisation and 3) Structure. Nonetheless, the set of interviews developed in France and England provides strong support for the different approaches of these HRMPP dimensions under the neo-contingency perspective. The following section will present the results from the interviews, reflected with the

support of the academic literature which could be addressed in future neo-contingency research.

Firstly, complexity in job definition was the organisational policy dropped from the factor analysis. This practice refers to the difficulty in defining jobs because they are in a constant state of flux. This could be explained as technology changes rapidly, thus it could affect job definition. However, the interviews developed gave an indication of other reasons for the fact that jobs are in a constant state of change. For example, the actual business dynamic requires flexible work-units, where employees encounter new methods of work organisation because of new quality processes and re-engineering of the firm, among other factors that do not necessarily imply technology change in the work-units. On the other hand, the organisational factors which were not included in the model test seem to have both a strong country and technology influence. These factors gave indications in the literature reviewed of these effects that future neo-contingency research should address. For example, work-organisation and structure factors, the academic literature puts forward that the level of bureaucracy and hierarchy tend to be higher in France than in Britain (Crozier, 1976; Crouzet, 1990; Maurice *et al.,* 1980). Additionally, the Hofstede-type approach (1990, 1993) suggests that France tends to be a collective country contrary to the individualistic feature found in Britain. Moreover, at the school level, the French learn to construct reality in terms of orderly hierarchies, while the British learn to do so in a less controlling, more individualistic way (Calori *et al.,* 1997: 687). Therefore, the work-organisation factor appears to reflect a pattern of social interaction learnt at school level in France that seems to be collective. On the contrary, the British seem to learn at schools in a less controlling and more individualistic way than in France. Therefore, it is plausible to argue that British managers, regardless of the firm's level of technology, tend exercise empowerment, which is a reflection of their earlier educational experience. These evidences should be tested statistically in future neo-contingency research projects.

Secondly, the two training policies and practices dropped in the factor analysis were: 1) Operational Procedures which refer to training programmes that emphasise repetitive operational procedures; and 2) Training with the firm which refers to providing employees with opportunities to learn new skills from other departments

within the firm. The statistics of educational attendance indicates that France seems to have higher levels of students at university level than Britain (OECD, 1999). The interviews held in both countries demonstrated that to some extent in Britain it is 'normal' to find a 'blue-collar' job without a specific qualification. In France, it seems that employees after obtaining the CAP or BEP certificates (vocational or technical education), the minimum employee qualification, they get a job position. Indeed, in France formal qualifications are common in both small and large firms, while in Britain there are very formally qualified workers in small plants (Senker, 1992: 99). It is plausible to argue that British managers could not expect to find qualified workers, foremen, and staff personnel in sufficient numbers on the labour market; therefore, they had to qualify their personnel themselves. They solve this task by adopting the apprenticeship system, in-house training. It seems that in Britain this system is still in existence on much larger scale than in France. The French would prefer state-run schools to do the training of supervisors and key workers (Kieser, 1994: 610). An explanation for this difference is that traditionally in France formal training takes place outside the organisations (König and Müller, 1986). To a large extent in Britain employers are themselves responsible for educational outcomes, in order to fill the gap of the formal school-education given through national institutions. To some extent the academic literature together with the interviews developed give support to the differences between France and England in these two HRMPP, which could be included in a future neo-contingency research agenda.

Finally, three compensation policies and practices were dropped from the factor analysis: 1) Equivalent Salary, which refers to a policy of an equivalent compensation system between a scientific employees working on R&D and a manager; 2) Freedom for the staff to develop compensation, which means that managers responsible for a division/business unit could have the freedom to develop their own payment system; and 3) Flexibility of the compensation system which refers to the capability of the compensation system to react to the competition within the market place. The cultural differences between France and England analysed in this thesis show that France seems to present higher levels of centralisation, bureaucratisation and control than England. It would have been expected for firms located in England to present higher levels of freedom for their managers in developing their compensation system than in

France. Nonetheless, the interviews developed in both countries in this respect show that French managers are more involved in employees' salary negotiation that their British counterparts. Therefore, it is plausible to argue that although French managers do not have the 'freedom' to develop their employees' compensation system, they feel more involved in this practice than the British managers since French managers could suggest the amount of the salary increase, based on the fixed salary range given by the French companies.

8.6 Final Remarks

Although the results presented in this chapter are complex and subject to a variety of interpretations, a number of rather clear features of our data have theoretical implications and suggest directions for continued research in this area. The balance between the convergence and divergence theories that results from the analysis of the statistical analysis presented under the neo-contingency perspective is differentiated but clear. The findings indicate a mixture of universal regularity and divergence that literature does not directly address. On the one hand, the difficulties of the traditional contingency theory being static and without a relation between the contingency variables have been partly resolved by the empirical result presented in this chapter. In addition to this, the national influences on HRMPP are strongly supported by the statistical analysis presented. It is plausible to argue that the factors which support the national differences between France and England are less closely related to the contingency variable 'technology' and more closely related to managers' sentimental and cultural patterns which are learned from their earlier experience at school (e.g. Calori *et al.*, 1997). Of course, one might wonder whether the country-of-origin effect is an explanatory variable in its own right or whether it is simply a proxy for other causal factors that happen to differ between countries (e.g. Ferner, 1997; Harzing and Sorge, 2003).

Nonetheless, it is hoped that future research with large random samples is forthcoming. Also, it would be important that future studies should present a more sophisticated way to operationalise the contingence and divergence variable; with revised research instruments. Perhaps firms' size and strategy could be studied together with their level of technology taken from here with quantitative data on the

social-cultural environment to triangulate results and provide new insights. Nevertheless, despite the limitations, it is hoped that this research will highlight the possible ways in which national and organisational variables might interrelate and offer some directions for future research.

Chapter Nine: Concluding Remarks: Towards a Neo-Contingency Theory of Technology, Culture and HRMPP.

9.1 Introduction

This thesis demonstrates that certain HRMPP present a close relation to technology and others to national institutions. This thesis supports the contingency theory which states that there is no single best way for a firm to organise itself (e.g. Woodard, 1965, Thompson, 1967; Donaldson, 2001). On the other hand, this study gives sufficient evidence to the importance of cultural and national institutional factors where a firm operates by contributing to its internal organisation, which supports the divergence theory (e.g. Child, 1972a; Gallie, 1978; Maurice *et al.*, 1980 and 1986; Gooderham *et al.*, 1999; Tremblay and Chênevert forthcoming). Therefore, the neo-contingency perspective proposed here is fairly supported.

The results presented in this thesis challenge those researches that have argued in favour of either the country –cultural approach or the industrial sector – contingency perspective to explain HRMPP in cross-national research; for example, O'Reilly (1992); Gooderham *et al.*, (1999); Tremblay and Chênevert (*forthcoming*). However, one of the main purposes of this thesis is not to claim primacy for either the cultural or industrial sector –technology perspectives. As Nelson and Gopalan (2003) discuss, convergence and divergence theoretical perspectives represent two opposing intellectual tendencies in academic thought, and they also clash in practice. Therefore, this thesis has analysed the contingency approach by reconciling it with the divergence theory which would lead to the neo-contingent theory proposed by Miles and Snow (1978), Sorge and Maurice (1990) Donaldson (2001). Then, enhancement of the neo-contingency perspective could be developed.

The neo-contingency theoretical approach developed in this thesis is grounded on technology, culture and HRMPP. This theoretical perspective directed the development of the research questions of this thesis.

Research questions:

1. What is the relationship between a firm's technology and its HR policies and practices?
2. How different would this relationship be (HR & technology) from that of firms located in different countries?

By analysing the above research questions, this thesis proposes to move from the *naïve* traditional approach of the contingency and divergence theories which are traditionally based on a one-dimensional variable effect on HRMPP. Additionally, the theoretical analysis presented directed the neo-contingency hypothesis proposed in this thesis:

The balance between convergence and divergence that results from the analysis of these research questions under the neo-contingency hypothesis is differentiated but clear. The findings in this thesis indicate a mixture of universal regularity and divergence that literature does not directly address.

This chapter reviews the major conclusions from each of the research questions listed above; which helped to validate the neo-contingency hypothesis. Firstly a summary of the statistics analysed is presented. Then, the strengths and weaknesses of the methods used in this study are explored. Thirdly, the implications for the theory and practices that the findings reported here contribute are discussed. Finally, recommendations for future agendas in neo-contingency research are presented.

9.2 Summary of the findings

9.2.1 The HRM Survey and Interviews

The Principal Component Analysis helped to cluster the twenty-three items into six factors: 1) psychological profile, 3) technical profile, 3) long-term approach to training, 4) work organisation, 5) structure; and 6) compensation based on performance. However, only three factors present a strong internal reliability and were further analysed in the model test in order to test the hypotheses: 1) technical profile, 2) long-term approach to training, and 3) compensation based on performance.

The technological aspect of the neo-contingency approach is validated in two factors: 1) technological profile and 2) long-term approach to training. France presents enough

statistical evidence to show variance in the level of technology variable for the factor technological profile; it was not possible to validate this finding with the British sample. Furthermore, France and England present statistically significant differences between the technology intensive and low-tech firms for the factor long-term approach to training.

The cultural aspect of the neo-contingency approach is notable in two cases: 1) long-term approach to training, and 2) compensation based on performance. These HRMPP have shown support for the divergence theory, which is highly consistent in the two countries. Thus, the results presented here have modestly validated the neo-contingency hypothesis:

Neo-Contingency Hypothesis:

HRMPP are shaped by the level of technology that a firm has and by the country factors where the firm operates.

This signifies that an understanding of HRMPP will be accomplished by analysing together the country and technological factors. According to the statistical results presented, both the technological and cultural factors shape managers' behaviour in France and England. It is plausible to argue that the HRMPP that support the cultural differences between France and England are less closely related to the contingency variable 'technology' and more closely related to managers' sentimental and cultural patterns which are learned from their earlier experience at school (e.g. Calori *et al.*, 1997). However, this thesis does not seek to claim primacy either for the cultural or technological factors. Rather, the results presented demonstrate how both culture and technology make an influence on managers' behaviour.

