

R&D managers' adaptation of firms' HRM practices

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The heads of R&D departments are those most responsible for the adaptation of firms' human resource management (HRM) practices to the idiosyncrasies of their departments. From their description, this paper analyzes the HRM practices in R&D departments and the adaptation achieved in four different firms. The data suggest that the main adaptations are produced primarily in recruiting and organizing the work of R&D personnel. In contrast to suggestions in the specialized literature, less adaptation is found in other HRM practices analyzed (managerial support and degree of delegation, compensation and career plans). Psychological theories of procedural justice and social comparison can improve our understanding of such results. The organizational structure affects the reference group for such comparisons and, consequently, the R&D managers' capacity to adapt such practices. Based on these arguments, the delegation of HRM practices to R&D departments will enhance the degree of adaptation of such policies.

1. Introduction

Innovation helps companies to lower their costs, obtain superior performance and create new products and services (Reed et al., 1996) in order to increase competitiveness. R&D departments are one of the main sources of such innovation, at least on a scientific basis (Dosi, 1982). R&D departments can provide an organization with a competitive advantage through the effective generation, deployment, transfer and integration of knowledge, particularly technological knowledge. The management of R&D professionals has become increasingly important in the face of growing competitive pressures, as organizations constantly seek to optimize their research potential (Manolopoulos, 2006). In fact, improvement in R&D activities is grounded primarily in management's capacity to adopt appropriate policies and methodologies for human

resource development (Pearson et al., 1993; Allen and Katz, 1995; Guimaraes et al., 2001).

These arguments seem to support the idea that the human resource management (HRM) practices of firms must be adapted to the R&D departments' specificities, and yet we know of no direct empirical evidence to corroborate this assertion. Given that psychological theories such as procedural justice (Greenberg, 1996; Folger and Cropanzano, 1998; Wiesenfeld et al., 2007) and social comparison (Wood, 1989; Taylor et al., 1990; Ployhart et al., 2006) emphasize the difficulties in implementing different policies for similar workers in the same firm, this lack of evidence creates a gap in the literature – a gap that this paper aims to address.

This study describes the internal organization of innovation-linked departments in four companies that are highly oriented towards R&D activities, and more specifically, the adaptation of the firms' HRM practices to the idiosyncrasy of R&D activities. Data

were collected from public sources and from focused interviews with HRM policy makers in each of the R&D departments. A cross-pattern analysis has allowed us to compare these HRM procedures among firms. This analysis highlights which HRM practices have been more or less tuned to the idiosyncrasies of R&D departments, thus allowing us to reflect on the R&D managers' capacity to adapt these policies to their specific environment.

Few studies have analyzed a wide range of HRM practices in the R&D department of more than one company. Furthermore, most of the existing evidence is based on comparisons of HRM practices among firms with high or low levels of innovation (Coombs and Rosse, 1992; Saura and Gómez-Mejía, 1997). One exception is a study by Martell and Carroll (1995), in which they analyzed some of the HRM practices (staffing, performance evaluation and compensation) applied to the heads of the R&D departments, and the influence of these practices on technological innovation capabilities in organizations. Following the call by Martell and Carroll, we have expanded the scope of the research to include the practices applied to other managers and professionals within the R&D function and to analyze a wider range of HRM practices.

The paper is organized as follows: the next section identifies HRM practices (delegation and managerial support, networks and multidisciplinary teams, recruitment policy, job rotation, compensation and career development) that scholars in this area have encouraged R&D managers to adapt. This theoretical section also reviews the difficulties that such adaptations can cause within an organization, in accordance with the literature on procedural justice and social comparison. Section 3 describes how the data have been obtained, and Section 4 summarizes the data collected for each case. Section 5 presents the data analysis carried out for identifying patterns across firms' HRM practices in R&D departments and the degree of adaptation of firms' HRM policies. Section 6 compares the results of this study with existing evidence and discusses how the arguments presented in the procedural justice and social comparison literature can improve our understanding of the empirical evidence available. Managerial and research implications are also discussed.

2. Literature review

From the perspective of the universalist theorists (Osterman, 1994; Pfeffer, 1994), some HRM

practices are intrinsically better than others, and should be adopted by all companies. Contingency theorists (Hambrick, 1983; Miles and Snow, 1984) argue, however, that these practices must be consistent with the firm's strategy. Configurational theorists (Doty et al., 1993; Camelo et al., 2004) emphasize the consistency of the HRM practices finally adopted. Delery and Doty (1996) find support in the three views, in the sense that high-performance HRM practices have greater effects on firms' performance when they are both internally consistent and consistent with the firms' strategy as well. Most of the cited literature, however, is based on the general HRM policies of the firms. Some authors go one step further by also suggesting the need to adapt the general HRM policies of the firms to the idiosyncrasies of each department (Dyer, 1984), especially in the case of R&D workers (Allen and Katz, 1995; Pérez and Quevedo, 2006). The following paragraphs summarize this literature.

2.1. *Why must HRM practices be adapted to R&D departments?*

In order to develop and commercialize innovations, the resources within R&D departments are managed by highly skilled people. Van de Ven (1986) defines innovation as a process that involves generating, developing and implementing new ideas and behavior. The challenge for managers is to tailor their HRM policies to fit the firm's innovation goals (Gupta and Singhal, 1993; Martell and Carroll, 1995; Jiménez and Sanz, 2008). In this sense, there has been a growing view among human resource managers that innovation performance improvements depend, to a great extent, on the adoption of innovative HRM practices for R&D workers (Ichniowski et al., 1996; Pérez and Quevedo, 2006). Specifically, this process involves an efficient degree of *delegation and managerial support* for idea/knowledge generation, as well as an idea/knowledge selection process. Such a procedure would ensure that the necessary resources are allocated to the development of an idea, and that ideas with the potential for high return will be implemented.

Are some people more suitable for idea generation than others? From the perspective of educational background, people with greater technical and scientific knowledge (Coombs and Rosse, 1992; Saura and Gómez-Mejía, 1997) and greater creativity (Wang and Horng, 2002) seem to be

those with greater chances of generating new advances, suggesting that *recruitment policy* should be adapted in order to attract this type of person. Employee creativity can also be encouraged by the work organization. The possibility of working in teams is highly valued by R&D workers because of the greater opportunity for exchanging ideas that this system allows (Chatterji and Thomas, 1993). But it is not only internal networks that encourage such contact with new ideas; external networks do so as well (Sundgren et al., 2005).

In fact, the success of the innovation process depends not only on mechanisms that facilitate the creativity of employees. Thamhain (2003) argues that the key challenge for companies is not so much the generation of innovative ideas at the R&D stage, but the effective transfer of technology from the discovery stage to the market. This process requires effective interdisciplinary teamwork across all business areas, including customers and suppliers. As is the case with creativity, such teamwork is a critical success factor at this innovation stage (Sawhney and Prandelli, 2000; Sen and Engelhoff, 2000). The challenge for management is, therefore, to facilitate *networks and multidisciplinary teamwork* conducive to market-oriented innovation, regardless of the existing business dynamics and complexities (Debruyne et al., 2002).

