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INSTITUTIONAL PLURALISM WITHIN SCIENCE-BASED FIRMS: A SCIENTIST-ENVIRONMENT FIT PERSPECTIVE

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CHAPTER 1

Introduction

Science is of fundamental interest to organizational scholars because it defines the spaces of technological innovation, organizational change, and adaptation in numerous and various industries. But can science and business coexist? It is often believed that science and business belong to separate worlds, philosophically and physically. As Stokes observed (1997): "As pure science was being provided with an institutional home in the universities, the sense of separation of pure from applied was heightened by the institutionalization of applied science in industry". The separation is not only physical and institutional but also cultural. As Merton (Merton, 1973) pointed out, science and business are associated with distinct institutions and norms. Science is a world focused on "first principles" and methods; in contrast, business concerns itself with commercially feasible products and processes. Lastly, both science and business are intensely competitive arenas but their "markets" and "currency" are distinct (Pisano, 2010).

Over the last fifty years, a number of studies have tried to elucidate the tangled relationship between "science" as a knowledge production institution and the formation of technological rents. Traditional perspectives on competitiveness and long-term economic growth have underscored the central role played by the public knowledge stream as the foundation of the private knowledge stream (Romer, 1994). At the highest level of abstraction, this relationship can be described in terms of the linear model of science: advances of knowledge in the scientific commons are equated with progress in basic science, which, in turn, establishes critical inputs for the downstream private stream of applied research, technological innovation, and commercialization. Bush (1945) famously articulated this view in his call for heightened funding of the "endless frontier" of public scientific knowledge.

Management theorists have often echoed this view by examining specific mechanisms that firms use to access and leverage public knowledge. The notion of absorptive capacity captures the possibility that firms can, and should, absorb knowledge available in the public commons as part of their attempts to make effective contributions to the private knowledge stream (Cohen & Levinthal, 1990). Moreover, it has been argued that firms that establish strong mechanisms for absorbing public knowledge are more effective innovators and, therefore, more competitive (Powell, Koput, & SmithDoerr, 1996; Zucker, Darby, & Brewer, 1998). On the other hand, engagement with the public knowledge stream may provide stronger intellectual foundations for private knowledge production. Specifically, building on Nelson's early formulation (Nelson, 1959), Fleming and Sorenson (Fleming & Sorenson, 2004; Sorenson & Fleming, 2004) argued that firms use public knowledge streams as "maps" for navigating and contributing to the complex landscape of patentable innovations. Three central features characterize these analyses. The first is the recognition that streams of knowledge are embedded in two distinct institutionalized spheres —i.e., public and private— that shape the rules of knowledge disclosure, access, and reward (Dasgupta & David, 1994; Merton, 1957; Murray & O'Mahony, 2007). Second, being close to science, adhering (at least partially) to the "invisible college" norms, and directly contributing to scientific advancements are valuable strategies for profit-seeking firms. By pursuing a strategy that rewards contributions to knowledge embedded in and endorsed by the public institutional sphere, private firms may be able to attract and retain high-quality researchers (Cockburn, Henderson, & Stern, 2000; Henderson & Cockburn, 1994, 1996). Moreover, engagement with public knowledge streams provides industrial scientists with non-monetary rewards —e.g., status and reputation gains— and access to academic conferences and the community of scholars (Stern, 2004). Third, the fundamental relationship between business and science remains in the background. The university is implicitly considered the bastion of science; the for-profit enterprise, the keeper of the business. But, as Gary Pisano noted (2006: xii), "the distinction of science and business has not been perfectly clear. Some great scientists were entrepreneurs, and some large corporations were home to extraordinary basic research laboratories," and "from the other side, universities clearly begin to see their science as a business. They aggressively patented and sought licensing deals, collaborated with venture capitalists to launch firms, and even began to mode downstream in the drug development."

Putting these features in perspective, the resulting image is one of a division of the "innovative labour" as a nexus of interrelated search behaviors (Rosenberg, 1990) that, in contrast to the past, occur at the crossroads of different institutions (Gibbons, 1994),and are loosely coupled with a multitude of organizations (Meyer, 2000). This new conceptualization of "innovative labour division" adds considerable nuance to the theme of the increasing heterogeneity in institutional logics and identities of participants.

The connection between science and business started to change in the last two decades of past century (Mowery, 1990, 2009). A number of large US enterprises, including DuPont, Corning, Dow, General Electric, Westinghouse, Xerox, Kodak, IBM, Chiron, and, of course, AT&T, created corporate research laboratories capable of pursuing cutting-edge science. A small number of Nobel Prize winners in chemistry and in physics were the products of industrial laboratories. Many of these laboratories, like their academic counterparts, offered scientists relatively wide latitude to pursue research projects and even publish their findings in academic journals (Stern, 2004). Even the supposed clean distinction between the norms of science in academic settings and the prevalent norms in industrial settings has recently been called into question (Hounshell & Smith, 1988; Shapin, 2008). For example, after investing millions in research on the genetic origins of type 2 diabetes, Swiss pharmaceutical firm Novartis released on the Internet, for anyone to use, a vast amount of gene sequence data from a genome-wide analysis of more than 3,000 type 2 diabetes patients. The president of the Novartis Institute for Biomedical Research chose this strategy because the data contained more research leads than his researchers could ever pursue: "To translate this study's provocative identification of diabetes-related genes into the invention of new medicines will require a global effort" (Tapscott & Williams, 2007).

The rich, phenomena-related literature has dealt with the potential detrimental effects due to the collision of norms and institutions associated with business and science, spanning across public policy, law, economics, and technology transfer. At the broadest level, some authors have pointed out that the commercial engagement of scientists through the intellectual property system may undermine academic objectivity causing bias, suppression of results, and even frauds (Krimsky, 2003; Resnik, 2007). Arguments in favor of this position relate to economic incentives that encourage secrecy and decrease the number of contributions to the public knowledge stream (Blumenthal et al. 1997; Campbell et al. 2002).

Drawing on institutional analysis, other works have studied the impact of private knowledge on the cumulative process of knowledge construction (Nelson, 1986; Schotchmer, 1991, 1196, 2004; Dasgupta & David, 1994). Huang and Murray (Huang & Murray, 2009), for instance, have shown that gene patents have decreased public genetic knowledge, with broader patent scope, private sector ownership, patent thickets, fragmented patent ownership, and a gene's commercial relevance exacerbating their effect.

Other scholars have explored the effects of the contiguity between business and science, focusing on potential distortions of research agendas. Due to the economic reward offered by patents (Thursby & Thursby, 2002), researchers may want to shift toward more applied research in order to contribute more effectively to the private knowledge stream (Aghion, Dewatripont, & Stein, 2008). This shift parallels the countervailing concern that firms that contribute to the public knowledge stream weaken their ability to generate private knowledge (Gittelman & Kogut, 2003). Many of these worries about public-private influence are premised in the idea that research projects conducted in public and private organizations differ. However, evidence suggests that this assumption is false: scientists engaged in a range of endeavors can contribute knowledge to either or both knowledge streams, from early semiconductors to recombinant DNA and software code (Murray, 2002; Murray, 2010).

All in all, these writings focus on the potential collision of different institutions of knowledge production—science on the one hand and intellectual property on the other—and their societal-level implications —e.g. understanding the conditions that shape an innovator's actual ability to build on the work of others—. Thus, it seems that scholars have favored a "macro-perspective," looking at the tangled relationship between business and science from the latter viewpoint.

In contrast, a few studies have examined the relationship between science and business from the perspective of a science-based company: that is, an entity that both participates in the creation and advancement of science and attempts to capture the financial returns from this participation (Gittelman & Kogut, 2003; Pisano, 2006a; Pisano, 2010). These studies add considerable insights into previous literature on organizing for innovation —e.g., generating ideas, selecting the most promising ideas, and designing development paths—, suggesting that the science behind many knowledge-based firms creates a very specific set of functional requirements for organizations. One major stream emphasizes that "how" knowledge-based firms access and practice science—in particular, whether they establish credible linkages with the scientific community—matters to the production of valuable innovations. Put another way, bridging the disconnect between scientific knowledge and innovation appears to depend on access to individuals who perform both activities, rather than on the ability to generate valuable scientific knowledge alone. The literature on the motives for firms to publish their research in scientific journals has implicitly or explicitly acknowledged the central importance of forming ties to this community, via boundary-spanning "gate-keepers," to access socially embedded knowledge (Allen, 1977; Gittelman, 2007; Lieberman, 2005; Tushman, 1977; Tushman & Katz, 1980). On the other hand, numerous studies in pharmaceuticals and biotechnology show that an internal orientation toward science and collaboration with researchers outside the firm leads to higher research productivity (Gambardella, 1995; Paruchuri, 2010; Powell et al., 1996).

Other studies emphasize the problem of converting cutting-edge scientific ideas into valuable innovation. The dilemma for firms that seek to profit from scientific knowledge is that science is not available as easy-made inputs but, rather, is produced by scientists who are situated in the scientific community. Gittelman and Kogut (Gittelman & Kogut, 2003) theorized that the difference in evolutionary logics that generates paper and patent citations reflects the difficulty faced by private firms when attempting to translate knowledge that has been produced in a scientific setting into valuable technologies. Scientific and commercial endeavors diverge in the different citation traces that are generated by the distinctive rules that govern the logic by which a good paper or a valuable patent is selected and replicated. Based on a longitudinal dataset of US biotech firms, the authors were able to show that the ability to produce excellent science—that is, frequently cited papers—has a strong, negative impact on the patent-citation rate. Later research provided further empirical evidence in support of this vision. Science-based firms pursuing an exploratory research strategy are relatively less capable of generating technological rents (Durand, Bruyaka, & Mangematin, 2008). Analogously, the prominence of science-oriented human capital has been found to inhibit firm-level abilities to translate scientific achievements into innovations (Toole & Czarnitzki, 2009). All in all, these studies suggest that science-based firms have heterogeneous abilities to transform scientific discoveries into innovation outputs, thus calling for further research on factors that moderate this relationship.

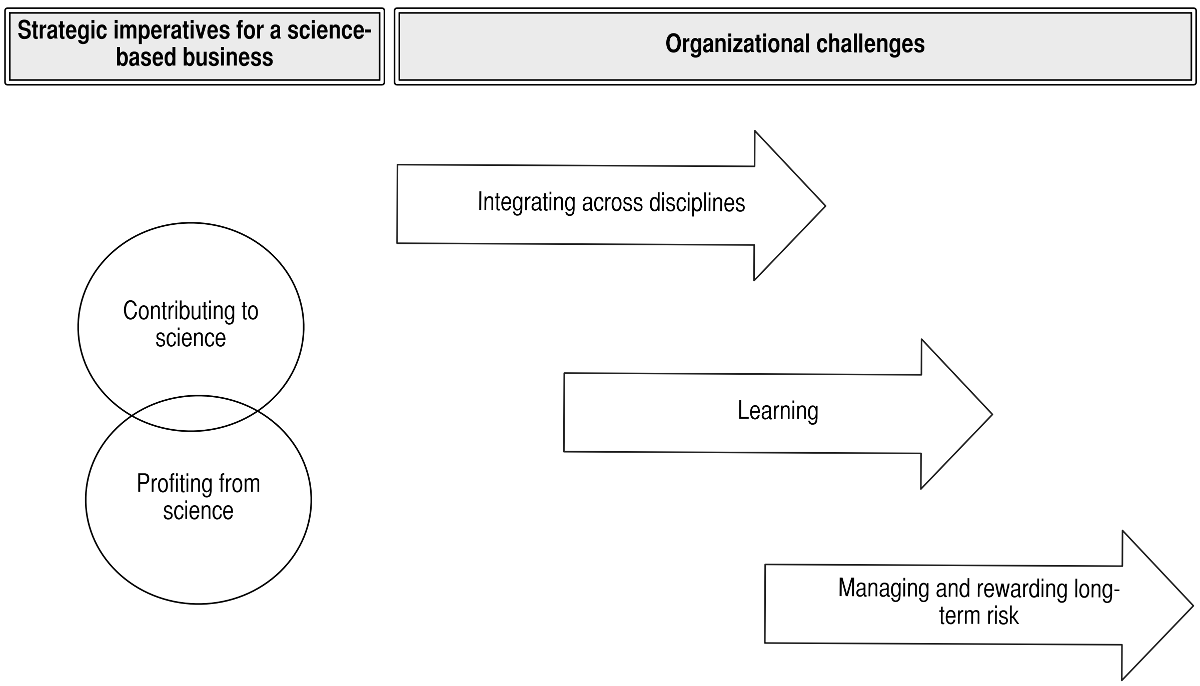
A well-developed group of studies provides a micro-organizational perspective on the connection between business and science. A major stream of research dates back to the 50s and 60s (Pelz, 1967; Shepard, 1956), and reflects precise historical contingencies: in particular, the growing engagement of private companies in scientific research (Mowery, 2009). The recurrent theme of these writings was the integration of scientists' work within an organizational structure characterized by varying degrees of bureaucratization (Burns & Stalker, 1961); various works highlighted the potential conflicts among the decisional premises of scientists, crucially affected by their participation in the epistemic community (Gouldner, 1957, 1958), and the organizational practices aimed at coordinating efforts in profit-seeking companies (Abrahamson, 1964; Lee, 1969; Lynton, 1969; Pelz & Andrews, 1966; Pelz, 1959, 1960; Porte, 1965; Shepard, 1956). In the 70s, Thomas Allen and his colleagues crucially advanced this literature by linking the individual level of analysis—which had been extensively explored theretofore—with organizational-level outcomes. Through a series of studies (Allen, 1977), grouped into a broader research program on twin R&D projects, the authors provided compelling empirical evidence that the outside connections of scientists with the epistemic community have serious implications not only for internal knowledge transfer but also for milestone project evaluation and project performance. To date, the writings of Thomas Allen and his colleagues represent one of the few attempts to provide a cross-level framework that illustrates how and to what extent scientists' participation in epistemic communities affects organizational-level outcomes for private companies. Recently, Dunne and Dougherty (Dunne & Dougherty, 2006; Dunne & Dougherty, 2009) conducted a processual study aimed at describing how science, as a set of socially constructed actions and practices, can impact the product-development process in the biopharmaceutical sector.