The factors which present differences between France and England support the interviews developed in both countries. As a French HR manager explained: 'The French are obsessed with examinations'. French students are trained to take tests and the education system seems to support the validity of tests to measure students' capabilities. Thus, it is not surprising that the fact that technology intensive firms will recruit employees with a more sophisticated profile than low-tech firms is only

validated in France and that French HR managers agree more than their British counterparts on a 'sophisticated' selection process. These results demonstrate that HR in France present higher levels of centralisation and control in the recruitment and selection process than in England. However, it is also important to highlight the impact of the level of technology that a firm has on shaping HRMPP. France and England presented statistical evidence that their technology intensive firms will place more emphasis on a long-term approach to training than low-tech firms. Additionally, the French mid-tech firms agree more than the British mid-tech firms on this factor. The differences between France and England in their education systems presented in chapter three illustrate the differences found between these two countries. Additionally, training is regarded as an important public policy issue because it is often cited as one (if not the) explanation for England's relatively low level of labour productivity (Cully, 1999).

Indeed, it was found in the interviews conducted in England that in-house training at the firms is the means used to fill the gap between the low attendance levels of the formal education system by the British. On the contrary, tight control of the educational system and the power distance from professor to students at schools in France delineate some of the major differences between these two countries (e.g. Rose, 1985; Crouzet, 1990, OECD, 1998 and 1999). These differences might be a reflection of how managers in both countries have internalised their earlier experiences at school and thus apply higher employee supervision in France as opposed to England, for example. France seems to prefer higher levels of control and formalisation of HRMPP than in England. Indeed, the twenty-five interviews conducted in eight firms located in France and England provided insight for further analysis of HRMPP.

9.3. The Methodology of the Research

9.3.1. Strengths

This thesis has presented a new perspective in management studies: the neo-contingency approach. Technology and cultural perspectives were considered simultaneously in their impact on HRMPP. The number of organisation units studied is sufficient to provide reliable results.

Technology measured by three levels of technology, high, mid and low-tech, provides a better understanding of this contingency variable in management studies. This technology classification provides a new perspective that challenges the oversimplification of the technology concept that traditionally describes a firm according to the type of production system as unit and small batch, large batch and mass production (e.g. Woodward, 1965). Therefore, the analysis of technology at the firms' level of analysis by case studies with different criteria such as (1) organisational structure in terms of number of employees per department, (2) turnover spent on R&D, (3) industrial classification, and (4) firm's main activity; provided a full understanding of the different firms analysed in this thesis.

On the other hand, illustrating the French and British cultural differences by the educational dimension has provided a better understanding of managers' behaviour. Because managers' early experience at school tends to influence the way they apply management policies and practices to real situations (e.g. Calori *et al.*, 1997)

Additionally, the methodology was designed in order to observe divergences and convergences in the HRMPP selected in firms operating both in France and England in the three levels of technology. Quantitative data analysis was complemented with diverse semi-structured interviews, which helped to understand and provide tentative conclusions. Although the kind of research presented here requires studying almost everything because any element may turn out respectively to be a cause in the on-going interaction between contingencies and divergences (e.g. Donaldson, 1997). The main variables chosen for validating the neo-contingency approach seem to be appropriate.

9.3.2 Weaknesses and limitations

This study presents certain limitations. First, although the sample was tested for internal validation with respect to the database, it undoubtedly presents a limited number of cases, one hundred and sixty-three firms from the HRM-questionnaire. Nonetheless, the eight firms where semi-structured interviews were conducted provide tentative validation for the neo-contingency perspective. The main two reasons for this drawback were the fact that the author of this thesis encountered research limitations

and inaccessibility in obtaining the required information from the firms in the sub-sample. However, to some extent this may reflect inadequacies in the measurement employed or the variables investigated. Thus, future work on refining methods of the relation between HRMPP under the neo-contingency approach proposed in this thesis would be useful. Therefore, additional data from a large sample size would enhance the generalisability of the findings.

Another important limitation discussed is the instrument's reliability. The factor analysis helped to reduce the number of cases to six factors. However, only three cases present a strong Alpha Cronbach Reliability: 1) Technical Profile; 2) Long-term approach to training; and 3) Compensation based on performance, which were included in the model test. The factors dropped from this analysis due to a lack of internal reliability in their items were: 1) Psychological profile, 2) Work-organisation and, 3) Structure. Although the results discussed in this thesis support the neo-contingency hypothesis, the factors dropped from the model test analysis challenge the validity of these results, especially in terms of the validity of the instrument developed in this thesis. A close revision of the instrument developed here must be taken into account in future research projects in order to provide stronger support for the neo-contingency approach proposed in this thesis.

Additionally, the HRM questionnaire is an instrument that is susceptible to misinterpretation. Some of the questions in both instruments tend to evoke sentiments, which could be problematic when a respondent is likely to have a strong feeling about a question (Steensma *et al.,* 2000). Furthermore, the HRM questionnaire did not include legal differences between France and England, which may influence HRMPP and a particular firm's performance. Therefore, the findings must be interpreted cautiously. The possibility of errors being introduced into the data out of ignorance or the perception of the respondents calls for caution in data validation and in its interpretation.

9.4. Implication for Theory

The tentative interpretation of the evidence for neo-contingency helps to explain the emergence of a comparative advantage on the basis of HRMPP, organisational

patterns and the embeddedness of types of firms in the French and British economic and social structures.

Additionally, analysing the neo-contingency approach empirically has provided a new perspective to management studies. On the one hand, the difficulties of the traditional contingency theory being static and without a relation between the contingency variables and HRMPP have been partly resolved by the empirical result presented in this thesis. Further, the high and mid tech firms investigated give evidence that R&D is a source of new products and processes, large investments that will promote greater external change, and variability for an organisation in a given industry. Indeed, a higher level of R&D effort creates a wider and more complex range of relevant knowledge, and employs the services of a greater variety of disciplines and more specialised personnel, it will also add to the complexity of the environment, especially the national location where a firm operates. On the other hand, managers' internalised cultural values can create an entirely different atmosphere in similar structures and systems (Locke, 1985: 205). The point is that the HRMPP that support the neo-contingency approach are not only important to managers in both England and France, but they are culturally rooted in the educational traditions of each country, and the effect that they have on managerial and organisational adaptability differs at the corporate and operational levels according to the firm's internal and external contextual-factors.

It is important to highlight that the firms studied in this thesis, which operate in different industrial and national settings, try to implement innovations in their HRMPP. This tendency is understandable, as Pfeffer (1998: 96) concluded: "It is difficult enough to change some aspect of the compensation system without also having to be concerned about training, recruitment and selection, and how work is organised". Implementing practices in isolation may not have much effect, however, and under some circumstances, it could actually be counterproductive. For instance, increasing the firm's commitment to training activities will not accomplish much unless changes in work organisation permit these more skilled people to actually implement their knowledge. If wages are comparatively low and incentives that recognise enhanced economic success are lacking, the better-trained people may

simple depart for the competition. Implementing work teams will probably not, by itself, accomplish as much as if the teams received training both in specific technical skills and team processes, and it will have less effect still if the teams are not given financial and operating performance goals and information. "Whatever the bundles or configurations of practices implemented in a particular firm, the individual practices must be aligned with one another and be consistent with the organisational architecture if they are ultimately to have an effect on firm performance" (Becker and Gerhart, 1996: 786).

However, the question to be raised is how widely applicable the neo-contingency perspective analysed is to organisations. Because the theory was constructed by trying to formulate generalisations from which the empirical findings on HRMPP can be derived, the fact that these data partly conform to the propositions on the neo-contingency perspective does not constitute a test of this perspective. There are different studies that have empirically tested the validity of the contingency perspective (e.g. Woodward, 1965; Lawrence and Lorsch, 1967; Perrow, 1967, Aston group (reported in Hickson 1969); among others). Additionally, other studies have tested empirically the validation of the divergence-type theory (e.g. Gallie (1978); Aix-en-Provence Group: Maurice *et al.*, 1980, 1986, 1990); and others have tested the contingency theory and culture perspective (e.g. Tayeb, 1987; Harzing and Sorge, 2003). Nonetheless, this independent test partly confirms the research questions implied by the theory. Whether the HRMPP that provide tentative support for the neo-contingency perspective are also valid for high, mid or low-tech firms operating in other countries, and how they must be modified or redefined to make them widely applicable, only further research can tell.

9.5. Implications for Practitioners

One of the challenges of this thesis is to communicate effectively to practitioners the findings discussed here and their implications for managers' day-to-day challenges in workplaces. On the one hand, powerful forces of economic and technological changes have strained to immerse managers in their daily work activities and little effort has been made to be aware of the contexts (internal and external) where their firm operates, in order to plan and exercise the HRMPP that would be a better match with

their firm's contexts. Furthermore, these turbulent global economic, political and societal challenges have definitively changed the way businesses operate. For example, IT technology is no longer a competitive advantage for a company. Firms around the world utilise IT systems in order to improve their management practices. However, employees are the key element that makes a difference in a firm. Therefore, culture seems to be a major driving force in shaping management practices. The French and British firms analysed have shown uniqueness in HRMPP that are explained based on the differences in their educational systems that practitioners should be aware of.

The most immediate practical implications of this thesis are likely to be for managers of national or multinational and multicultural organisations located in France and England with the three different levels of technology: high, mid and low-tech firms. At the macro level, this thesis draws the attention of managers to potential and actual advantages of national context to their business, as well as to technology context within their organisations. It also enhances the managers' awareness of the significant roles of the educational systems which mould certain HRMPP. This awareness helps the managers to understand their workforce better and devise appropriate means of handling its diversity at the micro level. For example, it would pointless for a low-tech firm to apply a policy of long-term approach to training to their employees. However, according to the results presented here, this practice could be acceptable in both France and British high-tech firms. Nonetheless, a difference is also observed between these two countries. Mid-tech firms present higher mean values in France than in England. These differences are grounded on the school education system that differs between France and England. The French system presents a close governmental control. Additionally, paternalism in France is observed as professors tend to lecturer to their students under a high power distance and, exercise close control (Hofstede, 1991; OECD, 1998 and 1999). These French patterns are contrary to the British. Thus, managers need to be aware of the national context where they work in order to apply an effective management policy and practice that will not confront the national context where the firm operates. One option would be to take French and British employees' cultural backgrounds into consideration when devising training and development strategies.

Another course of action for high and mid-tech firms located both in France and England would be to build up a strong organisational culture and create a more or less homogeneous values system to which employees will be encouraged to subscribe. Selection procedures can be devised to recruit new employees with the kind of values and preferences that are compatible with the prevailing high-tech and mid-tech organisational environment. For example, utilising net-recruitment and training employees in soft-skills capabilities that would lead employees to build an integral career development within the firm, as well as ensuring that the firm has an equal career development plan, could create an organisational culture that high and mid-tech firms in France and England seek to obtain. These practices could help to create in high and mid-tech organisations a humanware with a strong commitment culture of "innovation, science, and research" (Cascio, 1988).