The success of a given task does not depend merely on the capabilities of employees; it is affected by their motivation as well. As Badawy (1988, p. 23) has argued, 'scientists and engineers (like others) manage personal motivations depending on their perceptions of the relationship between effort, performance and reward.' These perceptions reflect their expectations, which, in turn, are determined by their needs (Maslow, 1943). In the fields of HRM and organizational behavior, individual needs are often described as being 'intrinsic' or 'extrinsic' in nature (Sansone and Harackiewicz, 2000).

Extrinsic motivation occurs 'when employees are able to satisfy their needs indirectly, most importantly through monetary *compensation*' (Osterloh et al., 2002, p. 64). In particular, the positive relationship between pay and work effort for R&D professionals is stressed in the literature (Manolopoulos, 2006). However, Kim and Cha (2000) argue that management strategies must include the fact that technically oriented R&D professionals, such as inventors, are likely to differ from other groups of employees with respect to their careers, values and reward preferences.

The literature suggests that independent of compensation, there is a positive correlation between satisfaction and other extrinsic incentives such as professional development within the organization (Kim and Cha, 2000). Because R&D employees are highly educated (Gómez-Mejía and Saura, 1996), and because their human capital investments are riskier (Kim and Oh, 2002), traditional job descriptions may not offer them the best reward mechanism; ability-based pay seems to be a more effective mechanism (Saura and Gómez-Mejía, 1997; Klarsfeld et al., 2003) for training, and consequently for *career development* inside or outside the organization. Furthermore, Allen and Katz (1986) have argued that the motivation of high-performing technical professionals would be sustained if they were given top technical positions in their organizations. Katz (1988) has further suggested that new challenges and demands for new skills are required in order to motivate engineers and scientists.

Intrinsic motivation exists, on the other hand, when individual behavior is oriented towards the satisfaction of innate psychological needs rather than the attainment of material rewards (Ryan and Deci, 2000). Intrinsic motivation has been variously defined as the motivation to 'perform an activity for itself' (Van Yperen and Hagedoorn, 2003, p. 340), to experience the satisfaction inherent in the activity (Deci et al., 1999) or to secure 'the obligations of personal and social norms for their own sake' (March, 1999, p. 377).

One mechanism for achieving intrinsic motivation is *job rotation* among different units or divisions of the same organization. Such job rotation has various advantages: (1) It offers individual R&D workers the opportunity to obtain a wide variety of experiences, thus improving their knowledge and increasing their chances of promotion (Gómez-Mejía et al., 2001). (2) It allows employees to see the company from a number of perspectives (Nonaka, 1994), contributing to the forging of strong personal ties among individuals and enhancing company cohesion, thereby encouraging a view of the company as a co-ordinated system. (3) Mobility fosters the transfer and integration of knowledge (McGill et al., 1992).

Furthermore, some authors (Amabile, 1996; Cooper, 2005) argue that the degree of *delegation and managerial support* can also boost intrinsic motivation when top executives establish a clear mission and strategy (Robinson and Stern, 1997; Christensen, 2000), develop leadership within teams (Kim et al., 1999) and allocate resources

to support and develop ideas (Robinson and Stern, 1997).

In summary, this literature would lead us to expect that the heads of R&D departments should adapt HRM practices to support their departments' specificities. In particular, attention should be paid to the degree of delegation and managerial support needed in R&D environments, networks and multidisciplinary teams, recruitment policy, job rotation, compensation and career development.

2.2. *Barriers to the adaptation of HRM practices*

The justice literature (e.g. Tyler and Lind, 1992; Greenberg, 1996; Folger and Cropanzano, 1998) presents robust evidence supporting a positive relationship between organizational commitment and *procedural justice*: a sense of fairness in the methods used to plan and implement resource allocation decisions. Following Wiesenfeld et al. (2007), there are four theoretical arguments provided in the literature for such a relationship. (1) In accordance with instrumental theory (Thibaut and Walker, 1975), procedural justice leads people to anticipate favorable outcomes in the short or long term. (2) The deonance model of justice (Folger and Cropanzano, 1998) argues that greater procedural justice behavior conforms to ethical and humanitarian standards – a preferred form of interpersonal treatment. (3) Uncertainty management theory (Van den Bos, 2001) suggests that procedural justice avoids personal concerns of being exploited by decision-making authorities. (4) Relational theory (Tyler et al., 1996) argues that fair treatment leads people to infer that the parties involved regard them highly.

Given the arguments that have arisen from psychological theories on *social comparison* (Wood, 1989; Taylor et al., 1990), the homogeneity of HRM policies can be seen as a key element of procedural and distributive justice inside organizations (McFarlin and Sweeney, 1992). Following these arguments, Akerlof and Yellen (1990) suggest that firms can increase their profits by reducing the dispersion of remuneration, and Baron and Pfeffer (1994) present evidence that this is the case for differences in remuneration that are not explained by objective differences among workers.

Relying on psychological arguments, Schneider (1987) has hypothesized that the traits of job incumbents influence the structures, processes

and cultures of their organizations, creating a movement towards organizational homogeneity: the Attraction–Selection–Attrition or the so-called ASA model (Ployhart et al., 2006). Those closer to the firms' actual incumbents tend to be *attracted* to the organization and then *selected* according to the incumbents' criteria; *attrition* occurs for those who fit less well into the organization. Jordan et al. (1991) and Schaubroeck et al. (1998) have presented evidence on personality homogeneity within occupations and organizations.

In this sense, some authors (Hambrick, 1994; Ocasio, 1994) see the process for assuring the future control of the firm – CEO succession – as one of competing styles 'that reflect the cultural frames used by production, marketing, operations, and finance personnel to make sense of reality, solve the problems of the corporation' (Ocasio, 1999, p. 535), to overcome the organization's dominant ideology and ruling coalition. HRM practices will therefore not only be homogenous within the firm, they will also reflect the styles of the dominant coalition. There is evidence that HRM configurations of policies vary with the predominant employment relationship in a firm (Lepak and Snell, 2002) or with its strategies and HRM philosophies (Lepak et al., 2007). Lepak and Snell (2002) find that firms in which knowledge-based employment (R&D development employees, research scientists, and design engineers, among others) is the dominant coalition, commitment-based HRM (investment in training, specific skills development, employment security, participation, knowledge-based pay programs, and long-term compensation) is the predominant philosophy.