Other works in the field of applied economics have addressed the role of incentive schemes. In the pharmaceutical industry, for instance (Cockburn et al., 2000), the provision of incentives related to publication productivity has been found to be positively correlated with project-level productivity (Cockburn et al., 2000). Stern (Stern, 2004) used data on job offers to postdoctoral biologists to investigate the heterogeneity of incentive schemes used by pharmaceutical companies. The study demonstrated that companies markedly differ in incentives provided to scientists; some firms allow their researchers to pursue and publish individual research agendas more than do others. According to Stern, the reasons for a firm to adopt such a "science-oriented" stance relate to different mechanisms that may operate in a complementary fashion: the "preference effect" is related to taste for science on the part of researchers, who seek a satisfying alignment between job-level incentives and their values, interests, and intrinsic motivations; the "productivity effect" is a sort of strategic posture for firms that aim to get earlier access to scientific discoveries with commercial application. Empirical evidence partially confirms the results of previous works (Cockburn & Henderson, 1996; Cockburn et al., 2000) concerning the inter-firm heterogeneity of incentive schemes directed at scientists. The large majority of job offers considered by Stern (about 95%) allowed scientists to publish results of their research; yet only 40% of the scientists were free to allocate part of their time to parallel research projects —i.e., projects with content not decided or influenced by the priorities of the employer—. The latter result seems to suggest a shift of attention—from contractual/formalized aspects as incentives to publish to concrete possibilities for scientists to set their research agendas (Cardinal, 2001; DiTomaso, Post, Smith, Farris, & Cordero, 2007)—and, as a result, to practice and contribute to science. The second finding of Stern's work suggested that firm-level decisions to adopt a "science-oriented" model for the R&D department were negatively correlated with the scientists' wages. All in all, Stern's thesis raises the intriguing implication that the relationship between commercial innovations and scientific knowledge is problematic for the scientist whose activities are aimed at commercial outcomes but whose identity remains embedded in the values and reward systems of a scientific community. Stern investigated job-level incentives offered to scientists from a broader perspective. Finally, a complementary relationship seems to affect the intensity of incentives promoting "basic research" and those promoting "applied research" (Cockburn, Henderson, & Stern, 1999).

Although these phenomenon-related studies considerably enhance prior research on organizing for innovation, they suggest even more research opportunities. First, very few studies exist that address the science–business connection from the perspective of a private company, and those that do exist often use a molar approach (Shadish, Cook, & Campbell, 2002), focusing on the functional relation between scientific inputs and technological outputs. These features do not clarify the organizational challenges posed by the adoption a science-oriented model for the R&D department. Second, these studies assume that firm heterogeneity in innovation performance centers on the ability to translate knowledge produced within the epistemic community of science into knowledge that a market will value. Moreover, scientists who simultaneously publish and invent are considered to play a crucial role (an instrumental one from a managerial perspective) in bridging the disconnect between scientific knowledge and important technologies. As mentioned, this assumption neglects empirical evidence that the relationship between commercial innovations and scientific knowledge is problematic for the scientist whose activities are aimed at commercial outcomes but whose identity remains embedded in the values and reward systems of a scientific community. What happens when the inputs of the production function, called scientists, care about their perception of what they do; why, when, and how they do it; and for what kinds of rewards? Third, the literature may point to the firm's ability to integrate and mediate these conflicting logics, but it rarely details their precise nature. As Gittelman and Kogut (2003: 368) argued, "heterogeneity in innovation performance comes from firms' abilities to access and create the capability to do science, while bypassing the evolutionary logic that selects among its outputs. This role points to potential differences in the capabilities of firms to recruit and manage intellectual capital." Are these "abilities" contractual competencies, as recently argued (Mayer & Argyres, 2004; Murray & Stern, 2008)? Are these "abilities" organizational in nature, attaining organizational practices (O'mahony & Bechky, 2008) or cultural elements (O'Reilly, Chatman, & Caldwell, 1991)? Fourth, although preferring a molar approach, these studies have moved away from the R&D department, the place where the distinct logics potentially collide. This leads to obscure adverse effects of adopting a science-oriented model: for instance, in terms of intra-organizational conflict. Fifth, these studies neglect both empirical evidence and theoretical arguments (Cheng & Vande Ven, 1996; Koput, 2003) that stress the serendipity of the innovation process. In reality, organizations that work at the frontier of science deal with huge levels of technological uncertainty regarding the technical feasibility of a promising idea, and ambiguity—that is, difficulty judging the quality of a technical choice—even after the fact (March & Olsen, 1976). Managing scientific artifacts is substantially different from developing a smaller and faster processor, or debugging a software code, as part of which technical feasibility is not in question. According to Pisano's thesis (2006) organizational practices, business models, and institutional arrangements that are successful in technology-intensive industries (ICT, semiconductors, aero-spatial) may be ineffective in science-based industries (biotech, pharmaceuticals, energy, nano-tech).

This state of research may arise from the extant literature's focus on the pay-off of adopting a science-oriented posture as opposed to the organizational challenges posed by such a strategy. This neglects the fact that the sciences behind many knowledge-based firms create a very specific set of functional requirements. Moreover, there is a lack of focus on the internal processes and structures of science-based firms. This gap reflects an implicit assumption about the organizational decision process. According to an economic perspective, studies on R&D management in biotech and pharmaceutical industries have typically treated the firm as if it were a rational individual making a decision (Arora, Gambardella, Magazzini, & Pammolli, 2009; Chandy, Hopstaken, Narasimhan, & Prabhu, 2006). This assumption has two main consequences. It neglects the role of uncertainty and ambiguity, which, as noted, play key roles in managing scientific artifacts (Knorr-Cetina, 1999). Moreover, the interpersonal structure of the decision process is completely ignored (Cohen, March, & Olsen, 1972; Kilduff, 1990; March & Simon, 1958). On the contrary, the study of organizational decision making as opposed to the individual model of choice could open up significant opportunities to appreciate the collision of business and science logics paired with many institutions, together with its antecedents and implications for the innovation process.

Figure 1.1 – Functional Requirements of a Science-Based Business



Source: Pisano (2006)

This gap in the literature is important to fill because prior evidence suggests that challenging science may represent a unique generator of technological innovation (Fleming & Sorenson, 2004) and organizational change as well (Wheelwright & Clark, 1992).

The purpose of this dissertation is to explore the relationship between science and business from a novel perspective that combines micro-organizational arguments and macro-level insights: in particular, sociology of science and the emerging literature on boundary organizations. I address this question in the context of the R&D department of science-based firms in which scientists and managers work side by side to generate scientific advancements and—together—retain "best quality" proposals of innovation. The thesis has two primary goals: (i) to explain why and when different institutions of knowledge production—paired with many logics—collide in science-based firms (Gittelman & Kogut, 2003; Huang & Murray, 2009; Murray, 2010; Pisano, 2006a); and (ii) to illuminate the consequences of collisions for the innovation process.

To accomplish these goals, I focus on the cross-level determinants of scientists' attitudes and behaviors. It is widely recognized that decisional premises —e.g., values, beliefs, and cognitions— of professionals are shaped by a multitude of institutions that operate at different levels (March & Simon, 1958). On the one hand, attitudes and behaviors of scientists are embedded in the broader epistemic community (Fauchart & von Hippel, 2008; Knorr-Cetina, 1999; Van Maanen & Barley, 1984); on the other hand, scientists are exposed to formal and informal organizational practices that coordinate their work as members of the R&D department (Cardinal, 2001). Therefore, studying these multiple sources of regulation of attitudes and behaviors may offer the unique chance to explore potential collisions of different logics of knowledge production.

Using an interactionist perspective (Argyris, 1973; Lewin, 1951), I investigate the "fit"—that is, the congruence, match, or similarity (Chatman, 1989; Muchinsky & Monohan, 1987; Schneider, 1987b)—between industrial scientists and their respective environments. A condition of fit is equated to an "equilibrium condition" (Schneider, 1987a) between scientists' attributes and the attributes of a given facet of the environment —e.g., higher-level values that inspire science-based companies and, at a lower level, the organizational mechanisms used to influence scientists' attitudes and behaviors, or even the goals of other researchers in the laboratory—. By contrast, a misfit condition parallels a divergence among scientists' attributes and the facets of the environment.

In this dissertation, the environment is conceptualized at different levels, according to a recent call for contributions in the field of person–environment (hereafter PE), which address multiple fit problems (Ostroff & Schulte, 2007). First, the "taste for science" of the focal scientist is compared with the tension of her colleagues in the laboratory toward new and challenging scientific issues. Second, scientist and supervisors are compared in terms of preferences for knowledge production --knowledge acquisition Vs. knowledge production--. Third, scientists' preferences for autonomy, formalization, incentive schemes, and so on are compared with the actual characteristics of their jobs. Fourth, scientists are compared to their "companies" in terms of higher-level values. Examples of higher level values include the importance of contributing to humanity, gaining status, and economic inducements. Thus, the first milestone of the dissertation is to highlight patterns of fit-misfit among scientists and their environments to show why and when different institutions of knowledge production collide within the organizational boundaries of a science-based firm. Such an approach reflects the assumptions that decisional premises (values, beliefs, cognitions) of individuals are crucially shaped and influenced by mechanisms at the organizational level (Simon, 1947) and extra-organizational institutions (March & Simon, 1958), such as the epistemic community.

The second milestone of the dissertation concerns the consequences of fit-misfit patterns for scientists' attitudes and behaviors. The basic premise of PE fit theory and research is that, when characteristics of people and the environment are similar, aligned, or fit together, positive outcomes for individuals, such as satisfaction, adjustment, commitment, performance and lower turnover intensions, result (Kristof, 1996; Tinsley, 2000). Several works have summarized the rich empirical literature on PE fit (Arthur, Bell, Villado, & Doverspike, 2006; Hoffman & Woehr, 2006; Kristof-Brown, Zimmerman, & Johnson, 2005; Verquer, Beehr, & Wagner, 2003), focusing on several individual-level implications of "equilibria." My perspective is quite different and tends to focus on: (i) the value of moderate fit levels (Edwards & Shipp, 2007), and (ii) patterns or configuration of fit-misfit relationships that take into account different levels and different contents of similarity or matching (Cable & DeRue, 2002; Kristof-Brown, Jansen, & Colbert, 2002). Both anecdotal evidence and the literature in the organizing-for-innovation stream (Christensen, 1997; Dougherty, 2001; Duncan, 1976) suggest that, in order to build sustaining innovation capabilities, firms should create isolated sub-systems within the organization to preserve a certain diversity within the organizational boundaries. Thus, a perfect fit between scientist and the environment may be as damaging as a perfect misfit. In the first case, the search behaviors of scientists may reflect only organizational preferences and beliefs for what is a "promising idea," and this reduction in variance would lead to a reduction in long-term innovation performance. In the second case, the flow of communication and fine-grained knowledge may be seriously inhibited (Allen, 1977; Edwards & Cable, 2009) at the expense of organizational learning and integration (Pisano, 2006a).

Analogously, an exclusive focus on one level of the scientist–environment fit may produce erroneous conclusions or policy suggestions (Kristof-Brown & Jansen, 2007). As highlighted by March and Simon (1958), members of the organization may disagree about high-level values or end-states, and/or lower level values, which is the means by which to reach an end-state. This differentiation is not without implications for organizational process and decision making. Translated into the context of this dissertation, it is reasonable to think that a scientist's agreement with a company's high-level values may attenuate negative effects due to disagreement about what constitutes a "good," "excellent," and "poor" proposal of innovation. By contrast, disagreement about high-level values may exacerbate the conflict about the perceived value of a proposal of innovation, with negative impacts on internal technology transfer and contextual performance in general (the scientist may want to re-allocate her attention and energy, reducing engagement in activities outside research). Therefore, we can have reliable results about fit-misfit consequences only by analyzing patterns or configurations of fit conditions (Drazin & Vandeven, 1986; Fiss, 2007; Gresov & Drazin, 1997; Meyer, Tsui, & Hinings, 1993) that span across levels and contents. Although the dissertation focuses on the micro-macro link between the individual and the environment, I argue that results may have direct implications at the organizational level as well, especially in the organizing-for-innovation area.

The consequences of the scientist–environment fit appear challenging in the specific context of innovation. On top of this, it becomes even more intriguing when one considers that a close link with the epistemic community may boost innovation performance (Cockburn et al., 2000; Fleming & Sorenson, 2004; Henderson & Cockburn, 1994) and accounts for a substantial portion of the heterogeneity of scientists' values and beliefs (Gittelman & Kogut, 2003; Stern, 2004). On the other hand, the influence of the epistemic community is virtually outside the control of the company.