One of the conclusions of the different approaches to HRMPP found between high, mid and low-tech firms located in France and England advocates that employees working in intensive technology firms need a creative and adaptive HR management approach, which could enable them to cope with the challenge that the current business environment demands. The results also suggest that HRM is a dynamic management function, where certain practices tend to exhibit the same importance for firms operating with different levels technology and in different countries. Thus, the HRMPP that support the neo-contingency approach extracted from the academic literature may not be exclusive for high, mid or low-tech firms located in a specific country.

It is also important to note the effect of the country where a firm operated. Differences were found between France and England in their operation of certain HRMPP. Of course one might wonder whether the country-of-origin effect is an explanatory variable in its own right or whether it is simply a proxy for other causal factors that happen to differ between countries (e.g. Harzing and Sorge, 2003; Ferner, 1997). Although the development of the neo-contingency approach offered the analysis of some of these variables: industry sector, level of technology, R&D department and size (number of employees), they had only a partial impact on the extent or significance of the firm's national location effect. Further, and this is the cornerstone

of this thesis, there is not much point in reasoning the differences of the divergence and contingency variables separately, because some of the differences may themselves be explained in terms of the national educational institutions that a country has, that in turn shapes managers' and practitioners' HRMPP.

Another important implication for practitioners of this study is that there are large differences in virtually every field investigated in European countries. The emergence of supranational government and rule-making has not led to a convergence within France and England. Although Europe is becoming more significantly integrated economically and politically, this has not resulted in a similarity of management practices for the Anglo-French sample analysed in this thesis.

9.6 Recommendations for Future Research

It would be important for cross-national research that future research with large, random samples is forthcoming. Perhaps studying firms' size and strategy together with their levels of technology taken here with quantitative data on social-cultural environment to triangulate results and provide new insights. Nonetheless, this study supports the hypothesis that HRM is a dynamic function that adapts itself to the requirements that a firm demands. Managers tend to decide on the best HRM bundles that match the organisation's relationship with its internal and external environment.

The changes in the business dynamic of how educational systems, technology and HRMPP are applied according to the firm's uniqueness should be interpreted and this lesson has to be applied in the explanation of variety on a world scale. HRMPP are a dynamic function and managers have to be inventive and creative when applying them according to the contextual and environmental circumstances where a firm operates. This more general finding, which of course needs more research and corroboration, lends more weight to the view that societal institutions constitute 'different but equal' practices. From this picture, a notion of universal state-of-the-art HRM policy and practice cannot be ascertained and demonstrated. Societal context and domestic economic strengths appear to define a particular 'rationale' of HRMPP that a firm puts into practice.

Finally, on the basis of the findings and their interpretation, there is a strong need for more empirical research into the neo-contingency approach proposed in this thesis. A lack of systematic empirical research in cross-national research on HRM under the neo-contingency views has created several myths. The field of international management is, unfortunately, full of partial insights blown up into conclusions that exceed the methodological foundations on which they stand (e.g. Harzing and Sorge, 2003). A firm's level of technology and the particularity of the national educational system where a firm operates appear to be stronger than suggested in their effect on certain HRMPP. They may both be rooted in origin. To further explore these nexus through more detailed research could be on the agenda for the future.

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Appendix 1:

Technology Definitions

Table 1: Technology Definitions

Author	Definition of Technology	Level of Measurement	Type and number of organisations	Methods of data on the technology variable
Woodward 1965	Theoretical: Technical complexity. Operational: Classification of firms according to type of production system (unit and small batch, large batch and mass), continuous process. Dimension of technology measured: production process.	System	Manufacturing firms, *N*= 100	Observations and interviews with managers.
Lawrence and Lorsch 1967	Technological: Certainty of task environment. Operational: Clarity of information, certainty of cause and effect relationships, time span of feedback. Dimension of technology measured: Knowledge.	System	Industrial firms, *N* = 10	Interviews with senior executives; questionnaires to managers.
Bell 1967	Theoretical: Job complexity. Operational: Predictability of work demands, number of difficult tasks performed, amount of discretion and extent of responsibility.	Individual	Departments in one community hospital, *N* = 30	Observation, interviews, and a questionnaire to all full-time day staff, *N* = 171
Rushing 1968	Theoretical: Hardness of material. Operational: "Ease with which a substance can be pierced, penetrated or broken". Dimension of technology measured: Raw materials	System	Classification of manufacturing industries on the basis of census data.	
Meissner 1969	Theoretical: Technical conditions of work. Operational: Production processes of conversion and transfer. Dimension of technology measured: Production processes.	System	The author analysed 32 previously published case studies of work in industrial settings.	
Aston group (reported in Hickson 1969 *et al.*,)	Theoretical: Techniques the organisation uses in its workflow. Operational: Automation of equipment, rigidity of workflow sequences, interdependence of workflow segments, and specificity of evaluation. Dimension of technology measured: Operations and production processes.	System	Manufacturing firms, *N*= 31, Service organisations, *N*= 15.	Interviews with chief executives and department heads.

Author	Definition of Technology	Level of Measurement	Type and number of organisations	Methods of data on the technology variable
Hage and Aike 1969	Theoretical: Routineness of work based on Perrow's model. Operational: "Routineness" factor composed of five questions. Dimension of technology measured: Overall routineness	Individual	Social welfare and health agencies, N= 16	Structural interviews with a stratified sample of all professional staff.
Fullan 1970	Theoretical: "Manual and machine operations performed on an object in this process of turning out a final product". Operational: Classification of firms according to production system: craft, mass production, and continuous process. Dimension of technology measured: Production processes.	System	Manufacturing firms, N=12	Author classified firms into the three categories of technology.
Zwerman 1970	Theoretical: Technical complexity (designed to replicate Woodward's, 1965).	System	Manufacturing firms, N= 55	Interviews with managers.
Morse 1970	Theoretical: Certainty of the task environment based on Lawrence and Lorsch, 1967. Operational: Routineness, predictability, certainty of unit's work. Dimension of technology measured: Raw materials and knowledge.	System	Industrial firms, N= 2, Communications firms, N= 2	Interviews and a questionnaire to top executives.
Perrow 1970	Theoretical: Exceptional cases encountered in the work and the required search behaviour. Operational: "Non-Routineness" factor composed of four questions. Dimension of technology measured: Raw materials and knowledge.	Individual	Manufacturing firms, N= 14	Self-administered questionnaire to all employees above the rank of foreman, N= 2633
Blau and Schoenherr 1971	Theoretical: Technological innovation. Operational: Automation of equipment: Number of computers and input/output units; Number of electric typewriters. Dimension of technology measured: Operations.	System	State employment security agency, N= 53, Local offices N= 1201	Documents: rental invoices of data-processing facilities and inventories of other technical equipment.

Author	Definition of Technology	Level of Measurement	Type and number of organisations	Methods of data on the technology variable
Mohr 1971	Theoretical: Manageability of task and materials. Operational: Uniformity, complexity, and analysability of material, Routineness of task interdependence, noise level. Dimension of technology measured: Raw materials, operations, production processes.	Individual	Work groups in thirteen local health departments, N= 144	Author assigned the work groups to eight categories based on level of Routineness: Experts rate work groups on basis of written task descriptions. Questionnaires to supervisors and subordinates.

Appendix 2:

Measurements and General Testing Approach

2.1. Testing and Back Translation to the HRM-Related Questionnaire

This section lists the questionnaire's revision carried out by my colleagues at Newcastle University, my Supervisor Professor McLoughlin, the Statistics expert and the HR managers in England. These revisions were very productive. They allowed me to single out various problems with the questionnaire, such as: (a) questions that did not make sense in English, (b) questions that were too complicated to understand and (c) questions that were too general and would not lead me to draw conclusions.

Questionnaire Section I

Q.1- Into which Industry Sector does the firm fall? (For example: Equipment manufacturing, pharmacy, service, software development, etc.)

Observations / Change Subjected:

In the UK all businesses have a standard numerical reference code called The Standard Industrial Classification, or SIC. "If you wish to have this information as an aid to correct classification of the Industry Sector, you should ask the firms for their SIC number".

Q.3- What percentage of the Organisational Structure falls into these criteria?

a. Directors: _____ b. Managers: _____
c. Engineers: _____ d. Technicians: _____
e. Manuel Workers: _____ f. Others: _____, please specify.

Observations / Change Subjected:

✓ Delete "this criterion" and replace with "the following categories".

Q.5- How many people who work in the R&D area have the following degree?

Observations / Change Subjected:

✓ At the end of the question add the words "or similar qualifications".
✓ What percentage of... much easier for respondent to answer.

Questionnaire Section II

Q.8- The company tends to employ a workforce, which has skills that are intangible or difficult to measure, such as the ability to work in a team-based system, commitment to work, flexible and good interpersonal relations.

Observations / Change Subjected:

✓ Replace the word "flexible" with "innovation, flexibility, problem solving capability".

Q.9- We have a strong orientation towards the use of Internet Advertising for recruiting employees.

Observations / Change Subjected:

✓ Delete "have a strong orientation towards the" and "of".

Q.10- **From the following employee classification, please inform us the percentage of employees recruited by Internet, in the last 6 six months.**

a. Directors: _____ b. Managers: _____

c. Engineers: _____ d. Technicians: _____

e. Workers: _____ f. Others: _____, please, specify

Observations / Change Subjected:

✓ Change "classification" to "categories" and "inform us" to "give". Line (e) should read "manual workers".

✓ Change the first lines to "Please estimate the percentage of the following type of...".

Q.11- The company has a strong preference for using Assessment Centres in the selection process of new employees.

Observations / Change Subjected:

✓ Replace "has a strong preference for using" with "uses".

Q.13- Could you specify the overall employees' profile in your organisation?

Observations / Change Subjected:

✓ Consider replacing this line with "please describe the attributes of your ideal job candidate".

✓ Not clear at all what do you mean by 'profile'.

Questionnaire's Section III

Q.14- For the company it is very important to design training programmes that focus on developing 'soft-abilities', for example: interpersonal relations, communication, working as a team and innovation.