In summary, although the adaptation of HRM practices can enhance performance in the R&D department, employees who perceive this differential treatment to be unjust can be negatively affected in their performance. From a *rational-comprehensive* perspective then, such perceptions discourage the adaptation of HRM practices to R&D department idiosyncrasy. The *rational-comprehensive* perspective is not the only view of how executive teams make key decisions (for a further discussion see Burgeois and Eisenhardt, 1988). Another predominant view is the *political incrementalism* perspective that emphasizes managers' interest in preserving their political power. However, based on the psychological and political arguments developed previously (Schneider, 1987; Ocasio, 1999) the *political incrementalism* perspective also predicts homogeneous HRM practices inside the firms. Table 1 summarizes the theoretical arguments behind the capacity of R&D

Table 1. Theoretical arguments for adaptation of HRM practices to R&D departments

Literature predicting non adaptation	Literature predicting adaptation	HRM practice description
Procedural and distributive justice (Greenberg, 1996; Folger and Cropanzano, 1998; Wiesenfeld et al., 2007)	Delegation and managerial support (Amabile, 1996; Kim et al., 1999; Christensen, 2000; Pérez and Quevedo, 2006)	Delegation of decisions, department's project selection process, establishment of the mission and strategy; development of team leadership and allocation of resources to help support and work out ideas
	Networks and multidisciplinary teams (Chatterji and Thomas, 1993; Sen and Engelhoff, 2000; Sundgren et al., 2005)	The presence of collaborative networks: internal (through the creation of multidisciplinary teams) and external (working with clients, suppliers or universities) in the job organization of department workers
Psychological arguments about social comparison (Wood, 1989; Taylor et al., 1990; Ployhart et al., 2006)	Recruitment policy (Coombs and Rosse, 1992; Saura and Gómez Mejía, 1997)	Policies and instruments used to attract the desired workers
	Job rotation (McGill et al., 1992; Gómez Mejía et al., 2001)	The allocation of different tasks or jobs maintaining the same job position or pay
Political arguments (Schneider, 1987; Ocasio, 1999; Lepak and Snell, 2002)	Remuneration (Saura and Gómez Mejía, 1997; Manolopoulos, 2006)	Pay systems. Variable versus fixed pay
	Career development (Kim and Cha, 2000; Klarsfeld et al., 2003)	Career support: Measurement and development of abilities, training, development. Internal promotion

Source: Own elaboration, based on previous literature.

managers to adapt the firms' HRM practices, such as delegation and managerial support, networks and multidisciplinary teams, recruitment policies, job rotation, remuneration and career development, to the idiosyncrasy of R&D departments.

All the theoretical arguments presented here make contradictory predictions about the degree of adaptation of HRM practices to R&D department specificities. Moreover, we do not have empirical evidence about whether firms' HRM practices are specifically adapted to support R&D departments nor whether the adaptations are similar across firms. According to Dyer (1984), a descriptive theory is required in order to understand existing HRM strategies before prescriptive theories can be formulated. A descriptive theory requires descriptive research. An initial step is a first-hand detailed description of the HRM policies of R&D departments and their conformity with the firm's general policies by the plausible initiators of their adaptation to this specific environment: the R&D managers.

3. Data collection

We conducted an analysis of four case studies, based on 'replication' logic (Yin, 1994), a techni-

que in which each case study serves to confirm or disconfirm the inferences drawn from previous ones. Between four and 10 cases is the size usually recommended by specialists (Eisenhardt, 1989a, p. 545) for obtaining reliable and manageable information. As emphasized in the literature (Burgeois and Eisenhardt, 1988; Yin, 1994), the main challenge is to ensure that data collection and analysis fulfill reliability criteria, construct validity and external and internal validity. In this section we focus on the description of the data collection process and how the above-mentioned challenges have been addressed.

3.1. Case process selection

Seeking external validity, we follow a criterion-based selection process (LeCompte and Preissle, 1993) for identifying candidate firms. We wanted to find economically significant firms in which R&D departments played a substantial role. Furthermore, we would like to avoid possible similarities in HRM practices due to the fact that the firms follow similar strategies (Lepak et al., 2007) or are dominated by similar coalitions (Ocasio, 1999). For this purpose, we looked for firms in different economic sectors, geographical

markets, competitive positions and top manager's origin.

Following the usual practice in the literature (Yin, 1994), we restricted our search to companies located in nearby Catalonia for reasons of convenience. This is one of the 17 autonomous communities in Spain and one with a great industrial tradition, classified among the most competitive regions of the European Union.¹ We initially identified the business sectors in Catalonia with the highest R&D investments²; then, using accounting information,³ we selected for each sector the companies with the highest total sales revenue, R&D activity and intangibles. Using this information along with press publications, a list of companies was compiled and the first contacts were made. We explained the purpose of the study to each contact person and asked permission to interview appropriate people within the firm. The potential interviewees were sent an interview request, accompanied by the interview protocol detailed in the next section. Four firms [Uriach Group, Lucta, Auna Group and Nissan Technical Centre Europe (NTCE)] agreed to participate, and the interviews were held between February and July 2005. Although further details are given in the case description, we summarize the main characteristics of the firms (see Table 2) in order to provide informa-

tion on the consistency between the criterion selection and the cases analyzed.

Uriach Group⁴ is a pharmaceutical laboratory that consists of six corporations held by a family corporation and managed by one of its members. In 2003, the group's revenues were 145.6 million euros and it employed 717 people. Ninety percent of the sales are concentrated in the Spanish market, being the 31st pharmaceutical laboratory in terms of sales, although Uriach Group exports its products to more than 50 countries. In the same year, this group dedicated 11% of its revenues to R&D expenses, exemplifying its strategic commitment to research. The person identified by the firm as responsible for HRM practices in R&D activities was the R&D Centre Manager, in charge of the basic research conducted by the firm.

Lucta is a family firm managed by a professional executive that produces fragrances, flavorings for human food and additives for animal feed; it is, in fact, a world leader in animal feed production. It has corporations in charge of production and sales activities in the United States, Colombia, Mexico and China. In 2003, Lucta's revenues were 83.85 million euros, and it employed 474 people. The head of the technical division, responsible for the basic research conducted by the firm, was the person who was finally interviewed.

Table 2. Main features of the firms analysed

Characteristics of the Firm	Uriach	Lucta	AUNA	Nissan
Sector	Pharmaceuticals	Flavorings, fragrances and animal food additives (chemical)	Telecommunications operator	Car manufacturing
Employees	717	474	2,113	180,000 (5,785 in Spain)
Sales	145.6 million euros	83.85 million euros	4,290 million euros	44,385.82 million euros (2,459.38 million euros in Spain)
Internationalization strategy	Exportations	Production and exports	National market	Subsidiary of a multinational firm
Competitive position	Low share in the local competitive market.	World leader in a market segment	Third brand in the local oligopolistic market	Strong position in a concentrated market.
Top managers' origin	Family ownership and management	An independent professional in a family business	A professional related with financial institutions	Multinational executives
Department analyzed	R&D Center: From basic research to placement in the market	Technical division: Basic and analytical research	Innovation: Development of new services	Technical center: New car development
Department employees	130	13	141	202

Source: Own elaboration. Numerical data correspond to the year 2003. HRM, human resource management.