The empirical context of this dissertation presents an ideal matching with the research problem. Data were gathered at several research laboratories nested in two multi-national companies. Both companies operate in science-based sectors, have similar dimensions —e.g., annual revenues of about 1 billion—, and adopt similar divisions of the innovative labour: several laboratories are engaged in pure research, working at that forefront of science, and generate a huge number of "embryonic" ideas. If the idea is selected for further research, scientists work to reduce the technological ambiguity and show its feasibility; in the last stage, the project is transferred to applied research laboratories that deal with two problems: fine tuning the technology and connecting the technological opportunity to the market.

One company is in the vaccine sector, where research is a recombinant process that relies on the expertise of scientists who are highly trained, with doctorates or advanced degrees in biochemistry and pharmacology. The engagement of the company in "science" is evident in the number of publications in peer-reviewed journals —near to leading universities performance—. The other company has an established competitive position in semiconductors, which resembles a technology-intensive more so than a science-based sector. However, the company has several exploratory research laboratories working in partially related areas, such as energy and life-sciences robotics, widely considered to be science-based industries (Pisano, 2006a). Considering ISIWeb publications, researchers outside of the semiconductors division have published an impressive number of research articles in the last two years.

On top of the congruence with the research problem, the empirical setting has other striking features. The research laboratories considered in this dissertation are located in different European countries and the United States. Although empirical evidence of a cross-country study would be considered more compelling, just a few works have adopted this approach, especially in the organizational-behavior field. Generally speaking, observations have indicated a nested structure: scientists form workgroups, which are nested in laboratories. The company represents the higher-level cluster of observations. This feature meets a critical requirement of PE research: that is, achieving heterogeneity at both the individual and the environmental levels. In reality, studies in the PE field are, quite often, based on observations from a single organization. Such studies focus on individual differences rather than the micro-macro link. Moreover, expectations of heterogeneity in the scientist–environment fit relate to the weird characteristics of the setting. Skills and capabilities employed by scientists are generally nontransferable, tacit, and, in most cases, area specific (Thomke & Kuemmerle, 2002). For instance, a scientist who is researching cures for cancer typically spends a lifetime in this area and is unlikely to shift to other areas of research. This feature combined with the time required to go through various stages of innovation leads to substantial immobility of scientists. It has been argued, for example, that scientists in acquired companies do not face a fluid job market that they can tap if the company is acquired (Paruchuri, Nerkar, & Hambrick, 2006). Moreover, research teams in pharmaceutical labs tend to endure over relatively long periods, at least as evidenced by the persistence of coauthorship patterns over time (Cockburn & Henderson, 1998).

I continue this dissertation with an overview of the broader literature related to behavioral theory of the organization, including the process of innovation, the extra-organizational sources of influence, and the interaction between individual values and the values of the organization and their consequences (Chapter 2). The objective of this chapter is to assess the literature and develop multiple research opportunities for future exploration including one broad research question that I explore in this dissertation study. Second, I propose the conceptual model that links the theme of science–business connection to concrete organizational dynamics (Chapter 3). Then I discuss the research methods—survey based—that I used to explore the research question, including an overview of the science-based sector and its organizational requirements (Chapter 4). Then I describe the findings that emerge from the study (Chapter 5). This includes a description of scientist–environment fit patterns, and their implications for scientists' attitudes, behaviors, and performance. Finally, I discuss these results in the context of the broader literature (Chapter 6) drawing implications for the study of institutional pluralism, decision making in organized anarchies, and organizing for innovation. I end with some concluding comments on this work (Chapter 7).

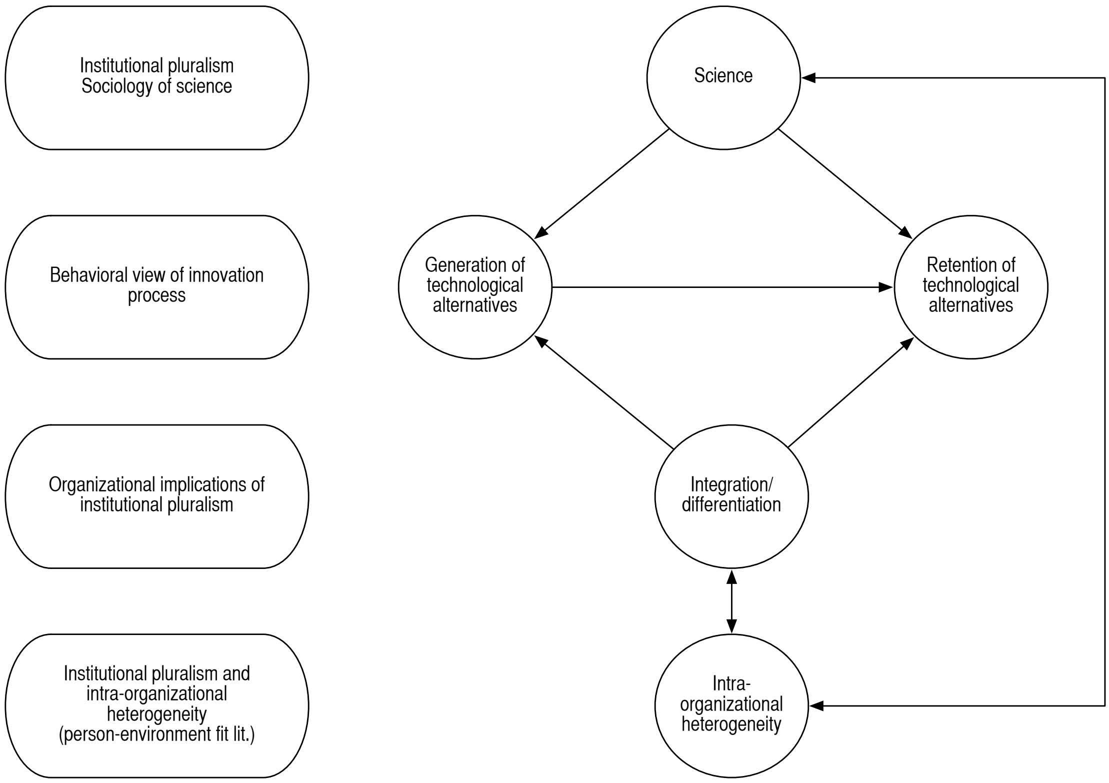
CHAPTER 2

Literature Review and Assessment

Research on organizing for innovation has grown substantially as the number and heterogeneity of participants in the innovation process has grown (Gibbons, 1994), and new methods and data have emerged for measuring generation and selection of new ideas (Arora et al., 2009; Boudreau, Lacetera, & Lakhani, 2009; Sutton & Hargadon, 1996; Terwiesch & Ulrich). Therefore, the literature on organizing for innovation is vast and based in multiple disciplinary traditions (Amabile et al.; Diehl & Stroebe, 1991; Duncan, 1976; Howell & Avolio, 1993; Pich, Loch, & De Meyer, 2002). I begin by arranging the literature into four streams: behavioral aspects of the innovation process, institutional pluralism, organizational-level implications of institutional pluralism, and intra-organizational heterogeneity at the individual level. Figure 2.1 depicts the theoretical background of the dissertation study.

Both empirical and theoretical contributions are reviewed. Specifically, this review focuses on articles in major English-language journals that are devoted to the topic of organization theory, such as *Administrative Science Quarterly*, *Academy of Management Journal*, and *Organization Science*, and organizational behavior/psychology, such as *Organizational Behavior and Human Decision Process*, *Journal of Applied Psychology*, and *Personnel Psychology*. Some relevant articles in field journals like *Research Policy*, *Research-Technology Management*, and *R&D Management* are also reviewed. I focus on research studies published in the past 10 years, but I also include highly influential older studies.

Figure 2.1 – The Theoretical Framework of the Dissertation



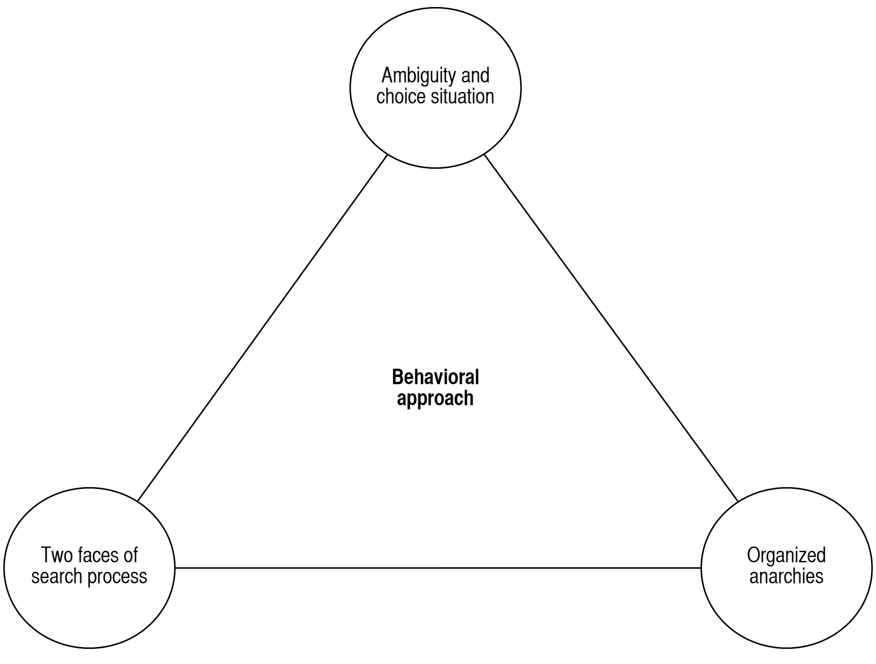
As I discuss in detail below, the primary objectives of this review are the organization of innovation processes in science-based firms, and the identification of a few important research opportunities. Specifically in regards to the latter, I point to an important gap in the current literature—why and when values and beliefs in science and business collide—that this dissertation study addresses.

2.1 - A Behavioral View of the Innovation Process

According to a consolidated view, innovation is the outcome of both "variety" and "order" (Burgelman, 1983; Koput, 1997; Vandeven, 1986). Plurality of information, knowledge base, and focus of attention have been traditionally considered powerful triggers of newness and innovation. On the other hand, the concept of "intra-organizational conflict" is seen as the natural downside of "variety" (Glynn, Barr, & Dacin, 2000). In this line of reasoning, the behavioral theory of organization—dating back to Simon's "The Administrative Behavior" (Simon, 1947)—can provide a unique contribution to studies in the organizing for innovation area. Indeed, this rich tradition of research relies on a definition of "organization" that combines both faces of the innovation coin: variety—i.e., intra-organizational heterogeneity of values, goals, and interests—and conflict—i.e., a cognitive or behavioral manifestation of heterogeneity.

Despite the congruence of the behavioral approach with the innovation phenomenon, just a few works (Chen & Miller, 2007; Greve, 2003) have relied on the pillars of the behavioral theory of organization to address technology and innovation management issues (on this point see also Brunner, MacCormack, & Zinner, 2008). In general, empirical studies in science-based contexts have typically treated the firm as if it were a rational individual making a decision (Arora et al., 2009; Chandy et al., 2006). This assumption has several implications. First, it challenges the view of innovation as a process characterized by serendipity (Van de Ven, 1986), as part of which both the generation and the retention of promising ideas often have an individual dimension rather than an organizational one (Roberts & Fusfeld, 1982). Moreover, this assumption neglects the role of uncertainty and ambiguity, which is widely acknowledged as playing a key role in managing scientific artifacts (Knorr-Cetina, 1999). Finally, the interpersonal structure of the decision process has been completely ignored (Cohen, et al. 1972; Kilduff, 1990). Conversely, the study of organizational decision making as opposed to the individual model of choice could open up significant opportunities to appreciate the collision of business and science logics—which are paired with many institutions—together with its antecedents and implications for the innovation process.

Figure 2.2 – Three Pillars of the Behavioral Theory of Organization



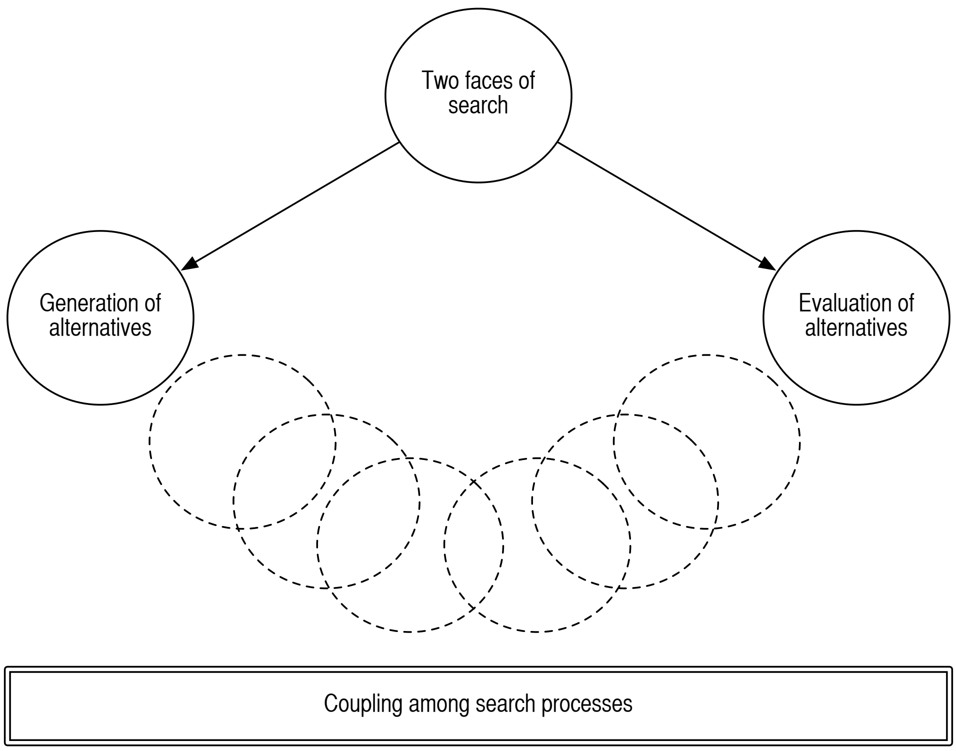
I argue that the behavioral theory of organization can be fruitfully applied to investigate innovation problems from a micro-organizational perspective—especially in science-based settings. First, behavioral arguments can be used to articulate the relationship between the generation of alternatives and how, once identified, they are evaluated. Second, behavioral theory, which regards the choice in "organized anarchies," can be used to describe the choice activities in science-based firms that deal with high causal ambiguity as well as technological uncertainty. Third, by conceptualizing organizations as composed of individuals with highly differentiated goals and fluid participation, the behavioral theory can also highlight how the epistemic community permeates individual organizational and decision activities.