Observations / Change Subjected:

✓ Replace "soft-abilities" with "soft skills/capabilities". Replace "working as a team" with "skills, team working". Following on from "innovation." Add the words "and problem solving capabilities".

Q.17- For some positions we design training, which focuses on following strict operational rules, such as how to deal with machines, as well as working with materials.

Observations / Change Subjected:

✓ Replace "rules" with "procedures" and replace "deal with" with "operate".

✓ Why just 'some positions'?

Questionnaire's Section IV

Q.21- The company has a flat structure; there are not more than two levels from top-managers to the bottom level.

Observations / Change Subjected:
- ✓ Replace "from" with "between" and "to the" with "and the".
- ✓ This confuses perception with observation data. You seem to be after perception but by adding levels are telling the respondent what is flat.

Q.22- The way people work in our firm is machine centred, meaning operation of machines.

Observations / Change Subjected:
- ✓ Too general will not make sense to respondent. Could be better: The way we work around here encourages people to 'leave their brains at the gate'?

Q.24- How would you classify the firm's organisational structure?
1. By projects, 2. By function, 3. Metrical

Observations / Change Subjected:
- ✓ (3) Replace "metrical" with "matrix".

Q.25- With reference to question 24: Does this organisational structure work properly? Please explain:

Observations / Change Subjected:
- ✓ Delete to the end of the line from "Does...." and replace with "Are you satisfied with your operational structure? If not, what in your opinion needs to be changed?"
- ✓ Change question to: "Please explain: To what extent does this organisation structure work effectively?" Use Likert Perhaps?

Questionnaire's Section V

Q.29- *We believe that the employee is more important than the job in terms of allocation, that is, individuals are rewarded in part on their mastery of the job skills.*

Observations / Change Subjected:

This question does not really make sense in English.

Q.33- How does the inflation rate effect the organisation's compensation system?

Observations / Change Subjected:

- ✓ A little general question. Are you asking if there are annual pay awards in response to cost of living and if so what % of pay awards are made up by this element?

1.2. Questions with more than 16 words in length

These questions are:

Q.8- 'The company tends to employ a workforce that has skills that are tacit or difficult to measure, such as the ability to work in a team-based system, innovation, flexibility, problem solving capability and good interpersonal relations'.

Q.14- 'For your company it is very important to design training programs that focus on developing 'soft skills/capabilities', for example: interpersonal relations, communication skills, team-working, innovation, creativity and problem solving capabilities'.

Q.17- 'We design training which focuses on following strict operational procedures, for example: how to operate machines or working with materials'.

Q.27- 'It is difficult for our company to define certain jobs because they are in a constant state of flux'.

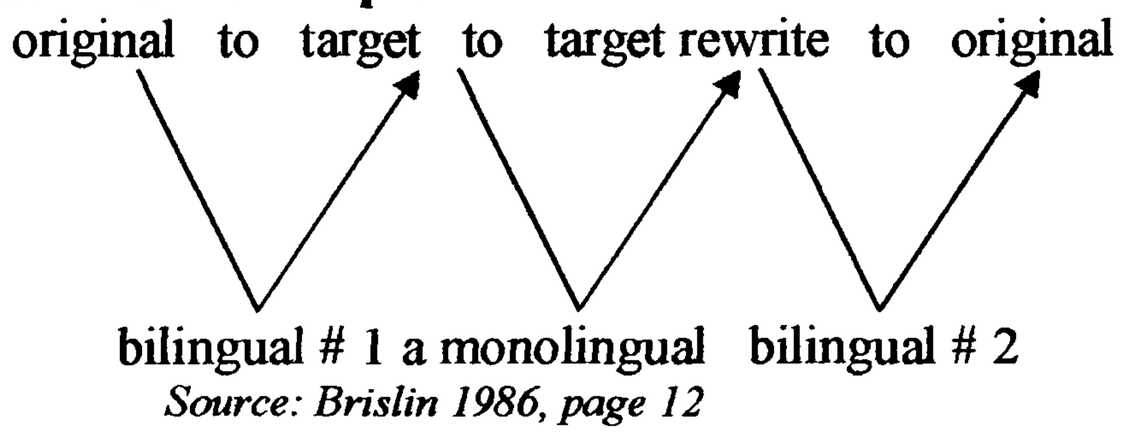
As we can see in these questions above, extra sentences were added in order to provide a further explanation of the concepts in each item. I wanted to make sure that the questionnaire would be free of misinterpretations.

2.2. Back-translation Process

This section presents the back-translation process developed in Grenoble, France. This process provided me with a useful research instrument, suitable for a cross-cultural research project in England and France.

The back-translation sequence:

Figure II: Back-translation process



Source: Brislin 1986, page 12

The author of this thesis was the bilingual # 1, he translated the questionnaire from English – (original language) into French (target language). It was first revised by my

French supervisor and then by a French monolingual, who was representative of the potential questionnaire's respondents. This process was developed as follows: the bilingual person asked a French monolingual to go over the translation. The French monolingual did not know anything about the kind of this research project; however, he is a manager in the area of HR for a mid-size financial services company. Incidentally, the questionnaire targets the HR Manager in each firm. The thirty-three questions were read together in French, including the first page of the questionnaire which deals with the questionnaire's instructions. The French monolingual made corrections in vocabulary, idioms and concepts that were not clear. From these corrections the questionnaire was rewritten in French –the 5 steps of the questionnaire' design diagram were followed and revised.

The first revision of the translated questionnaire (French version) by the monolingual person helped to identify some of the problems in the translation process. For instance, some of the questions translated into French did not have the same sense as in its original version (English). One of the major problems was the equivalence in terms and concepts.

For example question No. 21 in section IV,

Original version in English:

- *We believe that empowerment is an important practice in our organisation.*

Our translation into the target language (French):

- *Croyez-vous que la pratique de l' 'empowerment' est importante dans les processus de décision dans l'entreprise?*

The French monolingual that helped with the first questionnaire's revision did not have a clear idea of what the term 'empowerment' meant. Then, I asked the bilingual # 2 to conduct the back-translation process. The meaning of the same question in French and English was found to be different. Indeed, problems of equivalence in idioms and concepts were found.

The back-translation process with the bilingual #2 was developed as follows: a bilingual (French/English) French MBA student (bilingual # 2) at the Group ESC

Grenoble, France was asked to translate the questionnaire back from French into English. Please, refer to figure 1 shown above. The back-translation process was performed as Brislin (1976, p. 9) suggests: 'The back-translation into English is provided by a bilingual working from the target version with no knowledge of what was in the original version'. The author of this thesis gave the rewritten French version of the questionnaire to the MBA bilingual # 2 student, to translate into English. Like the French monolingual, the bilingual # 2 did not know anything about the research project that was being conducted, and he did not have access to the questionnaire's original version.

After this process it was realised that 'empowerment' is a complex term. An attempt was made to find in the French language a concept equivalent to 'empowerment'; however, it was a difficult task to achieve. The first step was to leave in the translated questionnaire the concept ('empowerment') in its original version, with a further explanation in the question. As a result, the question was even longer:

- *Croyez-vous que la pratique de l' 'empowerment' -la liberté donnée aux employés de décider et de faire- est importante dans les processus de décision dans l'entreprise?*

As mentioned earlier, Brislin (1986: 145), suggests having questions with not more than 16 words; however, Brislin also points out: 'add sentences that provide redundancy. This rule suggests that longer items and questions can be used'. Redundancy was given to the question, which helped to clarify the 'empowerment' concept.

Following the revision from the monolingual and the bilingual # 2, the questionnaire was tested again in Grenoble, France (September, 2002), where different suggestions for the revised questionnaire in French and in English were made. For example, the term in French *'habilitation'* was the closest concept equivalent term in French to 'empowerment' in English. However, the explanation was kept for clarification purposes. The final French version of question 21 is:

- *Votre entreprise croit en la pratique de l'habilitation (la liberté donnée aux employés de décider et de faire) est importante dans les processus de décision dans l'entreprise?*

The back-translation process helped to provide full feedback on the questionnaire in English and in French. There were concepts and idioms that did not make sense in French and were difficult to translate. However, it was possible to overcome such problems with the help of the back-translation.

2.3. General Testing Approach

Example: Comparison between the ANOVA and Linear Regression Tests

This section presents an example that illustrates the differences and similarities between the ANOVA and Linear regression tests.

The linear regression analysis requires a dummy variable. Therefore, the dichotomy variable level of technology was transformed into a dummy variable. It was necessary to consult a statistical specialist in order to develop this process, which is explained in the following section.

Furthermore, the linear regression analysis was developed for some of the factors obtained. It was found that the linear regression analysis is another method by which it is possible to test the neo-contingency theory suggested in this thesis. Additionally, the results obtained from the linear regression analysis developed were the same as the ANOVA. The following sections present an example where is possible to corroborate that the linear regression and ANOVA analyses provide the same results. The ANOVA analysis is proposed for the purpose of this thesis. Justification for keeping this analysis is given as concluding remarks.

Example

The following section presents an example where the linear regression analysis is compared with the ANOVA test. The technical profile factor is taken for this example which was the first factor obtained from the principal component analysisconducted on the recruitment and selection items.

Analysis

The dichotomy variable levels of technology was transformed into two levels using a dummy variable: 1) DUM_HIG: High and Mid tech and, 2) DUM_LOW: Low tech. These two levels (instead of three levels) were created in order to reduce the complications when comparing the linear regression with the ANOVA test. Additionally, this example does not include the interaction effect of the two independent variables.

Regression: Technical Profile = f (country, techno)

Table 1: Model

Model	R	R^2	R^2	Standard Error
1	,282(a)	,080	,068	,96533820

a Value: (constants), DUM_HM, DUM_COUN

Table 2: ANOVA(b)

Model		Means	Ddl	Mean	F	F
1	Regression	12,763	2	6,382	6,848	,001(a)
	Residual	147,237	158	,932		
	Total	160,000	160			

a Value : (constants), DUM_HM, DUM_COUN

b Dependent Variable : Technical Profile

Table 3 : Coefficients(a)

Model		Coefficients		Standard Coefficients	t	F
		B	S.D.	Bêta		
1	(constant)	-,291	,136		-2,137	,034
	DUM_COUN	,062	,154	,031	,405	,686
	DUM_HM	,562	,153	,281	3,680	,000

a Dependent Variable : Technical Profile

ANOVA

Table 4: ANOVA Two factors (country and techno level)

Tests des effects between subjects

Dependent Variable: Technical Profile

Source	Error de type III	ddl	Mean	F	Signification
Model Corrected	12,763(a)	2	6,382	6,848	,001
Constant	,071	1	,071	,076	,783
COUNTRIE	,153	1	,153	,164	,686
DUM_HM	12,622	1	12,622	13,545	,000
S.D.	147,237	158	,932		
Total	160,000	161			
Total corrected	160,000	160			

a R^2= ,080 (R^2 adjusted= ,068)

An example with interaction (country*techno level)

The tables above present the results from the linear regression and ANOVA analyses. The two methods present an equivalent significant global model of F= 6,848 (p= 0,001); tables 2 and 3.