In 2004, The Auna Group⁵ was the third largest communications operator in Spain after Telefónica and Vodafone. At that time, its total number of mobile communications customers (particularly those of its Amena brand) reached 9.3 million and the two corporations that comprise the group had consolidated revenues of 4,290 million euros. Telefónica, Vodafone and Auna concentrate 90% of the mobile communications market sales in Spain. Auna was owned by financial institutions and managed by a professional expertise in telecommunications. In this case, the firm referred us to the director of the department for developing new services.

NTCE is responsible for developing the new vehicles produced in Europe by the Nissan Motor Corporation, one of the largest automobile manufacturers in the world, with around 100 corporations. In this case, two people were identified as being in charge of the HRM practices of R&D personnel and a joint interview was conducted with the Human Resources Director of Nissan Motor España, S.A., and the head of the NTCE's Barcelona centre. As will be seen, this fact does not introduce relevant differences with the other cases, where only the head of R&D/innovation activities was interviewed.

In accordance with the research purpose, the firms we analyzed are large (have more than 474 employees) and they comprise more than one corporation. The firms are characterized by the importance of their R&D departments in the business process and are established in four different sectors of economic activity: pharmaceuticals, chemicals, telecommunications and automobile. The internationalization strategies of these four firms are also different. The Auna Group is focused only on the Spanish market. Although concentrating primarily on the Spanish market, the Uriach Group exports part of its production, whereas Lucta (a small multinational firm) has established sales and production activities in other countries. Finally, Nissan (a large multinational firm) focuses on international markets. The competitive pressures of these firms are quite different. Nissan is a world leader firm in a concentrated market while Lucta is a world leader in a specific market segment. Uriach Group competes in a low concentrated local market while Auna Group competes in an oligopolistic local market. Furthermore, the top manager's power seems to come from quite different origins. Lucta and Uriach Group are family firms, but just the Uriach Group is managed by a family member. The NTCE is managed by executives of the

multinational while an independent professional takes care of the Auna Group.

In all cases, the people in charge of the R&D activities were among those selected for interviews as they seemed to be the best informed about R&D activities and were the plausible initiators of the adaptation of the firms' HRM policies to their departments. Two firms – the Uriach Group and Lucta – are highly focused on basic research. The Auna Group develops new products and services, and NTCE is dedicated to technical development. Therefore, if our case selection process introduces a bias, it seems to be one that favors a greater variety of HRM practices among firms.

3.2. The case study protocol

Based on the literature review and our research goals, preliminary interview guidelines (open-ended questions) were prepared for analyzing the HRM practices in R&D departments and their conformity with the firm's general practices. Because of the necessity of guaranteeing construct validity, we asked only for a description of the HRM practices (delegation and managerial support, networks and interdisciplinary teams, recruitment policies, job rotation, compensation and career development) in R&D departments and their conformity with the firm's general practices. At the end of the interview, we asked about any changes that the HRM policy of the R&D departments were currently introducing or would be introducing in the very near future. The preliminary interview guidelines were checked by the Director of the 'Centre d'Economia Industrial', who is an associate professor at Universitat Autònoma de Barcelona and a specialist in R&D management. In addition, we conducted a pilot case study with the general manager of a pharmaceutical company, Fardi.⁶ Their experience and comments were helpful in reducing the number of subjective interpretations and valuations and in determining the scope and number of questions and the final semi-structured interview.

We promoted reliability (1) by using a case study protocol in which all firms and informants were subjected to the same sequence of procedures and interview questions and (2) by organizing the case database in a similar way for each firm we visited. Following suggestions for qualitative research (e.g. Waldman et al., 1998), we gave each candidate a brief description of the project and an interview protocol before to their agreeing to be interviewed. The interview protocol described the

duration of the interview and the fact that it would be recorded, and included the open-ended questions that helped configure the semi-structured interview (see Appendix A). In addition, participants were guaranteed that any data they considered confidential would remain so.

Once the potential interviewees had agreed to participate, we collected external information from company websites and economic yearbooks⁷ in order to prepare ourselves for the interview. The interviews lasted approximately 90 min and were conducted face to face, as this is considered to be the most appropriate approach for descriptive studies (Sekaran, 1992). The interviews were open-ended and conversational. Both researchers participated: one conducting the interviews and the other primarily taking notes. This procedure follows the recommendations of Piore (2006), who discourages the delegation of these tasks to research assistants, and the advice of Sekaran (1992), who encourages research teams, stressing the increased probability of catching each response and clarifying any doubts that the interviewee may have. In some cases, the interviewee provided us with internal documentary information, such as annual reports, executive and managerial reports and catalogues, which extended and supported the information we required.

Each interview was recorded on tape and transcribed. After triangulating these two bases of information with documentary sources, each researcher proceeded to summarize the main characteristics of the firm and information about its HRM practices. The combination of sources (triangulation of data collection methods) ensured greater validity and reliability of the available information (Yin, 1994). Comparing these summaries, a case report was written for each of the firms.

In research that examines personal valuations or causal relationships, construct validity is reinforced through the use of multiple sources of evidence. As this is not the case with our study, which focused on descriptive information, we focussed our efforts on ensuring the reliability of the information collected. Each interlocutor was sent a copy of their company's case report, enabling them to make comments and suggestions. After these suggestions were noted, all the final reports were included in a research report with the main conclusions of the study. This research report was checked by the director of the 'Centro d'Economia Industrial,' who was also present⁸ during some of the interviews, before it was presented and discussed in a subsequent

meeting with all the firms' interlocutors. Thus, the participants in the study had the opportunity to examine our interpretation of the information they had provided and to assess our inductive process.

4. Data description: the cases

Although space does not allow a full description of each final case report, a summary is developed based on the information collected for each case and related to the research questions (McClintock et al., 1979; Burgeois and Eisenhardt, 1988). First, we provide a brief description of the activities and the organization of each firm, based primarily on the documentary sources available. HRM practices in the R&D departments and their conformity with the firms' general policies are then described based on the interviews and internal documents provided.

4.1. *The Uriach Group*

4.1.1. *Description of the firm*

Following a family tradition of more than 100 years of drug production, the firm was established in 1946 by Juan Uriach, who was the firm's chairman at the time of the interview. He has a PhD in pharmaceuticals and complemented his education with management studies at an internationally recognized business school. Nowadays, the group comprises six corporations specializing in the production of different kinds of drugs with share capital belonging to the family-held Uriach Corporation, and organized into traditional departments: production, logistics, human resources, finance, marketing and R&D. Juan Uriach's four sons are members of the board of Uriach Corporation and one of them, Enrique Uriach, is fully involved in top management tasks with the group. Although Group Uriach exports part of its production, its principal market is the Spanish one (90% of group sales), which is dominated by Pfizer, with a 10% market share. The top five pharmaceutical laboratories dominate 30% of the Spanish market, and the Uriach Group is ranked 31st in sales among laboratories in Spain.

The R&D activities of Uriach Group are conducted primarily in a center located next to the company's headquarters in Palau de Plegamans (Barcelona); it has a staff of 130 and a budget of 15 million euros. All phases of drug development,

from basic research to market placement, are performed in this centre. Increasingly, this internal research activity is carried out using a strategy of technological cooperation with pharmaceutical partners to develop new products. The remainder of this section presents a summary of the interview conducted with the R&D center manager.