Alternative Generation and Alternative Retention

A central building block of the behavioral theory of the firm is the notion of bounded rationality (Simon, 1947). In contrast to the optimizing agent of neoclassical economics—whose decision activity is constrained in alternative sets that are given—the decision maker in Simon's theory discovers or searches for—through action—alternative sets. The model of search behavior proposed by Simon (Simon, 1955), and subsequently extended by March and Simon (Simon & March, 1958), suggests that, rather than optimizing a utility function, individuals search for alternatives until they identify one that satisfies some minimum performance criterion. This facet of the behavioral theory of organizations is by now well established, being at the core of seminal works of the Carnegie School (Cyert & James, 1963; Nelson & Winter, 1982; Simon & March, 1958) and its extensions as well such scholars as (Ethiraj & Levinthal, 2004; Gavetti & Levinthal, 2000; Levinthal, 1997; Rivkin & Siggelkow, 2003)). However, another critical facet of bounded rationality has been largely ignored in this tradition: that is, how alternatives, once identified, are to be evaluated (Gavetti & Levinthal, 2000). This research opportunity has recently been emphasized by both analytical models (Levinthal & Posen, 2007) and theory assessments (Argote & Greve, 2007; Gavetti, Levinthal, & Ocasio, 2007).

More specifically, the theory has left two gaps: works have treated organizations as unitary actors, thus disregarding the problem of how actors with different beliefs, values, socially derived organizing templates, collectively evaluate alternatives; moreover, the relation between alternative generation and alternative evaluation is largely unaddressed. Works on search behaviors have moved away from an organization-centered view of decision making, as it has been richly described in the seminal works of the Carnegie School (some exceptions are Lin & Carley, 1997; Rivkin & Siggelkow, 2003; Siggelkow & Rivkin, 2005)). The study of Knudsen and Levinthal (2007) has tried to fill this gap. Using a computational experiment, the authors investigated the role of alternative organizational structures in retaining best-quality alternatives. Results suggested that hierarchical structures, in which a proposal needs to be validated by successive ranks of the hierarchy to be approved, will tend to reduce the likelihood that an inferior alternative will be adopted—i.e., hierarchy reduces Type II errors. In contrast, polyarchies—a flat organizational structure in which approval by any one actor in a series of decision makers is sufficient for an alternative to be approved—will tend to minimize the probability of rejecting a superior alternative—i.e., polyarchy reduces Type I errors. Furthermore, the authors considered the relationship between the effectiveness of organizational structures and the ability of individuals to screen among alternatives. Results indicated that the less able (or, conversely, the more able) individual evaluators are, the more attractive are the organizational forms that tend toward hierarchy (polyarchy) because the hierarchical structure tends to compensate for the high error rates of less able individual evaluators (or, conversely, the variance induced by the polyarchy forms tends to compensate for the overly precise judgments of more able evaluators). To the best of my knowledge, no other work has faced the problem of the sequential evaluation of alternatives under different organizational structures.

Figure 2.3 – Alternative Generation and Alternative Retention



The second gap in the literature refers to the ambiguity that surrounds the relation between alternative-generation tasks and alternative-evaluation tasks. This gap raises some questions: are these activities loosely coupled? Is the coupling problem subject to constraints? Is it reasonable to assume alternative generation and alternative evaluation are loosely coupled activities? Are there some complementarities in the ways that alternatives are generated and/or searched and, once identified, are evaluated? Finally, if these two tasks cannot be decoupled, then key individuals or groups have to move across different task environments. What, then, are the consequences for organizational behavior? Knudsen and Levinthal (2007), for instance, assume that the generation of alternatives is specified exogenously and is determined by the structure of the performance landscape. In their scheme, alternatives are sampled according to a local search process, while it would be very important to consider how organizations evaluate non-local options (Gavetti & Levinthal, 2000). Moreover, this may be of particular interest in science-based settings where alternative sets rapidly change over time and evolve in a way that resembles a chaotic process rather than a local search (Koput, 1997, 2003).

A different form of endogeneity that would be interesting to consider is an actor's ability to generate alternatives and evaluate them. There is a vast literature on experiential learning (Argote 1999) that suggests that skill at tasks increases with repeated trials. Therefore, it is reasonable to expect that screening ability may change with an actor's experience with a class of problems. Thus, actors may become quite skillful at evaluating one class of alternatives, but rather inept at evaluating a different and—for them—novel set of alternatives. From the perspective of this dissertation, this might imply that scientists and managers have very different abilities when attempting to evaluate the quality of an alternative. However an additional problem may arise; alternatives to be judged may be considered exogenous for managers, but not for scientists who have searched or discovered them (Harrison & Harrell, 1993). This may introduce some biases in scientists' evaluations, which may be accentuated because their judgment is also scrutinized by external actors—the epistemic community—as compared to managers' evaluations in the organization.

Ambiguity and Organizational Choice

The large majority of works in management assume that the complete cycle of choice follows a straightforward procedure by which individual preferences and cognitions are aggregated into organizational choices (Argote & Greve, 2007). According to this logic, relevant solutions are associated with appropriate problems, and choices are made to resolve problems. Moreover, which issues and solutions are associated with which decisions, and which people participate in which decisions are assumed to be relatively unproblematic. As a consequence, outcomes of decisions tend to be independent of the broader context within which they occur (Elsbach, Barr, & Hargadon, 2005). The behavioral theory of organization has traditionally contested this view, pointing out that real organizations substantially deviate from such an ideal model of organizing.

This argument became a recurrent theme since the work of Cohen, March and Olsen (Cohen, March, & Olsen, 1972) who argue that decision activities in organization can be described as a "garbage can" as part of which actions become decoupled from the goals or intentions of any particular set of actors, and are better understood—within the framework of timing and context—as being shaped by the organization's structures of attention. In a series of works (March & Olsen, 1989; March & Olsen, 1976) March and his colleagues observed that organizations often look like "organized anarchies" in that it is difficult to impose a set of preferences to the decision situation that satisfies the standard consistency requirements for a theory of choice. Organized anarchies operate on the basis of a variety of inconstant and ill-defined preferences that are discovered through action as much as being the basis for action. Furthermore, technology is often unclear. Thus, organized anarchies are formed on the basis of simple trial-and-error procedures, the residue of learning from the accidents of past experience, and pragmatic inventions of necessity. Finally, participation is often "fluid" because individuals vary the amount of time and effort that they devote to different domains, classes of problems, and, within the same kind of problems, one type from another.

This conceptualization of organization has at least three consequences. First, "the boundaries of the organization are uncertain and changing" (Santos & Eisenhardt, 2009), and this, in turn, means that audiences and decision makers for any particular kind of choice change capriciously (Biktetine, 2011) and no single participant dominates the choice in all its phases. Second, the concept of ambiguity plays a central role. As observed by March and Olsen (1976), for many organizations, the causal world in which they live is obscure. Technologies are unclear; environments are difficult to interpret, and history—though important—cannot be easily specified or interpreted. Third, loose coupling implies a situated rationality in organizational decision making, accounting for both the intended rationality of organizational actors in a particular situation or context and the selective retention of the individual decisions made at any time within organizations (Ocasio and Joseph 2005).

In science-based settings, for instance, explicit decision activities may provide an occasion for problem solving and conflict resolution, the aggregation of individual and group preferences, and the transformation of power into collective choices. But a choice situation in this context also provides an occasion for a number of other revelations. Virtue and truth may be defined: an organization can discover or interpret what has happened to it, what it is doing, what it is going to do, and what justifies its action (Weick, 1993). Furthermore, role-expectations can be fulfilled and institution-given identity affirmed (Glynn, 2008). For instance, the choice of which R&D projects to select—and, conversely, to kill—opens up significant opportunities for scientists, who may want to (re-)affirm norms and values related to the epistemic community within the organizational boundaries of the company (Stern, 2004). Therefore, scientists who are relatively closer to the epistemic community may challenge projects from a scientific point of view. By contrast, middle management and top management may prefer "conservative" projects (i.e., projects that enhance the actual competence basis of the organization), thereby defending earlier commitments to stakeholders.

Surprisingly, the view of the organization as an "organized anarchy" is almost extraneous to the literature of organizing for innovation. In some research, loose coupling has been assumed to be a source of variation, experimentation, and change in organizations, but its consequences for the internal processes of organizations have been largely unaddressed. Analogously, several works have dealt with choice activities in science-based settings—in particular, in biotech and pharmaceuticals—but have neglected the fundamental problems posed by ambiguity (Arora et al., 2009; Chandy et al., 2006; Fleming & Sorenson, 2004). Such a perspective is evident in the terminology that these works use. For instance, the term "behavior" is not associated with individual actions but, rather, organizations as a whole.

2.2 - Institutional Pluralism and Boundary Organizations

Science-based firms resemble "organized anarchies." As organizations, they present pathologies from the point of view of theories of organizations (Barnard, 1938; Simon, 1947). They lack clear goals; ambiguity surrounds their decision environment; organizational decision making is sticky; individuals, problems, and solutions are loosely coupled and tend to coevolve over time; people in the organization have markedly different values, interests, and preferences that pose consistency issues (March & Olsen, 1976). This paragraph deals with the link between environmental demands that emanate from various "institutions" and the internal functioning of boundary organizations—especially science-based firms.

In order to do so, I draw on the idea of institutional pluralism, which was recently proposed by Kraatz and Block (Kraatz & Block, 2008). Institutional pluralism is a "usual" condition for boundary organizations, and consists of operating within multiple institutional spheres (e.g., science as a knowledge-production institution and the intellectual property system). In these situations, organizational actions appear to be co-produced by multiple identities and/or co-evaluated by multiple audiences. Taken for granted, beliefs and assumptions obviously affect organizational decisions and influence external responses to them. But, as highlighted by Kraatz and Block (Kraatz & Block, 2008) being taken for granted is clearly not sufficient as an explanation for these actions or the reactions that they engender. If taken-for-granted assumptions drive organizational actions, they can only do so after a specific institutional identity has been invoked. Thus, the organization must first be able to answer March's troublesome question of "Wo are we?"—then appropriate institutional rules or scripts can be activated.

Institutions, Environmental Demands, and Decisional Premises

One of the more enduring ideas in organizational theory is that organizations are embedded in social environments that influence their behaviors. Within this major stream of research, the "institutional theory" provides a rich theoretical framework that accounts for how organizations comply with institutional pressures that emanate from the environment in an attempt to secure legitimacy and support (DiMaggio & Powell, 1983; Meyer, Rowan, Powell, & DiMaggio, 1991). According to this theory, institutional pressures are exerted on organizations through rules and regulations, normative prescriptions, and social expectations (Scott, 2001). But institutional pressures are also carried over through "institutional logics" (Thornton & Ocasio, 1999), which are broader cultural templates that provide organizational actors with means–ends designations, as well as organizing principles. In this sense, science is "an institution" that is a source of socially derived norms and values (e.g., sharing, accountability, social judgment, and so forth) that disciplines the production and diffusion of knowledge (Merton & Storer, 1973). Insofar as profit-seeking organizations desire to participate in science (i.e., want to simultaneously contribute to science and profit from scientific knowledge), then they also have to comply with these socially derived norms and values.

In general, works inspired by institutional theory draw on the premise that institutional demands permeate organizational boundaries through two key mechanisms. First, institutional demands can be conveyed by actors who are located outside the organization and who disseminate, promote, and monitor these demands across the organizational field (i.e., the domain where an organization's actions were structured by the network of relationships within which it was embedded). These external actors—as professional organizations, regulatory bodies, or funding agencies—exercise compliance pressures on organizations by means of resource-dependence relationships (Oliver, 1991). Insofar as organizations depend on these key institutional referents for resources, they are likely to comply with what these stakeholders expect from them to secure access to these key resources.

Second, institutional pressures can lie within organizational boundaries as a result of hiring and filtering socially derived practices (DiMaggio & Powell, 1983). For example, institutional demands are conveyed by staff members, executives, board members, or volunteers who adhere to and promote practices, norms, and values that they have been trained to follow or have been socialized into (March & Simon, 1958). Organizational members, by being part of social and occupational groups, enact, within organizations, broader institutional logics (Thornton, 2002; Thornton & Ocasio, 1999) that define what actors understand to be the appropriate goals, as well as the appropriate means to achieve these goals (Scott, 2001).