The analysis of the variable country presents the following results:

Regression ➔ t= 0,405 (F= t^2=0,164) , p=0,686 ; table 4

ANOVA ➔ F=0,164 p=0,686; table 3 ➔ which is equivalent for the two methods.

The analysis of the variable levels of technology presents the following results:

Regression ➔ t= 3,68 (F= t^2=13,54) , p=0,000 ; table 3

ANOVA ➔ F=13,54 p=0,000; table 4 ➔ which is equivalent for the two methods.

These models present the same coefficient determination R2 = 0.080 (R^2 adjusted = 0.068); table 1 for the regression and table 4 for the ANOVA.

Appendix 3:

Invitation Letters

and Questionnaires

3.1. Letter English: HRM-questionnaire

Dear Sir/Madame:

Given the need to understand more about the role of Human Resources Management (HRM) in High-tech and Low-tech Organisations in an international context, I am undertaking a research study entitled: 'Different Approaches to HRM: A comparison between High-tech firms vs. Low-tech-firms located in France and England'. This study is part of a doctoral program at the Group ESC Grenoble, France and the School of Management at the Newcastle University upon Tyne under the supervision of Professor Dominique Jolly and Professor Ian McLoughlin.

The results of this study should help to clarify the practical value of the HRM techniques as well as its contribution to the academic testing of the concept. From your perspective I would expect that the outcome of the study would be of interest to your organisation.

In order to undertake this study I need to establish the rate and degree of adoption of HRM activities among organisations located in France and England. The questionnaire is being sent to Human Resources Managers in each firm because of their professional experience and the pivotal role they play in the decision making process.

In order to ensure that the results are representative, it is important to assure that a large amount of questionnaires are completed. Consequently, I have confined the contents to 31 key questions.

I would greatly appreciate you completing the enclosed questionnaire and return it in the following days. You may use the attached prepaid envelope.

I understand the demands this questionnaire may place on your time but your response would be of significant value in studying this issue. In any event, I thank you for taking the time to read my correspondence and trust that my research project will be of interest to you.

Finally you can be assured of complete confidentiality. The results of the study will be published in aggregate form only and will be circulated to all respondents. No reference will be made to individual firms.

Yours sincerely,

Jacobo Ramirez
Candidate
Doctor of Business Administration Program

3.2. HRM-questionnaire: English

QUESTIONNAIRE

Answering the questionnaire:

Please complete the questionnaire in the most objective manner possible.

The questionnaire is divided into 5 sections (firm details, selection and recruitment, training, organisation and compensation).

In the first section, certain questions require a simple tick for 'Yes' [ ] or 'No' [ ]. For others, it is necessary to write down the answer. In sections 2 through 5, some of the statements require you to give a ranking a number from 1-5 with 1 being *'Strongly Disagree'* and five being *'Strongly Agree'* or *'Never'* and *'Always'*, respectively.

There is no 'right' or 'wrong' answer. So please respond in the way that you believe best reflects your organisation's procedures with Human Resources Management (HRM).

Although you are asked to provide your company name and address, this is only for validation purposes. If the policy of the company is against this, you may omit this information.

Finally, I would like to thank you in advance for taking the time to complete this questionnaire. Without your help the study would not be able to take place!

Jacobo Ramirez

Grenoble; France

29 January 2002

Section I

Firm Details

Please complete the following section. If the space assigned is not big enough for your answer, you can write it down on the back of the page.

What is the company's Standard Industrial Classification (SIC) code?

SIC code: _____
or Industry Sector: _____

How many employees work at the site?

_____

3. What percentage of the workforce fall into the following categories (The categories should sum a total of 100%).

a. Directors: _____ b. Managers: _____
c. Engineers: _____ d. Technicians: _____
e. Manual workers: _____ f. Others: _____, please, specify:_____

4. Does the firm have a Research and Development, (R&D) department at this location?

a. Yes [ ]

b. No at this site, but somewhere else [ ]

c. No [ ]

If the answer is c. [No], please go to Section II. Otherwise, please continue this section.

5. How many employees who work in the R&D area have the following degree?

a. PhD:_____ b. Master:_____
c. Bachelor:_____ d. Engineers:_____
e. Technicians:_____ f. Others _____, please, specify: _____.

What is the percentage of 'turn over' spent on R&D?

_____ %

Section II

For each statement, please tick the item which you believe best reflects your organisation.

Our recruitment system has a global scope; that is, we hire people from all around the world.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The company tends to employ a workforce that has skills that are tacit or difficult to measure, such as the ability to work in a team-based system, innovation, flexibility, problem solving capability and good interpersonal relations.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

We use Internet Advertising for recruiting employees.

1. Never, 2. Infrequent, 3. Sometimes, 4. Frequent, 5. Always

Please select of the categories which you believe best correlates with the percentage of each class of employees recruited by Internet in the last 6 months.

A. Directors:

1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

B. Managers:

1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

C. Engineers:

1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

D. Technicians:

1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

E. Manual workers:

1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

F. Others, please specify:_____

1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

The company uses Assessment Centres in the selection process of new employees.

1. Never, 2. Infrequent, 3. Sometimes, 4. Frequent, 5. Always

The company has a preference for hiring employees who are younger than 35 years old.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

13. Please tick one or more of the following attributes that you believe an ideal job candidate should demonstrate.

☐ Ability to work autonomously. ☐ Proficiency in foreign languages.

☐ Strong interpersonal skills. ☐ Teamwork skills. ☐ Problem-solving skills.

☐ Ability to keep up with new technology.

Section III

Training

For each statement, please tick the item which you believe best reflects your organisation.

For your company it is very important to design training programmes that focus on developing 'soft skills/capabilities', for example: interpersonal relations, communication skills, team-working, innovation, creativity and problem solving capabilities.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

We view training as an integral part of the employee's career development in the company.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The firm provides all employees with career development plans to enable them to maximise their performance potential.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

We design training which focuses on following strict operational procedures, for example: how to operate machines or working with materials.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The company provides international training and development programs (for the employees that travel abroad).

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The company provides its employee opportunities to learn new skills from other departments within the firm.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

Section IV

Organisation

For each statement, please tick the item which you believe best reflects your organisation.

The company has a strong commitment to team-based job design.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

We believe that empowerment is an important practice in our organisation.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The company has a flat organisational structure.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The way we work here encourages people to leave their brains at the 'gate'.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

We believe that it is important to have close supervision of our workforce.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The firm's organisational structure is?

a. By project, b. By function, c. Matrix, d. Other, please, specify: _____

How strongly do you agree with this organisational structure?

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

It is difficult for our company to define certain jobs because they are in a constant state of flux.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

Section V

nsation

For each statement, please tick the item which you believe best reflects the organisation.

A scientific employee working in the R&D area could have equivalent salary scales to a manager.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

Our company compensation practices are based on individual performance.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

We believe that the employees' capabilities are important in terms of the compensation system.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The manager responsible for a division/business unit has the freedom to develop his/her own payment systems.

1. Never, 2. Infrequent, 3. Sometimes, 4. Frequent, 5. Always

The company has a payment system that focuses on employees' short-term accomplishments during a fixed time period.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

The company has a flexible payment system, which allows for reaction to competition within the market place.

1. Strongly Disagree, 2. Disagree, 3. Uncertain, 4. Agree, 5. Strongly Agree

If you would like to add any comments or observations please do so:
(If necessary, you can continuing writing on the back of the page)

_____

_____

Company name and address. If it is possible, please provide the name and position of the person that answered the questionnaire:

_____

_____

Thank you!

3.3. Letter French: HRM-questionnaire

Madame/Monsieur:

Au vu de la nécessité de mieux comprendre le rôle de la gestion des Ressources Humaines (GRH) dans les entreprises en contexte international, j'ai lancé une recherche intitulée « différentes approches de la gestion des Ressources Humaines (GRH) »: il s'agit de comparer les sociétés *high-tech* avec les sociétés de *low-tech* situées en France et en Angleterre.

Cette étude fait partie d'un programme doctoral du Groupe ESC Grenoble en France et de l'école de gestion de l'université de Newcastle-upon Tyne sous la direction des professeurs Dominique Jolly et Ian McLoughlin. Les résultats devraient aider à clarifier la valeur réelle des techniques de GRH. De votre point de vue on peut espérer que les résultats de cette étude intéresseront votre organisation. Pour entreprendre cette étude, il est tout à fait primordial d'établir le degré d'adoption des activités de GRH par des entreprises situées en France et en Angleterre.

Le questionnaire est envoyé aux directeurs des ressources humaines de chaque entreprise en raison de son expérience professionnelle et du rôle pivot qu'ils jouent dans le processus décisionnel. Afin de s'assurer que les résultats soient représentatifs, il est important d'obtenir une grande quantité de questionnaires remplis. En conséquence, je me suis limité à 31 questions principales. Je vous serais très reconnaissant de bien vouloir remplir le questionnaire ci-joint et de le retourner le plus rapidement possible. Vous pouvez utiliser l'enveloppe ci-jointe.

Enfin, vous pouvez être assurés de la totale confidentialité des réponses. Les résultats de l'étude seront seulement édités sous une forme globale et distribués aux répondants qui le souhaitent. Aucune référence ne sera faite aux différentes sociétés.

Je vous prie de croire, Madame/Monsieur en l'assurance de mes sentiments les meilleurs.

Jacobo Ramirez
Candidat au doctorat du programme de gestion d'entreprise.

3.4. HRM-questionnaire: French

QUESTIONNAIRE

Instructions pour répondre au questionnaire:

Veuillez remplir le questionnaire suivant de la façon la plus objective possible.