4.1.2. HRM practices

Delegation and managerial support. The entire organization works with a system of annual targets for departments and individuals. The targets are set in accordance with the firm's strategy, and each department develops its own projects. The departments propose their own projects and top management makes the final selection on which projects will be developed, in accordance with the firm's strategy. Each project usually has one 'sponsor' with political influence within the organization. Major differences obviously remain among the types of projects developed by each department; the average duration of an R&D project is about 2 years, for example, although larger pharmaceutical projects can last between 12 and 15 years. Projects are monitored annually, regardless of the total duration, as budgets are prepared every year. As with many companies, systems for checking compliance with working hours are instituted for monitoring work. Differences among the projects also affect the way work is organized.

Networks and multidisciplinary teamwork. R&D work in the Uriach Group is organized into multidisciplinary project teams. Two people are responsible for each project: one is in charge of management; the other is in charge of the scientific aspects. These two leaders form teams of people from various knowledge disciplines (chemistry, pharmacy and biology, for instance). Such teams are given a budget and the necessary resources to carry out the day-to-day management of the project, and can suggest that new employees be added to the team if necessary. Although teamwork does exist in other departments, it does not constitute the usual way of working in the rest of the firm. Thus, teamwork is specifically applied in the R&D department.

Recruitment policy. With respect to staff selection of, for example, a toxicology expert, the functional department makes the actual request based on the job description. Human resource personnel are responsible for conducting the search, and they participate jointly with the

department requesting the worker in the selection process. The main differences between the R&D department and other departments of the firm in this regard are the requirements for candidates and the way the search is conducted. Because of the higher technical and scientific requirements, they generally come from established university research groups.

Compensation. The same salary system applies to the entire firm and is managed by the human resource department. Variable pay has been established only at an executive and departmental manager level. Its total does not exceed one-sixth of the total compensations. The measures for establishing variable pay are based on both company and departmental targets. Objective and subjective criteria are accorded equal importance in this measurement, although different assessment scales are used, depending on the department.

Career development is also a joint responsibility of the worker's department and the human resource department. Throughout the firm, professional careers are strongly linked to a hierarchical position within the company and there is limited *job rotation*. The firm has no appraisal system of workers' abilities and capabilities. It appears to be similar to the description of an internal job market system in which internal promotion prevails. Specifically, it has been noted that if scientists want to progress, their only option is to assume managerial responsibilities.

Although the interviewee mentioned some aspects of the general HRM policy of the firm that could be improved, at the time of the interview no changes were scheduled at the firm or at the R&D center level.

4.2. Lucta

4.2.1. Description of the firm

Lucta is a family business established in 1942. The capital is currently dispersed among the various family members, and a professional manager has run the firm since 1994. Lucta's activity is focused on three main lines of business: (1) flavorings for human food – 26.5% of sales; (2) fragrances – 34.4%; and (3) additives for animal feed – 39.1% of sales. Lucta is the leading company for these three activities in Spain, where 63% of its sales are concentrated. Lucta exports to more than 52 countries and owns companies in charge of production activities in the four countries where a

total of 32% of its sales are concentrated: Mexico (12%), Colombia (10%), China (8%) and the United States (2%). In fact, Lucta is the world's leading firm in sales of animal feed additives.

Lucta is structured with geographical general managers and divisions for production and support activities. There are three production divisions, one for each of its business lines: flavorings, fragrances and animal feed additives. Each production division is structured into departments: typically production, quality control and sales. Support activities are provided by technical, marketing and administration divisions, the latter with its own human resource department. Lucta headquarters is located in Montornés del Vallés (Barcelona), where the technical division develops basic research on its three main lines of business. The interview was conducted with the head of the technical division. The rest of the section presents an excerpt from the interview.

4.2.2. HRM practices

Delegation and managerial support. An annual system of objectives for each division and department is established in accordance with the firm's strategy. Generally, top management is highly involved in the divisions' tasks through several committees. An executive committee is in charge of assessing and monitoring innovation activity in R&D projects, for example. The committee consists of the group general manager, the general manager for Europe, the head of the research group and specialists from each area. The committee decides which projects are to be implemented and the budget to be assigned to each project. This committee meets periodically (usually twice a year), to assess new project proposals, to analyze the progress of ongoing projects and to decide which projects will continue. Nevertheless, the management of each project is ultimately the responsibility of a team of technical division staff members.

Networks and multidisciplinary teamwork. One of the key elements of Lucta's business is both basic and analytical research. The innovation process is led by flavoring specialists and perfumers whose olfactory and taste skills are highly valued by companies in this sector. In attaining a specific scent, these experts are capable of directing the combination of aromatic components – molecules developed by the laboratory scientists. Because the research is centralized in Spain, and involves a relatively small team of 13 people, there is a greater need for external collaboration in this

area than in other divisions of the firm; these associations are often sought with universities and research centers.

Recruitment policy. Most of the people who work in the R&D department are chemists. However, some biologists and veterinarians specializing in animal nutrition are also present. In any case, the recruitment policy has been adapted to the R&D department specificities due to the high level of qualification and specialization (i.e. olfactory and taste skills) required in the candidates. This is especially evident in the way they look for (personal networks) and attract such candidates (specialized careers).

Compensation. The human resource department manages the salary system for the R&D department. It is generally applied to all the firm's workers. However, the range of jobs is small due to the size of the technical division in comparison with other divisions. Although variable pay was initially established for the executive level, this system was subsequently discarded, and all salaries are currently fixed.

Career development. Professional careers are strongly linked to hierarchical positions within the company, *job rotation* is limited and there is no established appraisal system for workers' skills and capabilities in the firm. Regardless of the department, therefore, professional careers at Lucta appear to bear a close resemblance to an internal job market system, where internal promotion prevails. It is also notable that, in this area, researchers make a specific, significant investment in self-training in order to apply their basic knowledge of chemistry to the needs of the sector.

At the time of the interview, neither the firm nor the technical division were involved in important changes in the HRM policies.

4.3. The Auna Group

4.3.1. Description of the firm

At the time of the interview⁹, the Auna Group was a communications firm with three lines of business concentrated in two companies: landline phones and a large customer base (Auna) and mobile communications (Amena). Three divisions were in charge of the production and sales activities of these services and the development of new ones. The purchasing, systems, human resource

and administration departments offered support to the three divisions. This group originated in 1996, when several professionals from Spanish State TV (Radio Television Española) obtained a phone operator's licence with financial support from a conglomerate of investors led by the Banco Santander Central Hispano. At the time of the research, in fact, the top manager was a telecommunications engineer with business school studies and previous experience at Siemens and Hewlett Packard, and the chairman and the vice-chairman of the company were members of the company's conglomerate of financial investors.