Recent contributions to institutional theory have mainly confronted this second mechanism. A first group of studies explored the relationship between internal and external mechanisms of institutional pressure. As underscored by Pache and Santos in their theoretical assessment (Pache & Santos, 2010), the literature has largely supported the view that internal and external mechanisms of institutional pressure operate simultaneously rather than in isolation. For instance, empirical works have reported that the hiring of organizational members espousing a given institutional logic can be a response to conformity pressures from external institutional constituents (Daunno, Sutton, & Price, 1991; Lounsbury, 2001; Zilber, 2002). Such a view is coherent with both anecdotal evidence and literature in science-based settings, according to which science-based firms hire star-scientists to gain legitimacy in front of the epistemic community (Gittelman & Kogut, 2003). The base reason is that mere contributions to the epistemic community are a necessary but not a sufficient condition for a firm to earn legitimacy. Conversely, it becomes crucial the ways in which the firm is connected to the broader epistemic community. In this line of reasoning, boundary spanners—scientists who move in both the scientific and business domains—can play a key role in establishing credible linkages (Cockburn et al., 2000).

A second group of studies have focused on organizational differences and the extent to which competing institutional demands are internally represented. The basic idea that underlies these works is that better comprehension of internal mechanisms might help to explain organizational reactions to institutional pressures. In particular, the extent to which organizational members adhere to and promote a given demand (Kim, Shin, Oh, & Jeong, 2007) may represent an organizational-level moderator that can explain why firms that face similar pressures react in different ways (Kraatz & Block, 2008; Pache & Santos, 2010). Moreover, a focus on internal pressures may also put into light the existence of unique organizational abilities to deal with institutional demands (Kraatz & Block, 2008), potentially representing a form of distinctive competencies.

These features suggest a progressive approach to micro-foundations of institutional theory (Powell & Colyvas, 2008). Since Meyer and Rowan's fundamental contribution (Meyer & Rowan, 1977), institutional theory has mainly dealt with isomorphic practices from the societal level to the level of organizational fields. Yet only a few works have focused on the concrete meanings and contents associated with "institutions." Friedland and Alford's seminal essay (Friedland & Alford, 1991), together with empirical works by Haveman and Rao (Haveman & Rao, 1997) and Thornton and Ocasio (Thornton & Ocasio, 1999) initiated a new approach to institutional analysis that posited institutional logics as defining the content and meaning of institutions. Although the institutional logics approach shares a concern with how cultural rules and cognitive structures shape organization structures with Meyer and Rowan (Meyer & Rowan, 1977) and Di Maggio and Powell (DiMaggio & Powell, 1983), it differs from their views in significant ways (Thornton & Ocasio, 2008). The focus is no longer on isomorphism, whether in the world system society or organizational fields, but on the effects of differentiated institutional logics on individuals and organizations in a larger variety of contexts including markets, industries, and populations of organizational forms. An institutional logics approach incorporates a broad meta-theory on how institutions, through their underlying logics of action, shape heterogeneity, stability and change, individuals and organizations (Thornton & Ocasio, 2008). Thus, from a functional perspective, institutional logics provide a link between institutions and action thereby bridging the micro-macro gap.

Since the term "institutional logic" was introduced by Alford and Friedland (Alford & Friedland, 1985), several definitions have been proposed. Institutional logics have been defined as cultural beliefs and rules that shape the cognitions and behaviors of actors (Friedland & Alford, 1991; Lounsbury, 2007; Thornton, 2002; Thornton & Ocasio, 1999); socially shared, deeply held assumptions and values that form a framework for reasoning, provide criteria for legitimacy, and help organize time and space (Thornton & Ocasio, 2008); and a stream of discourse that promulgates a set of assumptions (Barley & Kunda, 1992).

A mechanism by which institutional logics exert their effects on individuals and organizations occurs when individuals identify with the collective identities of an institutionalized group, organization, profession, industry, or population (March & Olsen, 1989). Collective identities emerge out of social interactions and communications between members of the social group. Because individuals identify with the collective identity of the social groups that they belong to, they are likely to cooperate with the social group, abide by its norms and prescriptions (Kelman, 2006), and seek to protect the interests of the collective and its members against contending identities (Tajfel and Turner 1979; White, 1992).

A particularly active area within institutional logics is research on communities of professionals (for a review, see Leicht & Fennell, 2008). Professional work has been defined as occupational incumbents: (i) whose work is defined by the application of theoretical and scientific knowledge to tasks tied to core societal values (health, justice, development, financial status, and so forth); (ii) where the terms and conditions of work traditionally command considerable autonomy and freedom from oversight, except by peer representatives of the professional occupation; and (iii) where claims to exclusive or nearly exclusive control over a task domain are linked to the application of the knowledge immured to professionals as part of their training (Leicht & Fennell, 2001). Professions are seen as a higher-order societal institution of "relative permanence" and a "distinctively social sort" (Thornton, 2004) that are often thought to have one dominant institutional logic that guides organizing and provides actors with vocabularies, identities, and rationales for action.

Recent articles on professions and institutional logics have mainly dealt with the problem of "multiple logics." In fact, it is widely recognized that professionals often operate within multiple institutional spheres, thus, being "subject to multiple regulatory regimes, embedded within multiple normative orders, and/or constituted by more than one cultural logic" (Kraatz & Block, 2008): 243). The multiplicity of attention associated with institutional pluralism may result in open conflict as part of which segments of the profession actively seek change (Bucher and Strauss, 1961; Washington and Ventresca, 2004; Lounsbury, 2007), in hybridization, whereby one aspect of a logic is incorporated with a related profession (Townley, 2002), or a shift to a dominant logic because tensions within a profession cannot be sustained over time (Suddaby and Greenwood, 2005). Recent contributions have provided a longitudinal perspective on this problem. For example, Dunn and Jones (Dunn & Jones, 2010) focused on the medical education sector where two institutional logics simultaneously operate. "Science logic" conceptualizes quality healthcare in terms of innovative diagnostic and therapeutic procedures to ameliorate human suffering and help eradicate disease. Conversely, "healthcare logic" refers to quality healthcare as quality of life rather than innovative new treatments. Using archival longitudinal data, the authors showed that plural logics of care and science in medical education have been supported by distinct groups and interests, and fluctuate over time, thus, creating "dynamic tensions" about how to educate future professionals.

Science as an Institution

Since Merton's structural analysis, science has been considered a key institution that presides over the production and diffusion of (public) knowledge, and several works have explored its normative contents using a sociological lens (Merton, 1957) or economics arguments (Dasgupta & David, 1994; Stephan, 1996). Regardless of the theoretical approach, works have relied on the premises that the reward structure of science is the main mechanism through which science as an institution affects individual behavior, and, in turn, organizational conduct. Stephan and Everhart (Stephan & Everhart, 1998) summarized previous literature, arguing that the reward of science has a triadic structure: "the ribbon," the recognition awarded priority and the prestige that accompanies priority; "the puzzle," or the satisfaction derived from solving a problem; and "the gold," the economic rewards that await the successful.

Peer recognition has largely been addressed. In the ‘50s,, Merton (1957) argued convincingly that a socially given goal in science is to establish priority of discovery by being first to communicate advancements in knowledge and that the rewards of priority are the recognition awarded by the scientific community for being first. Merton further argues that the interest in priority and the intellectual property rights awarded to the scientist who is first are not new phenomena but have been overriding themes of science for at least three centuries. In this sense, publication is a lesser form of recognition but a necessary step in establishing priority. A common way to measure the importance of a scientist's contribution is to count the number of citations to an article or the number of citations to the entire body of work of an investigator. And while eponymy and a prestigious prize are perceived by most to be beyond their reach, the reward of publication is within the reach of the vast majority of scientists. Financial remuneration is another component of the reward structure of science. Because the winner-take-all nature of the race places much of the risk on the shoulders of the scientist, it is not surprising that compensation in science is generally composed of two parts: one portion is paid regardless of the individual's success in races, the other is priority-based and reflects the value of the winner's contribution to science. Although this clearly oversimplifies the compensation structure, the role played by counting publications and citations in determining raises and promotions at universities is evident from the work of Arthur Diamond (1986a).

The other reward often attributed to science is the satisfaction derived from solving the puzzle. To quote Warren Hagstrom (1965, p. 16), "Research is in many ways a kind of game, a puzzle-solving operation in which the solution of the puzzle is its own reward." The philosopher of science David Hull (1988, p. 305) describes scientists as being innately curious and suggests that science is "play behavior carried to adulthood." This suggests that time spent in discovery is an argument for the utility of scientists. Although this provides a rationale for excluding the process of discovery from models of scientific behavior, the failure of economists to acknowledge the puzzle as a motivating force makes exclusively economic models of scientific behavior lack credibility.

In recent years, a more complex view of science has been presented based on several works dealing with “laboratory life” (Knorr-Cetina, 1999; Latour & Woolgar, 1979). Nightingale (Nightingale, 1998) defined science as the social practice of exploring and codifying patterns in nature with the goal of trying to understand nature. Consistent with this definition, Dunne and Dougherty argued that “scientists actively explore patterns rather than passively note them, so science is not simply a method, logic, or knowledge base, but involves a variety of actions and practices,” and “scientists learn to see these patterns in long schooling and then practice.”

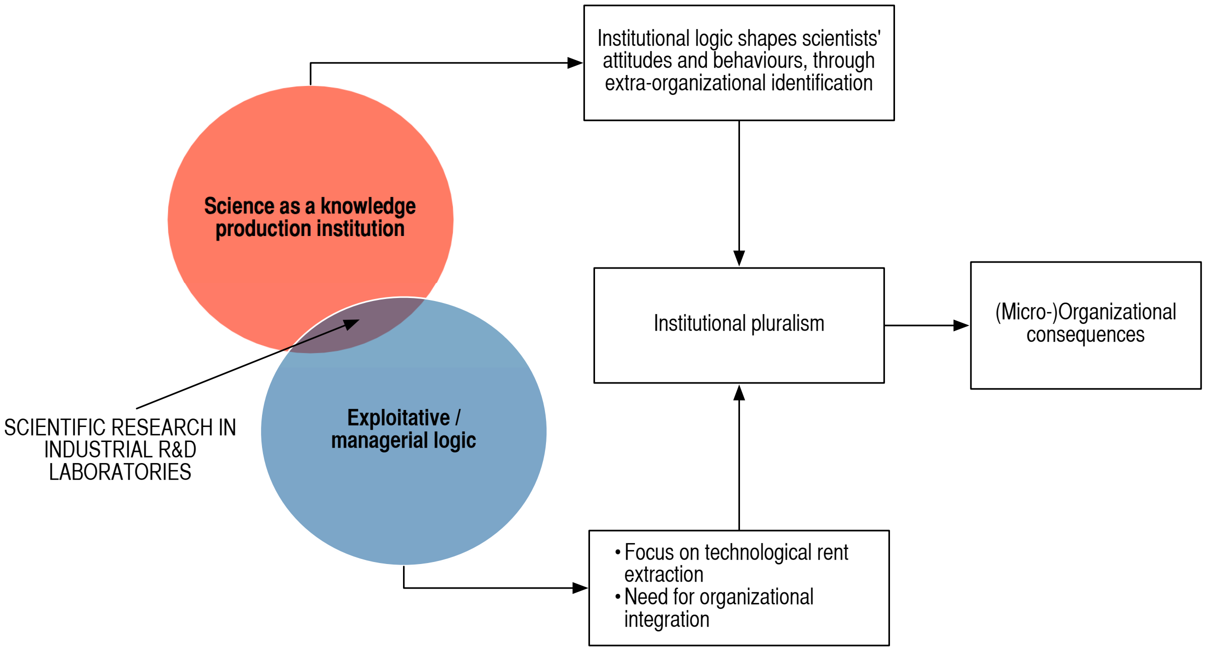
Science is, first of all, a community of practice. Brown and Duguid (1991) drew on Orr's study of technicians to show how knowledge is embedded in networks of practitioners who interact over problems and tell stories to create and share knowledge. Barley's (1996) study of occupational communities showed that technicians draw on physical and sensory referents, and piece together information from the situation. But these practitioners are also well aware of the distributed nature of knowledge, and communities have ways of accessing distributed expertise, sharing knowledge widely, asking questions, and drawing on others to help with puzzles. Scientists work in professional communities with strongly institutionalized norms and procedures for sharing knowledge, and the ethnographies cited above indicate that scientists work with contextualized knowledge along with principled knowledge. However, like intuition, contextual and communal knowledge are not easily formalized or rationalized, and Barley (1996) pointed out serious problems with trust and respect. Scientists might earn more respect from managers than technicians, but, in drug discovery, they must work in many other professional and technical communities in a very complex problem domain. The communities of practice ideas leave us with the challenge of organizing vast knowledge networks, crossing many disciplinary boundaries, and integrating many diverse people into the team sport of innovation.

Other scholars have argued that science provides a "holistic sense" to scientists. Knorr-Cetina (1999: 97) gave an example of a heart transplant surgeon who insisted on assisting in the removal of the donor's heart because he had to "see and feel" the heart, to "know whether it is really healthy and fits." She finds a similar holistic sense among molecular biologists who distrust their mind in favor of their senses in identifying and processing relevant information. In the lab, she says, the scientist's body is called upon as an information-processing machine. Knorr Cetina (1997) cited Keller's (1983) biography of scientist Barbara McClintock, entitled "A Feeling for the Organism," as another example of this embodied knowing. McClintock described feeling part of the chromosomes system, interpreted by Knorr Cetina as her identifying with the chromosomes she studies, being situated as "one of them," and being open to hearing what the material has to say to you. McClintock's feelings lie not in her love of nature but in her knowledge of the plants and their ingenious mechanisms of responding to the environment. Benner (2003) described a similar full-bodied, sensory approach to knowing as described by an advanced practice nurse who used clinical grasp and clinical forethought along with experiential learning.