Le questionnaire est divisé en 5 sections (informations sur l'entreprise, sélection et recrutement, formation, organisation et systèmes de rémunération)

Dans la première section du questionnaire, vous serez amenés à choisir entre 'Oui' [ ] ou 'Non' [ ] ou dans d'autre cas, à écrire votre réponse en toutes lettres. Veuillez évaluer les réponses incluses dans les sections 2 à 5 en utilisant l'échelle de 1 *'Absolument pas d'accord'* à 5 *'Complètement d'accord'* ou de '*Jamais*' à '*Toujours*'.

Il n'y a aucune réponse 'exacte' ou 'fausse'. Je vous demande seulement de cocher la réponse que vous estimez la plus proche de la façon dont votre entreprise gère son organisation et ses ressources humaines.

Vous êtes invités à fournir le nom et l'adresse de votre entreprise uniquement pour des raisons de validation. Si la politique de l'entreprise interdit de donner ce renseignement, ne mentionnez pas ses coordonnées.

Je vous remercie par avance de prendre le temps de remplir ce questionnaire. Sans votre aide, l'étude devrait être abandonnée !

Jacobo Ramirez
Grenoble, France
29 Janvier 2002

Section I

Informations sur l'entreprise

Les réponses doivent être écrites dans l'espace réservé ; si toutefois l'espace réservé n'est pas assez grand, veuillez répondre au verso.

1. **Code APE de l'entreprise :**_____

   Ou secteur d'activité : _____

2. **Nombre d'employés sur le site.**

   _____

3. **Répartion de l'effectif de l'entreprise en pourcentages ? (Le total des pourcentages devrait donner 100%)**

   a. Cadre dirigeants : _____% b. Management intermédiaire : _____%
   c. Ingénieurs : _____% d. Techniciens : _____%
   e. Ouvriers : _____% f. Autres : _____%, veuillez spécifier :_____

4. **Avez-vous un département qui gère la recherche et le développement (R&D) sur ce site de votre entreprise ?**

   a. Oui [ ]
   b. Pas à notre adresse, mais dans un autre site [ ]
   c. Non [ ]
   Si votre réponse est c. [Non], passez à la Section II.

5. **Nombre d'employé(e)s travaillant dans la recherche et le développement (R&D) :**

   a. Doctorat : _____ b. DESS ou DEA : _____
   c. Ingénieurs :_____ d. Maîtrise (bac+4ans) : _____
   e. Techniciens : _____ f. Autres : _____, veuillez spécifier :_____

6. **Quel pourcentage de votre chiffre d'affaires est dédié à la recherche et au développement ?**

   _____%

Section II

Sélection et recrutement

Pour chacune des affirmations, entourez ou cochez l'item qui convient le mieux à votre entreprise.

7. **Le recrutement et la sélection effectués par l'entreprise s'opèrent au niveau international.**
   1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

8. **Votre entreprise a tendance à embaucher des employé(e)s dont les compétences peuvent être tacites ou difficiles à évaluer (comme par exemple : l'aptitude aux relations humaines, l'innovation, la créativité et la résolution des problèmes).**
   1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

9. **Votre entreprise recrute par Internet.**
   1. Jamais, 2.Rarement, 3.Parfois, 4. Souvent, 5. Toujours

10. **Pourriez-vous nous communiquer le pourcentage de vos employé(e)s recruté(e)s par Internet dans les 6 derniers mois ?**
    A. Cadre dirigeants :
    1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%
    B. Management intermédiaire :
    1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%
    C. Ingénieurs :
    1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%
    D. Techniciens :
    1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%
    E. Ouvriers :
    1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

    F. Autres, veuillez spécifier : _____
    1. 0-19%, 2. 20-39%, 3. 40-59%, 4. 60-79%, 5. 80-100%

11. **Votre entreprise utilise des cabinets de recrutement pour la sélection du personnel.**
    1. Jamais, 2.Rarement, 3.Parfois, 4. Souvent, 5. Toujours

12. **Votre entreprise a tendance à embaucher des candidats de moins de 35 ans.**
    1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

13. **Laquelle ou lesquelles des options suivantes correspondent le plus au profil de candidat que vous pouvez embaucher (plusieurs choix possibles).**
    ☐ Capable de travailler de manière autonome. ☐ Maîtrise des langues étrangères.
    ☐ Aptitude aux relations humaines. ☐ Esprit du travail en équipe. ☐ Résolution de problèmes.
    ☐ Aptitude à rester en phase avec la technologie.

Section III

Formation

Pour chacune des affirmations, entourez ou cochez l'item qui convient le mieux à votre entreprise.

14. Pour votre entreprise, il est très important de définir des programmes de formation servant à développer des compétences telles que : aptitudes aux relations humaines, capacité à communiquer, innovation, créativité et résolution des problèmes.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

15. Votre entreprise considère la formation comme partie intégrante de la carrière de l'employé.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

16. Votre entreprise offre à tous les employé(e)s des plans de développement de carrière afin qu'ils maximisent leur potentiel.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

17. La formation vise plus la maîtrise des procédures opérationnelles - par exemple, la manipulation des machines ou des matériaux, plutôt que la compréhension.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

18. Votre compagnie offre des programmes internationaux d'entraînement et de développement (pour les employé(e)s qui vont à l'étranger).
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

19. Votre entreprise offre à ses employé(e)s l'occasion d'apprendre de nouvelles compétences issues d'autres départements internes.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

Section IV

nisation

Pour chacune des affirmations, entourez ou cochez l'item qui convient le mieux à votre entreprise.

20. Votre entreprise favorise tout particulièrement le travail en équipe.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

21. Votre entreprise croit en la pratique de l'habilitation (la liberté donnée aux employés de décider et de faire).
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

22. Votre entreprise a une structure d'organisation plate (horizontale), i.e. peu hiérarchisée.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

23. La façon de travailler ici amène les gens à -laisser leur intelligence à la maison-.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

24. Pour votre entreprise, il est important de garder un contrôle 'étroit' de vos employés.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

25. La structure organisationnelle de votre entreprise est :
*a. Par projets, b. Par fonctions, c. Matricielle, d. Autre, veuillez spécifier :*_____

26. Etes-vous d'accord avec ce choix de structure ?
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

27. Pour votre entreprise, il est difficile de définir des emplois, parce qu'ils sont évolutifs et se modifient sans cesse.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

Section V

Système de rémunération

Pour chacune des affirmations, entourez ou cochez l'item qui convient le mieux à votre entreprise.

28. Un(e) employé(e) scientifique travaillant dans la recherche et le développement (R&D) peut avoir un système de rémunération équivalent à celui d'un manager intermédiaire.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

29. Votre entreprise différencie sa politique salariale selon les individus.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

30. Votre entreprise pense que les capacités des employés sont très importantes pour décider de leurs rémunérations.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

31. La personne responsable d'une division ou d'un département a la liberté de décider des niveaux de rémunération de ses employés.
1. Jamais, 2.Rarement, 3.Parfois, 4. Souvent, 5. Toujours

32. Votre société a un système de rémunération qui récompense la performance des employés à court terme sur une période de temps fixe.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

33. Votre entreprise a un système de rémunération flexible qui lui permet de réagir aux demandes du marché du travail.
1. Absolument pas d'accord, 2. Pas d'accord, 3.Indifférent, 4. D'accord, 5. Complètement d'accord

Vous pouvez écrire vos observations et commentaires
(Vous pouvez écrire au dos de la page)

_____

_____

_____

_____

_____

Nom et adresse de l'entreprise. Veuillez indiquer, si c'est possible, le nom et la position de la personne qui a répondu à ce questionnaire :

_____

_____

_____

Merci beaucoup !

3.5. Remain Letter English: HRM-questionnaire

Dear Sir/Madame

About three weeks ago I wrote to you seeking your assessment about the role of Human Resources Management in the firm that you work, by completing a questionnaire. This questionnaire is part of my research study entitled: 'Different Approaches to HRM: A comparison between High-tech firms vs. Low-tech-firms located in France and England'. This study is part of a doctoral program at the Groupe ESC Grenoble, France and the School of Management at the Newcastle University upon Tyne.

If you have already completed and returned the questionnaire to me please accept my sincere thanks. If not, I kindly ask you to do so, because your response would be of significant value to me in my research study. Even if you are unable to help me, could you please return the questionnaire (with your name and company on the cover) using the prepaid envelope enclosed.

If by some chance you did not receive the questionnaire, or it got misplace, please write me an e-mail: jrn@itesm.mx, and I will get another questionnaire in the mail to you.

Yours sincerely,

Jacobo Ramirez
Candidate
Doctor of Business Administration Program

3.6. Remain Letter French: HRM-questionnaire

Monsieur,

Environ il y a trois semaines je vous avais écrit cherchant votre évaluation du rôle de Gestion de Ressources Humaine dans la société que vous travaillez, en achevant un questionnaire. Ce questionnaire fait partie de mon étude de recherche intitulée : « différentes approches de la gestion des Ressources Humaines (GRH) »: il s'agit de comparer les sociétés *high-tech* avec les sociétés *low-tech* situées en France et en Angleterre. Cette étude fait partie d'un programme doctoral du Groupe ESC Grenoble en France et de l'école de gestion de l'université de Newcastle-upon Tyne sous la direction des professeurs Dominique Jolly et Ian McLoughlin.

Si vous avez déjà achevé et m'avez rendu le questionnaire acceptez s'il vous plaît mes remerciements sincères. Si pas, je prie d'avoir l'obligeance de faire ainsi, parce que votre réponse aurait de valeur significative à moi dans mon étude de recherche.

Même si vous êtes incapables de m'aider, pouvaient vous rendez s'il vous plaît le questionnaire (avec le nom de votre société sur la couverture). Vous pouvez utiliser l'enveloppe timbrée ci-jointe.

Si par quelque chance vous n'avez pas reçu le questionnaire, ou il est arrivé mal placent, écrivez-moi s'il vous plaît ou envoyez-moi un courrier électronique : [illegible], et je vous obtiendrai un autre questionnaire dans le courrier.

Je vous remercie de l'aide que vous m'apportez et vous prie de croire, Monsieur, en l'assurance de mes sentiments les meilleurs.

M. Jacobo Ramirez
Candidat au doctorat du programme de gestion d'entreprise.

3.6. Remain Letter French: HRM-questionnaire

Monsieur,

Environ il y a trois semaines je vous avais écrit cherchant votre évaluation du rôle de Gestion de Ressources Humaine dans la société que vous travaillez, en achevant un questionnaire. Ce questionnaire fait partie de mon étude de recherche intitulée : « différentes approches de la gestion des Ressources Humaines (GRH) »: il s'agit de comparer les sociétés *high-tech* avec les sociétés *low-tech* situées en France et en Angleterre. Cette étude fait partie d'un programme doctoral du Groupe ESC Grenoble en France et de l'école de gestion de l'université de Newcastle-upon Tyne sous la direction des professeurs Dominique Jolly et Ian McLoughlin.