Amena was Auna Group's primary line of business, serving more than 90% of the group's customers. Amena's growth strategy was organized in order to develop its own network of collaborations around the technology that it managed and the terminals on which its services were offered. Consequently, Amena obtained an 18% share of the mobile communications market in Spain, making it the third-ranking brand in that country after Telefónica (54.8%) and Vodafone (27.2%).

In December 2003, 141 employees from a total staff of 2113 were directly involved in R&D activities. The investment in R&D between 1999 and 2003 was over 60 million euros. Activities for developing new services were conducted on the premises next to the company's headquarters in Alcobendas (Madrid), where our interview was held. The interview was conducted with the director of the department for developing new Amena services. The remainder of this section presents a summary of the interview.

4.3.2. HRM practices

Delegation and managerial support. At the group level, the strategic goals of the firm were detailed in annual targets for operational teams and people. Top general managers were involved in setting and monitoring these targets. Management's role as a driving force in project development throughout the departments is also noteworthy. In addition to allocating resources, management played a critical role in finding technological partners – whether universities, other companies with complementary technologies or content partners who could complement the development of Amena's products. Furthermore, although departments suggest which projects could be undertaken, the final decision is made at the top management level.

Networks and multidisciplinary teamwork. Networks and teamwork were particularly needed in Amena's innovation activities. The innovation strategy was based primarily on information about consumer needs. Accordingly, the company developed technological monitoring systems in various countries and information systems to reveal consumer preferences in stores. Similarly, Amena developed collaboration agreements with firms from different industries, as well as with university research teams.

Recruitment policy. The department for developing new services consisted of younger and more highly qualified people than were typical for the firm. The age of the workers in charge of innovation tasks averaged between 30 and 31 years. Their university education was usually in telecommunications engineering, information technology or physics. In general, these were people with excellent academic records, many of whom graduated at the top of their class. One of the most notable factors in recruiting such people was Amena's business project itself, which was perceived to be an exciting opportunity for training, professional development and participation in a unique project – a perception expressed throughout the interview as one of the central factors in the department's HRM policy.

Compensation. The R&D department initially established salaries jointly with the human resource department, on the objective basis of the employee's education and job position. Periodically, all group employees were assessed according to their attainment of targets, their attitude and their aptitudes. This appraisal served to fix incentive payments at around 20–30% of the employee's salary and to develop abilities, fostered through courses and task rotation.

Career development. These appraisals were also used for promoting employees and establishing their training needs. Although the other firms discussed up to this point used a relatively traditional method of compensation, member organizations of the Auna Group used a system closer to pay according to ability. At the time of our study, Auna was still a young company, which makes it difficult to analyze promotion policies. However, it seems that there were no dual careers, and that internal promotion was encouraged. Both compensation and promotion policies were universal throughout the firm.

Job rotation. This was the only case in which the job rotation was specifically mentioned as one of the basic HRM practices adapted to the innovation department, instituted in order to prevent people from becoming too settled. Approximately every 2 years, the employees in the new services development department were urged to change their activity so that they could progress professionally. Another tool for achieving this objective was staff training, including the development of tailor-made courses.

Given the age of the firm, their main concern was to continue developing the initial policies established both at the firm level and those adapted to the new services development department.

4.4. NTCE

4.4.1. Description of the firm

The Nissan Motor Corporation, with headquarters in Tokyo, is one of the largest car manufacturers in the world. The activities of the nearly 100 companies in the group are coordinated at headquarters through a matrix structure based on regional areas (Japan, North America, Europe and other global markets) and functional areas (marketing, product planning, R&D and technology, production, purchasing, accounting and finance, and human resources).

The European headquarter is located in France. It coordinates design, R&D, production, logistics, sales and marketing operations for the entire continent. In Spain, Nissan controls the total capital of two companies. In Nissan Motor España, S.A., which is dedicated to marketing the products, the top manager is a French executive from Renault. In Nissan Motor Ibérica, S.A., which has several production plants in various locations on Spain and Portugal, the top manager is a Japanese executive from Nissan.

The company's R&D activities are under the management of the Nissan Research Centre, which is focused on both basic and applied research, and the Nissan Technical Centre, which assumes the tasks of planning, designing and developing new products. On a European scale, the NTCE is responsible for developing the vehicles that are manufactured in Europe. Specifically, NTCE conducts its activities in the United Kingdom, Belgium and Spain (Barcelona and Madrid). The interview was conducted in Barcelona with two managers: the head of the NTCE in Barcelona and the human resources director of

Nissan Motor España, S.A. The rest of this section presents an excerpt from the interview.

4.4.2. HRM practices

Delegation and managerial support. NTCE uses an annual process of strategic planning and target setting, and the performance of all members of the organization is evaluated each year. The targets are quantitative, and are set according to the projects and resources available. Obviously, the tasks and projects differ among departments. In the case analyzed, for example, the various manufacturing centers compete for the production of a model. When headquarters assigns a model to Europe, NTCE provides the required resources and an action plan. Each project is assigned to a project management office (i.e. the Barcelona office), which is responsible for ensuring that the action plan is followed.

Networks and multidisciplinary teamwork. The development stage involves the various business areas that will be involved in production (e.g. engineering or purchasing), as well as the suppliers of different components and materials. This interdisciplinarity leads to a series of multifunctional teams being formed, which helps to reduce development time and costs. This way of working is not as common in other functional areas of the firm.

Recruitment policy. Although most NTCE employees have an industrial engineering background, qualifications are not usually that high in other departments. The recruitment of engineers is facilitated in this case by the attraction that the automobile sector holds for young people, given their career opportunities and the reputation of the Nissan brand. Willingness to travel and a command of languages are factors that are positively valued in hiring these employees.

Compensation. Nissan has a worldwide policy detailed in internal documents that includes positions and salaries, targets, incentives and training. This policy is the same for all the functional areas, and must be followed and implemented by the Human Resources departments in every center, adapted to the legal environment of each country. Remuneration comprises a base salary, linked to the job, and variable remuneration based on the degree to which each worker meets the quantifiable targets that are established each year. This system can lead to substantial remuneration for some employees.

Career development. Employees are appraised periodically on their knowledge and abilities. These appraisals are used to compare the requirements of vacant positions with staff availability at that time. Specific training plans are then developed. Training represents about 3–4% of an employee's working time, and it is usually carried out through both internal and external courses. Thus, the system is closer to pay-according-to-abilities than to a traditional job system.

All this information is used to assign people to the different tasks – to define the company's internal promotion policies. Such policies are key, given the low staff turnover. Thus, the professional careers of these employees are linked to the company for many years. *Job rotation* aside from the promotion system is unusual in the firm.

Although the people interviewed suggested that the introduction of a dual career (scientific and managerial) would be a good idea, there was no concrete project to introduce it nor were there any important changes scheduled in the rest of the HRM policies at the time of the interview.