Scientists share the "feeling for the organism," which engages and motivates them. They collectively seek a similar "knowledge object," or epistemic thing that is always unready to hand, unavailable, and in the process of transformation. Scientists can work together within and across various disciplines because science is an object of knowledge that scientists are all interested in working with, attracted to, and attached to. Scientists can work together in very large communities: not because they share norms but because they are pursuing similar knowledge objects. Thus, the traditional social bonds of kinship, local groupings, and modern social bonds of bureaucratic professionalism are evolving to "knowledge society" bonds around long-term and consuming engagement with knowledge objects. The knowledge object of science provides the basis for mutual recognition and sense of belonging, which is why people make the effort to search for alignment.

Recently, some works have criticized the view of science as a monolithic institution that affects the organizational behavior of scientists. One group of works has simply recognized that scientists (and professionals in general) differ in terms of identification with norms and values of the epistemic community. Whereas a strong collective identity encourages group members to uphold a norm of generalized exchange (Flynn 2005), social loafing and free-riding behaviors are more common when group members feel lower levels of identification with the group (Kidwell and Bennett 1993). A second group of studies have dealt with individual-level differences associated with "deviation" from the communal norm of science (Merton & Storer, 1973). Empirical evidence has shown that scientists are more likely to withhold information not only if they are more involved in commercial activities or receive more industry support, but also if they receive more requests, conduct research on human subjects, or are male (e.g., Blumenthal et al. 2006). Similarly, the tension between a norm of communalism and individual interests suggests that scientists will withhold more if others have denied their requests in the past, if their academic mentors were less willing to share their own information with other scientists, or if they perceive competition for recognition or scientific priority in their area to be more intense (cf. Walsh et al. 2007).

Figure 2.4 – Science-Based Firms and the Crossroads of Institutional Spheres



All in all, these works support Merton's argument that professionals often face conflicting rather than clear role expectations (Merton and Barber 1963, Merton 1976). Merton's original conceptualization of the normative structure of science has long dominated characterizations of the scientific profession as well as critiques that argue that this conceptualization views actors as unduly constrained (e.g., Mulkay 1969, Knorr-Cetina 1999, Sismondo 2004). But Merton later departed from his initial view to propose that science is "patterned in terms of potentially conflicting pairs of norms," rather than governed by fundamental norms that serve as clear guides to professional conduct (Merton 1976, p. 33). For example, scientists' roles demand originality, which encourages them to strive to be first to announce a significant discovery, but also humility, which discourages them from fighting for priority if multiple investigators announce a discovery simultaneously (Merton 1963). Merton argued that such juxtapositions of dominant norms and counter-norms create "sociological ambivalence" in the form of "inner conflict among scientists who have internalized both of them" (Merton, 1976, p. 36).

Haas and Park (Haas & Park, 2010) recently advanced Merton's argument by pointing out that scientists are aware of counter-normative expectations of information withholding that conflict with the dominant normative expectations, and that this creates sociological ambivalence for them. According to their conceptual model, scientists who face such contradictory role expectations may simply decide to act according to their individual interests, as prior research suggests. However, the authors propose that scientists may also look to professional reference groups to guide their behavior because their professional role expectations are often conflicting rather than clear. These conflicting role expectations create "sociological ambivalence"—uncertainty about the appropriate course of professional conduct—that makes it difficult to weigh a fundamental norm of communalism against individual interests (Merton and Barber 1963, Merton 1976). The work has strong implications for organizational behavior suggesting that, in the context of sociological ambivalence, scientists continue to value professional norms, albeit at a meso rather than macro level.

Institutional Pluralisms and Multiple Identities

Quite often, several institutional spheres simultaneously operate in organizational fields, thus, producing multiple and potentially conflicting institutional pressures. As a consequence, organizations in these fields face a fundamental dilemma because satisfying one institutional pressure may require violating others (Gresov & Drazin, 1997), and this, in turn, potentially jeopardizes organizational legitimacy. Kraazt and Block recently used the term "institutional pluralism" to identify a situation in which firms operate within multiple institutional spheres (Kraatz & Block, 2008). As stated by the authors, "If institutions are broadly understood as the rules of the game that direct and circumscribe organizational behavior, then the organization confronting institutional pluralism play two or more games at the same time. Such an organization is subject to multiple normative orders, and/or constituted by more than one cultural logic. It is a participant in multiple discourses and/or members of more than one institutional category. It thus, possesses multiple, institutional-derived identities which are conferred upon him by different segments of its pluralistic environment" (Kraatz and Block, 2008: 243).

Prior empirical research has uncovered numerous instances of organizations facing institutional environments that appear to exert pluralistic demands. These include hospitals (D'aunno, Succi, & Alexander, 2000; Denis, Lamothe, & Langley, 2001), rape crisis centers (Zilber, 2002), drug treatment centers (Daunno et al., 1991), non-profit and public organizations (Dutton & Dukerich, 1991; Stone & Brush, 1996), universities (March & Olsen, 1976), cuisine (Rao, Monin, & Durand, 2003), and arts organizations (Alexander, 1996). Research in stakeholders theory has also drawn on neo-institutionalism, pointing out that corporations, in general, are properly viewed as pluralistic entities (Donaldson & Preston, 1995; Mitchell, Agle, & Wood, 1997).

The increasing number of contributions to institutional pluralism and the variety of empirical settings probably underscore a more general tendency. Some authors pointed out that the current evolution of modern societies, combined with the evolution of modern organizations, is leading to an increasing occurrence of conflicting institutional demands globally (Pache & Santos, 2010; Seo & Creed, 2002). According to Pache and Santos (Pache & Santos, 2010), this is happening through multiple and reinforcing mechanisms. Organizations increasingly adopt hybrid forms that draw from and try to integrate sometimes competing logics. An example is the increasing integration of social goals by commercial enterprises and of commercial goals by organizations with a social mission. Furthermore, at the organizational level of analysis, the increase in workforce diversity, as well as in occupational differentiation (Greenwood & Hinings, 1996), increases the likelihood of emergence of competing normative pressures in organizations. In scholarly work, the overall phenomenon is reflected in the recent upsurge of empirical studies on competing institutional logics (Dunn & Jones, 2010; Durand, Rao, & Monin, 2007; Greenwood, Diaz, Li, & Lorente, 2010; Heinze & Kuhlmann, 2008; Lounsbury, 2007; Marquis & Lounsbury, 2007; Purdy & Gray, 2009; Rao et al., 2003)

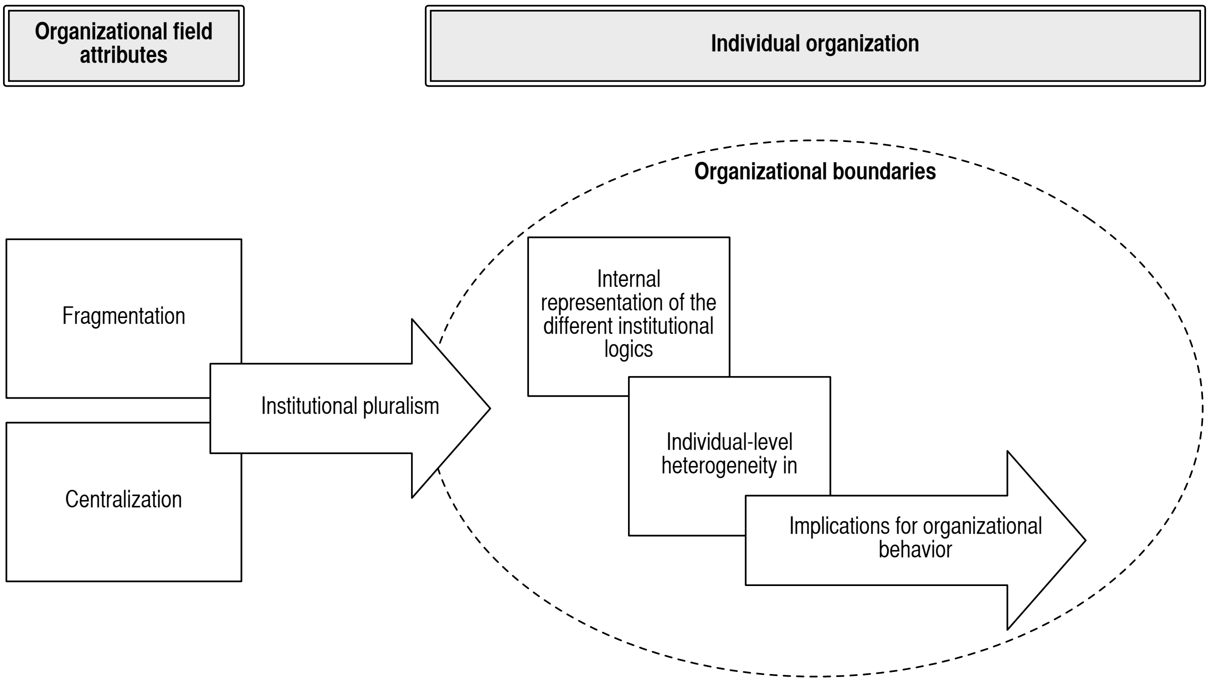
Science-based firms fit quite well a situation of institutional pluralism (Huang & Murray, 2009; Powell, 1999b). On the one hand, science-based firms depend on the scientific community to get earlier access to valuable knowledge (Stern, 2004). This, in turn, requires that firms adhere—at least partially—to the norms of science that discipline knowledge production, utilization, and diffusion (Knorr-Cetina, 1999). In this sense, a mere scientific contribution may be a necessary but not a sufficient condition for science-based firms to comply with institutional pressures. The creation of credible linkages with the epistemic community may be required to earn legitimacy in front of actors in the field. On the other hand, science-based firms depend on "other resources" that are provided by various actors in the field (e.g., funding agencies, capital markets, regulatory boards, and so forth). For these reasons, science-based firms offer a promising empirical setting for dealing with institutional pluralism and its effects on organizational behavior.

Yet, additional elements render science-based firms a particularly appropriate context or addressing the institutional pluralism problem. First, in science-based firms, the multiple institutions—and the related logics—are internally represented. On the one hand, scientists are committed to the institutional logic of the epistemic community; both their goals and organizing template are shaped by the affiliation to science. On the other hand, middle-level management and top management are committed to stakeholders' interests. Thus, different organizational groups exhibit "competitive commitment patterns" (Greenwood & Hinings, 1996) that lead them to fight against each other to ensure that the template that they favor prevails. Glynn's (Glynn, 2000) study of the Atlanta Symphony Orchestra provided a vivid illustration of the tensions that arise from the promotion of competing ideologies by two key internal constituencies. Musicians, espousing the "artistic excellence" logic of their profession, sought to develop "a world-class orchestra in a world-class city." Managers, however, promoting the "economic utility" ideology that they had been trained to follow, focused on building "the best orchestra . . . [they could] afford" (2000: 288). As a result of this competitive commitment, the two groups engaged in a passionate battle over what the orchestra's core competencies were and how its resources should be allocated, with musicians emphasizing investment in artistry and managers emphasizing cost containment. A similar pattern is illustrated by the study of O'Mahony and Bechky (O'mahony & Bechky, 2008) on volunteer production communities, which showed that the coexistence of two competing logics championed by different organizational groups led to the emergence of internal tensions.

Second, a science-based setting can be considered to be a "highly fragmented" and "moderated centralized" organizational field (Pisano, 2006a; Powell, 1999b). According to Scott and Meyer (1991), conflicting institutional demands are particularly likely to emerge in these kinds of fields. Fragmentation refers to the number of uncoordinated organizations or social actors on which field members depend (Meyer, Scott, & Strang, 1987). In a highly fragmented field, such as the educational sector in the United States (Scott and Meyer, 1991), organizations rely on and are responsive to multiple and uncoordinated constituents. This differentiates them from unified fields, such as the military field in most democratic countries, where organizations depend on a few coordinated decision makers.

Once conflicting demands emerge in fragmented fields, the likelihood that they will actually be imposed on organizations is a function of the ability of these competing institutional referents to enforce their demands. This is, in itself, a function of the degree of the field's centralization (Scott and Meyer, 1991). Centralization characterizes a field's power structure and accounts for the presence of dominant actors at the field level that support and enforce prevailing logics. The most complex fields for organizations to navigate are moderately centralized fields, which are characterized by the competing influences of multiple and misaligned actors whose influence is not dominant—no one can resolve a dispute among institutional pressures—yet is potent enough to constrain organizational behavior—pressures that emanate from different institutions cannot be ignored by actors. An example of a moderated, centralized field is provided by Scott's study (1983) of the healthcare system. He highlighted the fragmented character of the field, where organizations are expected to satisfy multiple and sometimes conflicting requirements from a wide variety of funding agencies, each in charge of specific programs. He also described the field's dual authority structure—which thus qualifies it as a moderately centralized field—with public figures wielding funding authority and health care professionals wielding programmatic authority.