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Même si vous êtes incapables de m'aider, pouvaient vous rendez s'il vous plaît le questionnaire (avec le nom de votre société sur la couverture). Vous pouvez utiliser l'enveloppe timbrée ci-jointe.

Si par quelque chance vous n'avez pas reçu le questionnaire, ou il est arrivé mal placent, écrivez-moi s'il vous plaît ou envoyez-moi un courrier électronique : [illegible], et je vous obtiendrai un autre questionnaire dans le courrier.

e vous remercie de l'aide que vous m'apportez et vous prie de croire, Monsieur, en ssurance de mes sentiments les meilleurs.

acobo Ramirez
dat au doctorat du programme de gestion d'entreprise.

Appendix 4:

Samples

4.1 High-tech

FIRMS No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
1	31-32 Chemical and Oil Industries	Research and manufacturer of speciality fine chemical including agrochemical and pharmaceutical.	1	5.00	ENGLAND
2	31-32 Chemical and Oil Industries	Biotechnology	1	*Not available*	ENGLAND
3	31- 32 Chemical and Oil	Petroleum and Chemicals	1	*Not available*	ENGLAND
4	31-32 Chemical and Oil	Chemical Manufacture for Industry	1	*Not available*	ENGLAND
5	31-32 Chemical and Oil	R&D in Chemical Industry	1	4.00	ENGLAND
6	32 Chemical Industry	Pharmaceutical. To discover and develop prescription medicines to improve the treatment of common illnesses	1	*Respondent's note: The firm has 17,000 employees in R&D. In the UK the firm spends £2.4 millions on R&D.*	ENGLAND
7	32 Chemical Industry	Pharmaceutical	1	17.00	ENGLAND
8	32 Chemical Industry	Pharmaceutical	1	12.00	ENGLAND
9	31 Chemical Industry	Pharmaceutical. Company active in R&D of antibody-based therapeutic products.	1	*Respondent's note: This question is not applicable for the firm, as we are not yet profitable. The cash turnover is approx. £1.8M per month.*	ENGLAND
10	31-32 Chemical Industry	Biotechnology	1	*Not available*	ENGLAND
11	7430/85 Chemical Industry / Various Services, Research	Analytical Activities in Chemistry and business	1	3.00	ENGLAND
12	32 Chemical Industry	Scientific and research based organisation with R&D facilities and management resources to provide world-wide services and products. The company applies the products of its laboratory work to the business of pest monitoring and control.	1	5.00	ENGLAND
13	31/38 Chemical Industry/Precision Equipment	Biotechnology materials focus on the application of phosphorylcholine (PC) Technology in medical device and bio-materials.	1	35.00	ENGLAND
14	32/85 Chemical Industry/Research	Bio-pharma manufacture, Micro-biological Research	1	22.00	ENGLAND
15	37/39 Electrical, Electronic Equipment, Transport Equipment	37-100 Systems for industrial, construction and railway applications	1	7.00	ENGLAND
16	31/38 Chemical Industry/Precision Equipment	Medical and surgical equipment	1	*Not available*	ENGLAND
17	37 Electrical, Electronic, Data Processing Equipment	Design and manufacturing Special Purposes Machines	1	30.00	ENGLAND
18	37 Electrical, Electronic, Data Processing Equipment	Design and manufacturing electronic equipment	1	*Not available*	ENGLAND
19	37 Electrical, Electronic, Data Processing Equipment	Design and manufacturing electronic equipment	1	10.00	ENGLAND

FIRMS No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
20	37/38/31 Electrical, Electronic, Nucleonic Equipment/Precision, Medical Equipment/Chemical Industry/	Development and manufacture of the most advance optical biosensors available, markets instruments and information management systems for use in biochemical research and production, as well as in clinic diagnostics.	1	5.00	ENGLAND
21	37-40 Electrical, Electronic, Precision Equipment	Design and manufacturing electronic special purposes machines	1	5.00	ENGLAND
22	38 Precision Equipment	Medical and Surgical equipment production. Develops, manufactures and markets sophisticated medical devices.	1	*Not available*	ENGLAND
23	38 Precision Equipment	Develops and manufactures measuring, testing, optical, medical and surgical equipment	1	14.00	ENGLAND
24	73-10/74-14/74-30 Research and Various Services	Engineering	1	10.00	ENGLAND
25	31/85 Chemical Industry /Research and Various Services	Provide a wide range of contract, clinical, biological and chemical research services. Drug development.	1	*Not available*	ENGLAND
26	31/84/85 Chemical /Research, Technical Services, Engineering	Research in Chemical Industry	1	*Not available*	ENGLAND
27	31/748K Chemical/Services annex to production	31-611 Pharmaceutical laboratory	1	4.80	FRANCE
28	311b Electrical electronic equipment	37-550 Fabrication of Electro-medical and biological apparatus.	1	*Not available*	FRANCE
29	316A Electrical Machines and Equipment	Production of Electrical materials for motors	1	5.00	FRANCE
30	321B Electrical, Electronic Equipment	37-740 Fabrication of Attendant parts Equipment for Semiconductor Device, Micro-Electronic Circuits, etc.	1	6.00	FRANCE
31	321B Electrical, electronic equipment	Active component electronic equipment production	1	5.00	FRANCE
32	403/741J Energy/Services - Administrative-	37-910 Nuclear Engineering plant	1	5.00	FRANCE
33	291A Machines and Equipment	40-010/35-961Design and manufacture of hydraulic and oleo-hydraulic machines and equipment, water turbines, values, etc.	1	3.00	FRANCE
34	285C Machines and Equipment Production	45-500 Develop and fabrications of Extraction and Construction Equipment.	1	5.00	FRANCE
35	291D Machines Special Equipment	40-010 Design Hydraulic and Oleo-hydraulic Machines and Equipment, Water Turbines	1	3.00	FRANCE
36	291H Machines and equipment	Mechanic and equipment production	1	4.00	FRANCE
37	292D Machines, Mechanic and Equipment Production	45-500 Fabrication and maintenance of special purposes equipment -mining, quarry, stone-working, etc.	1	5.00	FRANCE
38	731Z Research and Development	Research and Development Science physiques and naturals	1	6.00	FRANCE
39	39/272C Transport Equipment/ Metal Industry	39-520 Development of equipment and infrastructure for motor vehicles.	1	6.00	FRANCE
40	331B Precision Equipment	26-440 Medical and Surgical Equipment Production	1	5.00	FRANCE
41	731Z Research and Development	85-100 Research in physics and natural sciences	1	*Not available*	FRANCE

FIRMS No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
43	731Z Research and Development	48-110/84-400 High precision engineering works, classified by nature of work, consulting engineers for turnkey projects.	1	4.00	FRANCE
44	731Z/721Z Research and Development	Computer Activités	1	5.00	FRANCE
45	731 Research and Development	80-221 Computer software.	1	5.50	FRANCE
46	731/241G Research and Development	85-100 Researches in physics sciences	1	5.00	FRANCE
47	353A Transport Industry/Aerospace	39-730/40-050/40-110 Aircraft electrical equipment, steam and gas engines and turbines, internal combustion engines.	1	5.00	FRANCE

4.2 Mid-tech

FIRM No.	APE/SIC CODE	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
1	31-32 Chemical and Oil Industry	Chemical Manufacture for Industry	1	2.00	ENGLAND
2	32 Chemical Industry	Manufacture chemicals	1	1.00	ENGLAND
3	20 Food Industry / 31 Chemical -Biotechnology	Process maize to produce glucose syrups and powder for the food, drink, pharmaceutical industries.	1	10.00	ENGLAND
4	20 Food Industry / 31 Chemical -Biotechnology	R&D Company in Food Industry- Biotechnology	1	10.00	ENGLAND
5	20 Food Industry / 31 Chemical -Biotechnology	20-480 Food products with an innovation organisation around two areas of activities: Food Science – Development of emulsifiers, textural ingredients, etc. Bioscience –Biotechnology, nutrition, food safety and preservation and the development of enzymes.	1	*Not available*	ENGLAND
6	47 Machine Tools and Accessories	Engineering	1	0.50	ENGLAND
7	84 Research, Technical Services, Engineering, Research	Research in civil engineering, mechanical and general public work.	3	*Not available*	ENGLAND
8	52 Research and services auxiliary to construction industry	Engineering	1	4.00	ENGLAND
9	82 IT & Wireless services	Services in execution-only stock brooking for private investors in the UK and USA. Includes an online trading service.	3	*Not available*	ENGLAND
10	79 Telecommunication	Telecommunication business, focused on the provision of high performance Internet protocol and data services to business customers.	3	*Not available*	ENGLAND
11	35-36 Metal Industry	Manufacturing machines and tools accessories	1	10.00	ENGLAND
12	79 Telecommunication	Telecommunications	1	*Not available*	ENGLAND
13	36 Metal Industry	Manufacturing	1	8.00	ENGLAND
14	36 Metal Industry	Metal pressing manufacture	1	5.00	ENGLAND
15	71-74 Transport/Services	Logistics transport	1	*Not available*	ENGLAND
16	35-36/47 Metal Industry/ Metal Machines	High-technology engineering group in Cemented-carbide and high-speed steel tools for metalworking applications.	2	5.00	ENGLAND
17	311A Electrical, Electronic Equipment	37-070 Fabrication of motors, rectifiers, static converters and reactance coils.	1	1.00	FRANCE
18	293D Machines and Equipment Production	41-030/41-100 Manufacturing and design agricultural equipment and machines.	1	4.00	FRANCE
19	297C/403Z Machines and Equipment/Energy	35-540 Manufacture Non-electric central heating systems.	1	0.30	FRANCE
20	284C Metal Industry	31-180 Metallurgy -Inorganic compounds of high-melting and noble metals	1	1.00	FRANCE
21	287N Metal Industry	Small Metallic Products Production	1	4.00	FRANCE
22	284B Metal Industry	34-090 Iron and steel rods, sections, rails, tyres, rolled steel, etc.	1	5.00	FRANCE
23	287N Metal Industry	Small metallic products production	1	5.00	FRANCE
24	284 Metal Industry	Metallurgy	1	3.00	FRANCE
25	722Z IT & Software	Providing enterprise software database, tools and application products, along with related consulting, education, and support services.	3	*Not available*	FRANCE
26	79 Telecommunications	Telecommunication (Holding)	3	*Not available*	FRANCE