5. Data analysis

Data analysis was conducted using the 'pattern matching' procedure, in order to increase its internal validity (Yin, 1994). We arrayed the data by following techniques for cross-case pattern sequencing (Eisenhardt, 1989b) and tabular displays (Miles and Huberman, 1984). Following the advice of Eisenhardt and Graebner (2007), we identified patterns of HRM practices across the R&D departments of the four firms. In particular, for each of the HRM practices analyzed, we were interested in identifying the degree of adaptation to R&D department specificities and how common it is across the firms studied (i.e. its frequency). As with deductive hypothesis testing, we are looking for formal observations to fit a consistent pattern, although they do not always conform perfectly (Miles and Huberman, 1984; Eisenhardt, 1989b).

Regarding the degree of delegation and managerial support, a main concern seems to be the consistency of the departments' goals with the firm's strategy. The four firms analyzed follow a planning system in which their strategy is broken down into annual targets for the departments and workers in the various firms. In the four cases analyzed, R&D/innovation activities constitute a basic element of their strategy. Without any particular adaptation to the R&D department,

general managers are closely involved, contributing time and financial resources to the process of selecting and following the projects developed. With the exception of Nissan, where the NTCE has a clear project to develop, it is the R&D department in these firms that proposes the set of projects to be developed, with general management establishing the corresponding controls.

We observed a greater tendency to create collaborative networks in R&D departments than in other departments of the firms, whether those networks were internal (through the creation of multidisciplinary teams) or external (working with clients, suppliers or universities). Such collaborative efforts not only enable knowledge and ideas to be exchanged, but they also help direct the innovation process towards market needs and establish relationships with the owners of the external resources required to carry out the projects successfully.

The firms analyzed for this study have human resource departments that develop, jointly with the other departments, the HRM practices on recruitment, compensation and career development (usually training and promotion) – policies that have been established at the firm level. There are some subtleties in the recruitment policy, however. Although the procedure might be similar to other departments, it was noted that in all four companies R&D employees were more highly trained and had higher academic qualifications. This disparity has implications for recruitment strategies – where those workers can be found (i.e. contact with universities) and how they can be attracted (interesting projects). In this sense, we observed, in all the firms analyzed, that recruitment practices have been specifically adapted to idiosyncrasy of the R&D department.

The extrinsic motivation factors analyzed in this study were pay and promotion policies. Although the compensation mechanisms are not particularly adapted to the R&D department, there are relevant cross-case differences. Some firms use a fixed-pay system, for instance, whereas others have introduced a variable pay system which, depending on the cases, is applied to all the workers of the firm or merely to those with managerial tasks.

With regard to promotion policies, although internal promotion seemed to be the most common system in the companies studied, we observed specificities related to the firms' support for career development. Some companies – those that pay according to abilities (Auna and Nissan) – tend to invest heavily in formal training and

generate more information about workers' capabilities and training needs.

Only in Auna has job or task rotation been highlighted as an explicit policy – in that case, in the innovation department. It must also be noted that none of the firms was involved in a process of changing the current HRM policies.

In summary, we find that the HRM practices that are similar across all the firms investigated, and less adapted to the R&D department specificities, appear to be the degree of delegation and managerial support. Among HRM practices that tend to be specific to each company, but less adjusted to the idiosyncrasies of R&D departments, are those related to remuneration or the pay system and career development, usually in terms of training and promotion. With respect to job or task rotation, the evidence is less conclusive, although we detect some differences among firms and some adaptation to the R&D/innovation department. Finally, as distinctive HRM practices of R&D departments in all the cases analyzed, we found a tendency to create multidisciplinary teams that maintain both internal and external networks, and an employee recruitment policy aimed at attracting highly trained employees with high academic qualifications. This analysis is summarized in Table 3.

The evidence presented here is obviously limited to the four cases analyzed, which include a larger number of companies. Because the case selection process has been designed to encourage differences rather than homogeneity among the firms, we did not expect it to generate the low degree of adaptation found in HRM practices in the R&D department of each firm. Furthermore, the data also emphasize differences in the origin of the top manager's power and the competitive position of each firm. The Uriach Group is a family firm with no separation between ownership and control, and with a low market share in its competition with a large number of pharmaceutical laboratories. The Auna Group, on the other hand, is managed by a technical professional supervised by financial investors, and has an important market position in an oligopolistic market. Thus, it is unlikely that the high level of homogeneity among the practices of these four firms can be explained as a result of similar sources of power (Ocasio, 1999) or a firm's strategies (Lepak et al., 2007).

Similarities among the firms evidently remain. For example, all the top managers have strong educational backgrounds in science or engineering. Because replication logic (Eisenhardt, 1989a)

is central to building theory from case studies, additional empirical evidence may support the evidence presented here and contribute to the development of a strong descriptive theory. Accordingly, in the next section we discuss the implications of the results for the formulation of a prescriptive theory and its managerial implications.

6. Theoretical and managerial implications

One pattern common to the firms analyzed is that recruitment policies and networks and multidisciplinary teams are the only HRM practices adapted to the R&D department idiosyncrasy in a similar way. These results are consistent with previous literature. Coombs and Rosse (1992) and Saura and Gómez-Mejía (1997) have emphasized the need to contract people with greater technical and scientific knowledge in these tasks. Other authors (Sawhney and Prandelli, 2000; Sen and Engelhoff, 2000; Sundgren et al., 2005) emphasize the creation of multidisciplinary teams that maintain networks as critical factors for the success of R&D activities. The findings in this paper support the idea that, due to their nature, R&D activities require more qualified workers and stimulate the creation of networks and multidisciplinary teams.

Furthermore, the data show that the degree of delegation and the managerial support has little adaptation to the peculiarities of R&D departments in the firms analyzed. These results apparently contradict previous evidence (Robinson and Stern, 1997; Kim et al., 1999; Christensen, 2000). But our results should not be taken to suggest that delegation or managerial support are not important for R&D activities; nor do they necessarily imply that greater support is required in R&D departments than in other areas. We merely present evidence that, when an R&D department has been established, the delegation and the managerial support it receives are similar to that received by other departments of the firm.