Figure 2.5 – Key Factors Influencing the Experience of Conflicting Institutional Pressures



Source: adapted from Meyer et al. (1987); Pache and Santos (2010)

Finally, institutional logics provide scientists with both values or high-level goals (Simon & March, 1958) as well as organizing templates or appropriate means to achieve these goals (Thornton & Ocasio, 1999). Such a differentiation reflects the fact that conflicting institutional demands may differ with regard to the nature of their prescriptions (DiMaggio and Powell, 1983; Oliver, 1991). Specifically, they may influence organizations at the ideological level, prescribing which goals are legitimate to pursue, or they might exert pressures at the functional level, requiring organizations to adopt appropriate means or courses of action (DiMaggio and Powell, 1983; Oliver, 1991; Scott and Meyer,1991; Townley, 2002). This differentiation is also relevant if one considers the implications of institutional pluralism for organizational behavior. As argued by March and Simon, organizational responses to conflict vary according to the nature of the conflict (Simon & March, 1958). When conflict is originated by inter-personal disagreement on intermediate or low-level goals—which refer to functional and process demands—then a negotiation process is likely to occur among the parties that are involved in the conflict. In contrast, when the conflict arises from incongruence about high-level values—which are expressions of the core system of values and references of the epistemic community as a collective identity—then negotiation is less likely to occur in favor of a political solutions.

For these reasons, science-based firms represent a "laboratory" for addressing the organizational implications of institutional pluralism. The nuances of this topic may increase if one considers that scientists—and professionals in general—are heterogeneously permeated by institutional logics, as shown by recent empirical works (Dunn & Jones, 2010; Haas & Park, 2010; Johnson, Morgeson, Ilgen, Meyer, & Lloyd, 2006). Figure 2.5 summarizes the abovementioned arguments by highlighting the field-level conditions that enact institutional pluralism. At the same time, the figure accounts for the organizational-level elects that moderate the influence of institutional pluralism on organization-behavior phenomena within individual organizations—for example, science-based firms.

Organizational Responses to Institutional Pluralism

What do organizations do when faced with institutional pluralism (i.e., powerful competing institutional demands)? Greenwood and Hinings (Greenwood & Hinings, 1996)—in their model of organizational change—argued that the extent of internal commitment to institutional demands matters for organizational responses. In particular, the authors suggest that organizations are likely to resist institutional demands when an alternative template is supported internally by at least one internal group. In such situations "choice" condenses a number of—different—meanings for a number of people in the organizations (March & Olsen, 1976), especially if distinct sub-groups within the organization are primarily committed to different institutional pressures (March & Olsen, 1989). In this line of reasoning, a choice situation opens up opportunities to defend an institutional logic and (re)affirm a collective identity in individual organizations by permeating specific organizational context with values and broader organizing templates (Glynn, 2008). The main consequence is that more than one course of action is considered appropriate (March & Olsen, 1976; Whittington, 1992), and this effect is amplified in the presence of high uncertainty and ambiguity.

Recent works in institutional theory have largely stressed the potential benefits of being exposed to conflictual institutional pressure. In particular, these works have focused on the possibility for organizations to exercise some level of strategic choice (Clemens, 2003; Friedland & Alford, 1991; Seo & Creed, 2002; Whittington, 1992). This body of work acknowledges that the existence of antagonistic demands challenges the taken-for-granted character of institutional arrangements; makes organizational members aware of alternative courses of action; and requires them to make decisions as to what demand to prioritize, satisfy, alter, or neglect to secure support and ensure survival (Pache & Santos, 2010). Seo and Creed (Seo & Creed, 2002) vividly described this process, pointing to institutional contradictions as the key driver of purposeful action within an institutional context. They propose that the inherent contradictions of social structures provide a continuous source of tensions and conflicts within and across institutions, thus reshaping the consciousness of organizational actors and motivating them to take action to alleviate the tensions. They also point to misaligned interests as an important determinant of praxis, recognizing that the degree to which actors are dissatisfied with a given institutional demand is positively related to the emergence of agency within an institutional context.

Conversely, the research has left a gap about the implications of institutional pluralism for the internal functioning of organizations (on this point see Kraatz & Block, 2008). To the best of my knowledge, only a few works have tried to characterize the repertoire of responses that organizations can use to face institutional pluralism (Kraatz & Block, 2008; Oliver, 1991; Pache & Santos, 2010). Analogously, just a few works have addressed empirically the internal processes through which organizations face the institutional pluralism problem (Alexander, 1996, 1998; Daunno et al., 1991; Elsbach & Sutton, 1992).

For a long time, the study by Oliver (Oliver, 1991) was the only work to deal with "how" organizations respond to conflicting institutional pressures. Drawing on institutional theory and resource-dependence arguments, Oliver proposed a useful typology of responses to conflicting institutional pressures: acquiescence, compromise, avoidance, defiance, and manipulation. Acquiescence refers to organizations' adoption of arrangements required by external institutional constituents. The most passive response strategy, acquiescence can take three different forms: it can result from habit (i.e., the unconscious adherence to taken-for-granted norms), from the conscious or unconscious imitation of institutional models, or from the voluntary compliance to institutional requirements (Oliver, 1991). Compromise refers to the attempt by organizations to achieve partial conformity with all institutional expectations through the mild alteration of the demands, through the mild alteration of the responses, or through a combination of the two. When using compromise, organizations aim for at least partially satisfying all demands. They might try to balance competing expectations through the negotiation of a compromise, they might conform only to the minimal institutional requirements and devote resources and energy to pacify the resistant constituents, or they might attempt to actively bargain alterations of the demands with institutional referents (Alexander, 1998; Oliver, 1991). Avoidance refers to the attempt by organizations to preclude the necessity of conforming to institutional pressures or circumventing the conditions that make this conformity necessary. Avoidance tactics include concealing nonconformity behind a facade of acquiescence through pure symbolic compliance, buffering institutional processes by decoupling technical. Considering that conflicting institutional pressures activities from external contact, or escaping institutional influence by exiting the domain within which the pressure is exerted (Alexander, 1998; Oliver, 1991). A more aggressive strategy, defiance refers to the explicit rejection of at least one of the institutional demands in an attempt to actively remove the source of contradiction. Defiance can be exercised through dismissing or ignoring institutional prescriptions, overtly challenging or contesting the norms imposed, or directly attacking or denouncing them (Oliver, 1991). Finally, manipulation refers to the active attempt to alter the content of institutional requirements and to influence their promoters. Oliver (1991) pointed to three specific manipulation tactics: organizations may attempt to co-opt the sources of the institutional pressures to neutralize institutional divergences, to influence the definition of norms through active lobbying, or, more radically, to control the source of pressure.

Oliver's conceptual model has been criticized for its "low power" when it comes to specifying responses to conflicting demands because it is unable to distinguish between alternative organizational responses. Pache and Santos (Pache & Santos, 2010) have extended Oliver's model by identifying determinants of the use of various organizational responses. The core of their argument is that the nature of the institutional conflict (means versus goals) interacts with the degree of internal representation (absence, single, or multiple) to shape the experience of conflicting demands and influence the strategies that organizations mobilize in response. Furthermore, the authors innovated Oliver's model by augmenting it with the point of view of intra-organizational groups and taking into account their (heterogenous) level of attachment to the competing demands. In this vein, the authors tried to move away from a conception of organizations as unitary actors that are either passive recipients of (DiMaggio andPowell,1983) or active resistors to (Oliver, 1991) external constraints to a view of organizations as pluralistic entities shaped by—and, potentially, shaping—the institutional pressures that they are subject to (Barley and Tolbert, 1997).

However, the authors were silent on two fundamental issues. First, they assumed that the unique dimension of intra-organizational heterogeneity is linked to the presence—or, symmetrically, absence—of groups representing competing institutional demands. Such an assumption seems quite unrealistic if one considers that members within the same group do differ, as shown by empirical works on collective identities (Bartels, Pruyn, De Jong, & Joustra, 2007; Fiol, Pratt, & O'Connor, 2009; Ibarra, 1999; LeBoeuf, Shafir, & Bayuk, 2010; Pratt, Rockmann, & Kaufmann, 2006; Swann, Johnson, & Bosson, 2009). Second, the work aimed to understand "why organizations, when facing similar conflicting demands, may experience them differently and, in turn, mobilize different responses." This seems more of a recursive problem because the institutional pressures with which organizations experiment may be a function of their internal structure and, specifically, the extent to which different groups committed to competing institutions are present. It this is true, and we assume that institutions shape goals and means homogeneously across different organizations, then all organizations should respond in the same way when faced with institutional demands. In sum, Pache and Santos probably are guilty of the same error that they recognize in institutional theory; abandoning the assumption that organizations behave like "unitary actors," they have assumed that groups do so.

Like Pache and Santons, Kraatz and Block conceptualized organizations as complex entities composed of various groups that promote different values, goals, and interests (Greenwood & Hinings, 1996). Kraatz and Block described four adaptation strategies related to what they call "institutional pluralism." They proposed that organizations may attempt to eliminate the sources of conflicting institutional demands, compartmentalize them and deal with them independently, reign over them through active attempts at balancing them, or forge a new institutional order. Many organizations adapt to pluralism by trying to eliminate pluralism. Kraatz and Block argued that an organization's leader may want to deny the validity of various external claims that are placed upon it, attack the legitimacy of the entities making the claims, attempt to co-opt or control these entities, and/or try to escape their jurisdiction or influence altogether. They may, in short, attempt to marginalize some aspects of the institution's identity and attend to obligations that constituencies seek to impose upon their organizations. A second approach to adapting to a pluralism legitimacy standard is to compartmentalize identities and relate independently to various institutional constituencies. The organization may do this by sequentially attending to different claims and/or by creating separate units and initiatives that demonstrate its commitments to the values and beliefs of particular constituencies. Such initiatives are often viewed as being decoupled from the core of the organization or as merely symbolic rather than substantive in nature. Although this response is an integral part of the typology, the authors were skeptical about the practical viability of such a response: "We do not see how one can invoke the concept of decoupling without presuming to know the organizational "core" from which a thing is decoupled." Organizations may also want to try to rein in such tensions produced by institutional pluralism. For instance, disparate demands may be balanced by finding more deeply cooperative solutions to the political and cultural tensions that pluralism create. Finally, organizations may be able to forge durable identities of their own and to emerge as institutions in their own right. As an institution, the organization becomes a valued end in its own right and, thus, becomes capable of legitimizing its own actions within certain limits.

The striking feature of these works is that, despite the common awareness of the existence of institutional pluralism, there has, to date, been little apparent effort to systematically assess its practical and theoretical implications for organizations. Works have been limited to arguing that organizations may have multiple institutionally given identities, and theory has represented the structural embodiment of multiple logics where different values and beliefs may be simultaneously taken for granted. At the same time, works have largely relied on the assumption that intra-organizational processes are important factors that can explain how institutional demands are filtered (George et al., 2006; Greenwood and Hinings, 1996; Hirsch and Lounsbury, 1997; Kim et al., 2007; Selznick, 1996; Seo and Creed, 2002). Finally, subgroups within the organization are recognized as playing key roles in filtering institutional pressures, but works have encountered the same limitations of earlier formulations of institutional theory, assuming that groups are composed of homogeneous individuals who respond in the same way in the face of institutional pressures.

The Emergence of Boundary Organizations

The literature on boundary organizations has primarily regarded cooperation in interorganizational settings, though it may provide some responses to organizational issues posed by institutional pluralism situations. Drawing on the premise that collaboration may be difficult to achieve when the interests, goals, and practices of participants differ, this body of works has explored the ways in which "defending" and "challenging" parties bridge their differences without threatening the core values that make them distinct. Universities, for instance, have largely been studied using the perspective of boundary organizations, and empirical results have supported the argument that, when boundaries between academia and science were not adequately maintained, the nature of the knowledge produced was affected (see also Mowery and Ziedonis, 2002; Murray, 2007).

Several works have faced the collaboration problem—especially in science-based settings—focusing on how actors use boundary management strategies, behaviors, and objects to collaborate across diverging worlds. In scientific and technical collaborations, participants create standards, methods, and objects to bridge the boundaries between different social worlds. Boundary objects have a common structure yet remain flexible in interpretation, which enables their use across worlds with different interests (Star and Griesemer, 1989). Research demonstrates how challenging and defending parties use boundary objects to shape the distribution and application of knowledge across distinct occupational communities (Carlile, 2002, 2004; Bechky, 2003a, 2003b). In these contexts, workers use boundary objects to transform domain-specific knowledge so that it can be used toward a shared goal (Bechky, 2003b). One example is the widely disputed relationship between the worlds of science and medicine, in which divergent interests often influence the outcomes of collaboration (Latour, 1987; Fujimura, 1988; Star and Griesemer, 1989). For instance, Timmermans and Leiter (2000) described how social movements and professional organizations created a new distribution system for the controversial drug Thalidomide despite competing concerns over its effects. Although this drug was well known to cause birth defects, it could also be used effectively to treat serious diseases, including leprosy and AIDS. While the FDA deliberated over approval, activist AIDS patients pressured doctors for effective treatments whereas activist Thalidomide victims pushed to minimize the likelihood of future birth defects. To distribute the drug safely and effectively, all of the actors involved—patients, physicians, regulators, victims, manufacturers, and pharmacists—negotiated from their interests.