FIRMS No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
27	341Z Transport Industry	Automobile Manufacture	1	4.00	FRANCE

4.3 Low-tech

FIRM No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
1	31-32 Chemical and Oil Industry	Manufacturing healthcare products	2		ENGLAND
2	37 Electrical Electronic Equipment	Manufacturing of high precision rotary tables and pallet systems to leading manufacturers in the Aerospace, Automotive, Power Generation, Machine Tools, Scientific and General Engineering Industry.	3	2.00	ENGLAND
3	37/47 Electrical, Electronic Equipment, Special Purposes Machines	Manufacturing precision machines tools	3		ENGLAND
4	37/84/85 Electrical, Electronic, Data Processing and Nucleonic Equipment	Technical Services and Research in Engineering.	3		ENGLAND
5	37 Electrical, Electronic, Data Processing Equipment	Automation and Drives	2		ENGLAND
6	37 Electrical, Electronic, Data Processing Equipment	Manufacturing, assembly and testing of integrated circuits.	3		ENGLAND
7	401Z/402Z Energy	Electric and natural gas services, merchant energy trading, energy marketing, energy delivery, telecommunications, and energy-related services	3		ENGLAND
8	20 Food Industry	Food Manufacture	1	4.00	ENGLAND
9	20 Food Industry	Catering Services	3		ENGLAND
10	47 Machine Tools and Accessories	Engineering	3		ENGLAND
11	47 Machines Tools and Accessories	Manufacturing garden machinery	2		ENGLAND
12	47 Machines Tools and Accessories	Machines Tools	3		ENGLAND
13	47 Machines Tools and Accessories	Machine Tool Engineering -Manufacture-	3		ENGLAND
14	47 Machines Tools and Accessories		3		ENGLAND
15	47 Machines Tools and Accessories, Metal and Special Purpose Machines	Manufacturing of complete range of machines tools, from small lathes to machines	3		ENGLAND
16	47 Machines Tools and Accessories, Metal and Special Purpose Machines	Manufacture and installing machine tools accessories for industries such as steel, papermaking, power generation, shipbuilding, defence and aerospace.	3		ENGLAND
17	47 Machines Tools and Accessories, Metal and Special Purpose Machines	Specialises in test equipment for transmissions, transfer cases, axles and differentials. Design and built test cells for steering components, cylinder heads, hydraulic motors, etc.	3		ENGLAND
18	47 Machines Tools, Metal Machines, Special Purpose Machines	Manufacture mills machines	3		ENGLAND

FIRMS No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
19	47 Machines, Mechanic and Equipment Production	PGM has developed markets and technical capability in balls crews for Machine Tools, Medical Applications, Semi Conductor machines, Aerospace applications, Nuclear Power control rod drives and many other applications.	3		ENGLAND
20	47/48 Metal and woodworking machines, General mechanical engineering	Engineering Machines Tools	3		ENGLAND
21	34 Metal Industries -Basic-	Processing and distribution of specialised range of aluminium products to high-tech customers: aerospace.	3		ENGLAND
22	35/36 Metal Industry	Metal pressings manufacture	3		ENGLAND
23	35-36 Metal Industry	General steel stockholder supplying the welding, fabrication, manufacturing and engineering industries.	3		ENGLAND
24	36 Metal Industry	Design manufacture and distribution of precision miniature instruments	2		ENGLAND
25	35-40/84 Metal Industry, Precision, Electrical Equipments	A diverge range of environmental control systems and equipment, process control systems, precision switching and sensing device, fibre optic components.	2		ENGLAND
26	29-40 Plastic and Rubber Products	*Not available*	2		ENGLAND
27	30/42 Plastics Products, Chemical, rubber and Plastics Plant and Equipment	Medical Industry, Global health company	3		ENGLAND
28	47 Machine Tool and equipment	A variety of products and systems for coolant filtration and processing, swarf handing and processing, automation and parts handling to the metal working industry.	3		ENGLAND
29	38 Precision Equipment	Manufacturing special purposes machines	3		ENGLAND
30	38 Precision Equipment; Measuring, Testing, Optical, Medical and Surgical Equipment	Manufacture and sale of surgical sutures, mechanical wound closure	3		ENGLAND
31	85 Services Various	*Not available*	3		ENGLAND
32	85 Services Various	*Not available*	3		ENGLAND
33	85 Services Various	Technical Services	3		ENGLAND
34	75 Service	Air transportation	3		ENGLAND
35	80 Services -Administrative-	Personnel Consulting	1	*Not available*	ENGLAND
36	82 Services -Financial and Insurance-	Baking	1	*Not available*	ENGLAND
37	87 Services -Public Administration-	Public Sector	1	*Not available*	ENGLAND
38	74 Services -Sea Transportation, Ports-	Shipping	3		ENGLAND
39	85 Services Various	*Not available*	3		ENGLAND

FIRMS No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
40	76 Services Various, Consulting	An economics, finance, and business consulting firm, works with businesses, law firms, accounting firms, and governments, in providing a wide range of services.	3		ENGLAND
41	76 Services Various, Transport, Good Storage	Logistics	3		ENGLAND
42	79 Telecommunication, Communication Services, Radio and Television	Television, broadcasting	3		ENGLAND
43	23 Textile Industry	Confections Manufacture	2		ENGLAND
44	23 Textile Industry	Manufacturing	3		ENGLAND
45	23 Textile Industry	Manufacturing	3		ENGLAND
46	23 Textile Industry	Manufacturing	2		ENGLAND
47	23 Textile Industry	Manufacturing	1	1.00	ENGLAND
48	39 Transport Industry	Automobile Manufacture	2		ENGLAND
49	62-65 Wholesale Distributive Trades	Trade Consumer Goods -Cosmetics-	3		ENGLAND
50	62-65 Wholesale Distributive Trades; Consumer Goods	Home Articles	3		ENGLAND
51	62-65 Wholesale Distributive Trades; Consumer Goods	Fast moving consumer goods	2		ENGLAND
52	211C Cellulose, Paper and Board Industry	Paper and carton production	3		FRANCE
53	211C Cellulose, Paper and Board Industry -Paper and Carton Production-	24-340/24-820/27-320 Manufacture tissue paper, cellulose products, wadding industrial.	3		FRANCE
54	211C Cellulose, Paper and Board Industry -Paper and Carton Production-	27-300/27-720/27-940/30-300 Manufacturing of Kraft-paper for packaging (bags and cardboard boxes)	3		FRANCE
55	241G Chemical and Oil Industries	31-330 Manufacture of other organic-based chemical products -acid and alkalis.	3		FRANCE
56	245C Chemical and oil industry	32-150/32-200 Manufacture of soaps, fatty acid based detergent, cosmetic products.	2		FRANCE
57	244A Chemical Industry	31-100 Pharmaceutics Products Production	2		FRANCE
58	244C Chemical Industry	31-510 Medicine Production	3		FRANCE
59	315C Electrical and Electronic Equipment	37-330 Manufacture electric lighting equipment, indoor.	3		FRANCE
60	300C Electrical, Electronic, Data Processing, Computers Equipment Production	37-790 Manufacture electric and electronic equipment and components to client's specifications, sub-contractors.	3		FRANCE
61	403Z Energy	Heating Production and Distribution	3		FRANCE
62	159T Food Industry	21-480 Lemonades, aerated waters, soft drinks	1	10.00	FRANCE
63	151E Food Industry	Industrial preparation of meat based products	3		FRANCE
64	295L Machines and Equipment Production	Printing Equipment Production	3		FRANCE

FIRMS No.	CODES APE/SIC	PRINCIPAL ACTIVITY	R&D	TURNOVER SPENT ON R&D	LOCATION
65	285D Metal Industry	General Mechanic	3		FRANCE
66	284A Metal Industry	35-010 Forged stamped and hot pressed metal products.	1	0.50	FRANCE
67	275E Metal Industry Metallurgy	Molten of light materials	1	2.00	FRANCE
68	261E Non-metallic Mineral Products	26-100/33-520 Manufacture of domestic furniture mechanically processed hollow glass for domestic and catering use, crystal glassware.	3		FRANCE
69	251E Plastics Products -Other Plastic Products Production-	29-260 Manufacture of rubber and synthetic products classified by process and use.	3		FRANCE
70	334A Precision Equipment, Optical and Medical Equipment	38-100 Contact Lenses.	3		FRANCE
71	222C Printing and Publishing	28-300 Flat-bed printing	3		FRANCE
72	22C Printing and Publishing	28-300 Printing and publishing, flatbed prints.	3		FRANCE
73	221C Printing and Publishing	28-600 Magazine, newspaper and periodical (non-commercial) publishers.	3		FRANCE
74	22C Printing and Publishing	Other Printing	1	5.00	FRANCE
75	221C Printing and Publishing	28 News paper edition	3		FRANCE
76	660A Services -Financial and Insurance-	82-750/82-751 Insurance company.	3		FRANCE
77	611A Services -Sea Transportation, Ports-	74-100 Sea and Inland waterway transportation, shipping services, passenger and freight	3		FRANCE
78	632E Services Various - Transport Auxiliary	Air Transport Services	3		FRANCE
79	182E Textile Industry	24-100 Ready-made ladies' clothes	3		FRANCE
80	172A Textile Industry	24-900 Manufacture of household textile goods	3		FRANCE
81	343Z Transport Industry	Fabrication of automobile equipment	3		FRANCE
82	516G Whole Distributive Trades	67-900 Commerce de gross office machines and computer materials.	3		FRANCE
83	515H Wholesale Distributive Trades	66-400/66-800 Imports and distribution: Attachment products and parts for professionals in the fields of vehicles, wood, metal and industry in general	3		FRANCE
84	515C Wholesale Distributive Trades	Industry Supplies	3		FRANCE
85	516J Wholesale Distributive Trades	Electronic and Electrical Equipment Distribution	2		FRANCE
86	66-67 Wholesales Distributive Trades	*Not available*	3		FRANCE
87	516K Wholesales Distributive Trades	81-400 Photographic products	2		FRANCE
88	*Not available*	*Not available*	1	5.00	FRANCE
89	516K Wholesales Distributive Trades	Goods Distributions	2		FRANCE