In addition, one would expect from previous empirical studies that R&D departments would have high levels of job rotation (Nonaka, 1994; Gómez-Mejía et al., 2001), variable pay compensation (Saura and Gómez-Mejía, 1997; Manolopoulos, 2006) and internal promotion (Kim and Cha, 2000). Our data show considerable variation among firms in the adoption of such policies – and low adaptation of compensation and career

Table 3. Cross-pattern analysis

HRM Practices	Uriach	Lucta	AUNA	Nissan	Adaptation patterns	
					Differences among firms	Degree of adaptation
Delegation and managerial support	All departments propose projects and top management decides. Relevance of sponsorship in all the projects	High involvement of top management in divisional tasks and projects through different committees	Top management is a driving force in departmental project selection, development and supervision	Projects (automobile models) are selected by headquarters. Key role of the project management office	Similar among firms	Low adaptation to R&D department
Networks and multidisciplinary teams	R&D projects organized in multidisciplinary teams. Technological cooperation for product development. Highly specific to R&D department	External cooperation because R&D department is small and highly specialized. Specific to R&D department	High use of external collaboration. Specific to innovation department	Multifunctional teams. Suppliers' collaboration	Similar among firms	High adaptation to R&D department
Recruitment policy	Proposed by each team. Specific requirements by R&D department	Differs from the rest of the firm because of abilities and educational requirements of the candidates	Young people with excellent academic records. Specific to innovation department	Specific needs: people with industrial engineering background	Similar among firms	High adaptation to R&D department
Job rotation	Extremely limited	Extremely limited	Explicitly promoted. Contingent to innovation department	Very limited	Some differences among firms	Some adaptation to R&D department
Compensation	Fixed salaries for workers and variable compensation for managers. Firm's general policy	Fixed salaries. Firm's general policy	Variable compensation. Firm's general policy	Variable remuneration. Firm's general policy	Differences among firms	Low adaptation to R&D department
Career development	No appraisal of abilities/capabilities. Firm's general policy	No appraisal of abilities/capabilities. Self-training. Firm's general policy	Appraisal of abilities. High effort on training. Firm's general policy	Appraisal of abilities. High effort on training. Firm's general policy	Differences among firms	Low adaptation to R&D department

Source: Own elaboration based on the data description. HRM, human resource management.

development to R&D specificities. Although the greater use of job rotation, variable pay compensation or internal promotion in R&D activities might be efficient, procedural justice (Greenberg, 1996; Folger and Cropanzano, 1998; Wiesenfeld et al., 2007) and social comparison (Wood, 1989; Taylor et al., 1990; Ployhart et al., 2006) could make their implementation difficult.

Although the specialized literature emphasizes the adaptation of HRM practices (delegation and managerial support, networks and multidisciplinary teams, recruitment policies, job rotation, remuneration and career development) to R&D departments, the evidence provided does not seem to be so conclusive. Procedural and distributive justice arguments, together with assumptions about the people who implement the procedures (in our case HRM practices) and the group of workers affected by social comparison, can help to bring theory and evidence into line.

The procedures related to delegation and managerial support are established by top management, and a social comparison is then established among departments. In this sense, strong pressure for egalitarian procedures is expected to be found among departments in all the firms. Furthermore, the creation of a department is, in itself, a delegation process that seems similar among firms, at least in the degree of delegation and managerial support in the firms analyzed in this paper.

The organization of work and personnel requirements is usually established by the R&D departments, whereas compensation and career development are established by the human resource departments. In the first case, the comparison group comprises the people in the R&D departments; in the second case, it consists of all the workers in the firm or in similar hierarchical positions. This might explain why the practices related to the organization of work (networks and multidisciplinary teams, recruitment policies and job rotation) are more adapted to the particularities of R&D departments than practices related to remuneration and career development are. Furthermore, the differences in the workers' tasks among the firms analyzed seem to be greater than do the differences among the tasks performed by workers in their R&D departments. Thus, when the comparison is established across firms, greater heterogeneity among the policies established for the whole firm (compensation and career development) should be expected than for those fixed at the R&D department level (networks and multidisciplinary teams, recruitment policies and job rotation), as our data suggest.

Further research is needed to confirm such relationships – how workers react to differences in HRM practices, or what the comparison groups are for each of the procedures, for example. The confirmation of such relationships would have significant managerial implications. The main implication is that the organizational structure determines the comparison group used for evaluating the procedural and distributive justice of a firm's policies. Delegating certain decisions to the direct manager of a group of workers can favor the implementation of specific policies for those workers. Consequently, the organizational structure and delegation of decisions will be an important determinant of a firm's capacity to adapt such policies to specific groups. Applied to the context analyzed in the paper, the existence of a centralized human resource department could be a barrier for the adaptation of specific departmental policies. If specific remuneration or career development policies are needed for R&D workers, delegating those decisions to the R&D department heads would aid in their adoption. The debate, then, would be the suitability of this type of delegation.

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4. Some of the information included in this section has been obtained from the group's website: <http://www.uriach.com>
5. At the end of 2005, Auna was acquired by ONO and Amena (the mobile and Internet division of Auna) was acquired by France Telecom. Our interview was conducted when Auna was an independent firm.
6. For more information regarding these pharmaceutical laboratories, visit: <http://www.fardi.es>.
7. Most of the economic information was obtained from the ranking of 5,000 large Spanish companies published by Actualidad Económica.
8. Without participating in the interview process.
9. At present it is shared by France Telecom.

Appendix A (This interview outline has been translated from the original Spanish by the authors)

Presentation: Company name, interviewee name, interviewee's position . . .

Regarding the company's R&D activities:

Brief description of the type of R&D activities underway in the company.

Is there a department or person responsible for these activities?

Who decides the type of activities to be carried out by this department?

How is the (responsible) department's contribution to the company assessed?

Emphasis on results versus the process

Objective and subjective measures of performance

Frequency of formal performances assessments

Frequency of informal assessments

Who should measure the performance of scientists and engineers?

Within the project: manager, self, colleagues, subordinates . . .

In the centre/department: manager.

Setting: clients, outside stakeholders . . .

What criteria should be used to measure that performance?

Aimed at the market

Specific to the R&D project

Researcher's technological attributes

Researcher's performance attributes

Number of people responsible for these R&D tasks.

How are these tasks organized? (by project, people per project, team structure, etc.)

Innovative activity results during the last few years.

Who owns the results of these research studies?

Have any results leaked out?

Notes

1. Eurostat Regional Yearbook 2007.
2. From the information available from CIDEM (Centre for Innovation and Business Development) (<http://www.cidem.com>).
3. Obtained from the SABI database (from Bureau Van Dijk Company), for which general and financial information is collected from more than 200,000 Spanish companies and 18,000 Portuguese companies.

How are the results of these activities applied to the company's operation (can you state an example)?

Role of leadership. Economic and professional incentives.

Have you experienced any significant organizational change? Can you describe it?

Causes of the change. Difficulties. How has it affected human resources management?

Regarding HR management in an R&D department:

1. Job and recruitment design

- Training for job assessment.
- Technical and human abilities demanded of researchers
- Requirements, tests, etc.
- Assessment of these abilities and improvement processes
- Are there differences with the other functional areas?

2. Career plans

- Are there clearly defined professional careers within the company?
- Internal-external promotions
- What careers have the people currently in charge had?
- Is that career similar to those of the other managers within the company?

3. Rewards

- Amounts. How are they decided? Criteria for granting them: group-individual, subjective, objective, etc.
- Non-monetary remuneration, importance and opinions.
- Bonuses and other incentives.
- Connection between the assessment and the reward. Frequency of the assessments.

4. Opportunities (Empowerment, Employability)

- Degree of staff rotation.
- Reasons for departure. Target job positions.
- How are the ideas protected?

5. Differences in the HR policies of other departments in the company.

- Describe the main ways in which the HR policies differ from those of other departments.
- Do you think that the HR policies associated with the R&D department should be changed? (In what sense? How?).

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