Sociologists of science have proposed the related construct of a boundary organization to describe the intermediary organizations that align the divergent interests of science and politics (Guston, 1999, 2000, 2001; Miller, 2001). Boundary organizations facilitate collaboration between scientists and nonscientists by remaining accountable to both (Guston, 2001). They "perform tasks that are useful to both sides and involve people from both communities in their work but play a distinctive role that would be difficult or impossible for organizations in either community to play" (Guston, 2001: 403). Boundary organizations can enable challengers and defenders to substantively collaborate by bridging divergent worlds and allowing collaborators to preserve their competing interests. Boundary organizations make collaboration possible by enrolling actors on the basis of their convergent interests. As Latour (1987: 109) noted, the easiest way to forge collaboration is to "tailor the object in such a way that it caters [to] people's explicit interests" because this creates a tension that enables actors to choose elements that meet their goals.

Like boundary objects, boundary organizations can accommodate the varying interests of parties by providing a mechanism that reinforces convergent interests while allowing divergent ones to persist. Unlike boundary objects, however, the concept of boundary organizations allows us to focus on the organizational mechanisms and processes that enable collaboration. Rather than objects that are highly transportable (Fujimura, 1988) and "weakly structured" when used in different locations (Star and Griesemer, 1989: 393), boundary organizations are more durable structures that encourage parties to isolate and organize around their convergent interests. Although they are stable, boundary organizations share the interpretive flexibility of boundary objects, enabling parties' divergent interests to coexist because they seek collaboration while pursuing mutual goals.

Table 2.1 – Convergent and Divergent Interests of Firms on Open-Source Software Projects

Community-managed open-source software projects	Firms
Convergent interests	
Enhance technical capability, performance, and portability of software for use in the enterprise	Acquire access to technical expertise and improve recruitment of skilled programmers
Improve individual skill through exposure to new commercial performance challenges	Collaborate with skilled experts to solve difficult technical problems; learn how source code can be customized to solve customer problems
Achieve commercial legitimacy and recognition; establish traditional marketing channels	Alleviate power of industry monopoly and enhance their own market share
Enhance project's market share and diffusion	Increase margins through reduced licensing fees
Divergent interests	
Maintain communal form: informal collegial project practices and working norms	Influence project direction to align with firm strategy and timetable
Maintain individual technical autonomy	Acquire more predictability in the software development process to foster firm planning
Preserve transparency and open access to code develop-	Pursue partnership and collaboration opportunities with discretion
Sustain project's vendor independence	Establish formal governance mechanisms to shape a project's future

Source: O'Mahony and Bechky (2008: 432)

O'Mahony and Bechky (O'mahony & Bechky, 2008) studied collaboration practices between the open-source community and some profit-oriented software houses; hey described "what" boundary organizations are and "how" they operate when bridging competing beliefs, assumptions, and interests. Using a multiple inductive case study, the authors vividly characterized the divergent interests of the open-source community on one side and the profit organization on the other —see Table 2.1—. Moreover, the authors provided a grounded theoretical framework that elucidated the role of boundary organizations. In the process, all projects created nonprofit foundations to serve as boundary organizations. Creating these entities forced communities and firms to confront their interests and adapt their organizing practices with respect to four domains: governance, membership, ownership, and control over production. Changes in organizing practices in these domains also shaped a new triadic role structure that included communities, their nonprofit foundations, and firms. Decisions about the role of the foundation in the triadic role structure were thought to have lasting consequences. Parties were concerned about establishing precedents and the implications of their decisions on their practices. Thus, we found that collaboration in these settings was not contingent on conjoining, co-optation, or collapse of boundaries. Instead, collaboration between open-source community projects and firms was accomplished by delineating boundaries across organizing domains to form a relatively durable boundary organization.

Table 2.2 – Role of a Boundary Organization in Enabling Collaboration

	Interest satisfied	
Organizing Practices Adapted	Community-managed open- source software projects	Firms
	Governance	
Establishing project representation	Provides open access and participatory processes	Reduces ambiguity and provides some degree of discretion
Pluralistic control	Ensures independent and collective control without undue firm influence	Provides some voice on project direction without direct control
	Membership	
Defining rights of members	Preserves individual basis of member- ship and independence of the community	Firms cannot gain formal rights, only sponsor contributors
Sponsoring contributors	Provides additional resources to help project improve	Offers firms a means of direct access to development process
	Ownership	
Obtaining work assignment rights	Reinforces individual autonomy and independence	Ensures clear provenance of code
Developing contribution agreements	Ensures clear provenance of code	Ensures clear provenance of code
Managing code donation	Enhances technical quality and reach of the project	Improves efficiency: no separate code base to manage
	Control of production	
Community control of code contribution	Allows community to preserve autonomy and independence	Sponsored contributors provide firms with visibility and access to code development
Managing technical direction	Allows community to preserve autonomy and independence	Sponsored contributors provide firms with informal influence on code development

Source: O'Mahony and Bechky (2008: 441)

Boundary organizations share the interpretive flexibility of boundary objects or inscriptions (Latour and Woolgar, 1979; Star and Griesemer, 1989; Bechky, 2003a); they are flexible in use, bridging divergent worlds while preserving elements that are distinct to each. But they differ from boundary objects in their durability. Boundary objects are mobile, material representations that move from party to party in a process of enrollment or problem solving (Fujimura, 1988; Henderson, 1999; Bechky, 2003a). Because they are more durable, boundary organizations enforce a confrontation of interests that is rarely seen with boundary objects, which can be ignored, lost, or made irrelevant (Henderson, 1999; Bechky, 2003b). The durability of boundary organizations and their instigation of change around key organizing domains also creates collaborative conditions that are different from those suggested by other scholars of science and technology. For instance, in some social worlds, such as physics (Galison, 1997) and advertising (Kellogg, Orlikowski, and Yates, 2006), collaboration occurs within trading zones. Trading zones are emergent, provisional spaces in which disparate communities meet and temporarily coordinate their activities (Galison, 1997; Kellogg, Orlikowski, and Yates, 2006). But the practices involved in a trading zone are informally structured; issues of governance and membership are not articulated much less formalized. By contrast, boundary organizations require participants to make lasting decisions about key organizing domains, such as governance, which forces them to confront and delineate interests. In summary, boundary organizations created by all four open-source community projects seem to provide an enduring organizational structure that solidified the convergent interests of the two types of parties and attenuated their most critical differences. At the same time, they allowed both parties to preserve critical aspects of their native worlds.

2.3 - Institutional Pluralism and Internal Organization

As noted so far, organizations react to institutional pluralism following different schemata or ideal types of responses. Kraatz and Block (Kraatz & Block, 2008) proposed a typology of organizational responses to "institutional pluralism." The authors pointed out that organizations facing conflicting institutional demands may attempt to: (1) eliminate the sources of conflicting institutional demands; (2) compartmentalize them and deal with them independently; (3) reign over them through active attempts at balancing them, or (4) forge a new institutional order. In other words, this typology suggests that firms have to choose among two "radical responses" (i.e., removing the source of conflict, forging a new institutional order) and two "organizational solutions" (i.e., compartmentalizing or balancing various institutional demands).

In a science-based setting, choosing a "radical response" may have significant implications for the direction of search behaviors (Fleming, 2001). To remove the conflict, the firm is obliged to disengage itself from science, and, thus, rearrange the innovation process outside the public knowledge stream. On the other hand, the possibility of forging a new institutional order depends on two conditions that appear very difficult to achieve. The first refers to the permeability of different institutions. Various empirical works have addressed this point, showing that different institutions may co-evolve over time though remaining fundamentally distinct worlds (Colyvas & Powell, 2006; Dunn & Jones, 2010; Powell, 1999a; Powell, 1999b). The second condition concerns the fundamental relationship between institutions (and fields) and single organizations. Since its first formulation, Institutional Theory has assumed that macro factors influence both structure and conduct of organizations. Introducing the possibility that single firms may affect institutions necessitates a fundamental reshaping of this relationship. Conversely, responses based on "organizational solutions" face conflict in institutions that draw on internal mechanisms (compartmentalizing or balancing), and, thus, they do not affect the shape of institutions in the field. For this reason, responses that draw on organizational solutions seem a more viable way to face institutional pluralism in a science-based setting.

These features suggest that works about organizational responses to conflicting demands (Kraatz and Block, 2008; Oliver, 1991; Pache & Santos, 2010) have left a gap about the sustainability of specific responses. To the best of my knowledge, no works have tried to highlight the implications of different responses for the success of the organization or its subparts. According to the focus of this dissertation, I try to elucidate the consequences that different responses to institutional pressures have on the innovation process, especially in science-based settings. The focus of attention is limited to responses based on organizational solutions: in particular, "compartmentalizing" sources of conflicting institutional demands and "balancing" them. The basic idea that I explore here is that the choice of which response to put in place has serious implications for the organization of the innovation process, especially the ways in which a firm can manage the well-known differentiation–integration dilemma (Duncan, 1976; Lawrence & Lorsch, 1967).

In this line of reasoning, dealing with institutional pluralism by "compartmentalization" resembles a differentiation choice. To avoid the negative consequences of collisions between different instances, science-based firms may want to physically separate the fundamental tasks of innovation (i.e., generating technological alternatives and selecting among alternatives). Such a response equates to a strict division of the innovative labor. First, scientists would mainly be involved in the generation of technological alternatives through scientific discovery (i.e., scientists allocate the majority of their energy, attention, and time to managing scientific artifacts). Second, they would have substantial autonomy about which ideas to explore and which ideas to pursue by investing physical and financial resources (i.e., scientists would have the autonomy to choose which scientific artifacts to manage so as to contribute to the scientific field). Third, the employer would free scientists to divulge the outcomes of their research and the contents of their agenda—to a certain degree. In this case, the tension among conflicting instances is not resolved within the organizational boundaries of R&D departments. Conversely, frictions are managed at "the next organizational level" thereby becoming crucial to the interface of the R&D department and the broader organizational structure.

An organizational response based on "balancing" (i.e., mediation of conflicting demands) would evoke the typical elements of integration. The strict division of the innovative labor would disappear, and scientists would be required to generate technological alternatives and undertake "exploitative" activities as well (e.g., evaluating and selecting ideas, transferring tacit knowledge to other people in developmental research, and meeting with middle and top management). In this case, the R&D department would become the place where institutional pluralism "occurs" and conflicting demands would be managed with ad-hoc organizational structures.

This section reviews some contributions about the differentiation–integration dilemma, bringing to light its recent advancements with a particular focus on the role of individuals. At the same time, it highlights the research opportunity to intersect this body of literature with works focused on internal organizational aspects related to Institutional Theory.

The Differentiation–Integration Dilemma

Since the seminal contribution of Lawrence and Lorsch (Lawrence & Lorsch, 1967), a number of works have dealt with the so-called "differentiation–integration dilemma." In general, these writing draw on two main ideas. First, differentiation and integration are mechanisms for enabling complex organizations to deliver effective outcomes, especially in the innovation area (Dougherty, 2001; Ettlie, Bridges, & O'Keefe, 1984). Second, long-term success of complex organizations is strictly related to their abilities to exploit current capabilities while simultaneously exploring fundamental new competencies (March, 1991). The large majority of these works block in the structural ambidexterity literature and spin across business policy and organizational theory (Andriopoulos & Lewis, 2009; Benner & Tushman, 2003; Cao, Gedajlovic, & Zhang, 2009; Fang, Lee, & Schilling, 2010; Fang & Levinthal, 2009; Fleming, 2001; Gibson & Birkinshaw, 2004; Greve, 2007; Gupta, Smith, & Shalley, 2006; Lavie & Rosenkopf, 2006; Lazer & Friedman, 2007; Lubatkin, Simsek, Ling, & Veiga, 2006; O'reilly & Tushman, 2008; Raisch & Birkinshaw, 2008; Raisch, Birkinshaw, Probst, & Tushman, 2009; Rothaermel & Alexandre, 2009; Rothaermel & Deeds, 2004; Siggelkow & Rivkin, 2006; Simsek, 2009; Smith & Zeithaml, 1996).

According to the structural ambidexterity framework, differentiation refers to the separation of exploitative and explorative activities into distinct organizational units whereas integration refers to the mechanisms that enable organizations to address exploitative and explorative activities within the same organizational unit. Within this stream of research, one group of studies has emphasized differentiation: that is, the subdivision of tasks into distinct organizational units that tend to develop appropriate contexts for exploitation and exploration. In this approach, the separate organizational units pursuing exploration are smaller, more decentralized, and more flexible than those responsible for exploitation (Benner & Tushman, 2003; Christensen, 1997; Christensen, Grossman, & Hwang, 2009). This structural differentiation helps complex organizations maintain different competencies with which to address inconsistent demands arising from emerging and mainstream business opportunities (Gilbert, 2005). The other group of studies has focused on integration: that is, organizational and behavioral mechanisms that enable organizations to address exploitation and exploration activities within the same unit. Gibson and Birkinshaw (Gibson & Birkinshaw, 2004) described how organizations design business unit contexts to enable employees to pursue both types of activities. Further, Lubatkin and colleagues (Lubatkin et al., 2006) found that the behavioral integration of top management teams facilitates the processing of disparate demands that are essential to attaining ambidexterity.

Scholars have pointed to the shortcomings inherent in focusing too much on one side or the other of this duality (Raisch & Birkinshaw, 2008; Raisch et al., 2009). Critics of the differentiation approach, for example, claim that exploitation and exploration have to be recombined to create value (Eisenhardt & Martin, 2000; O'reilly & Tushman, 2008). From this perspective, the mere coexistence of exploitative and explorative activities in differentiated organizational units represents an important yet insufficient condition for organizational ambidexterity (Gilbert, 2006). Several researchers have pointed to the need for top management teams to ensure integration across differentiated units (Smith & Tushman, 2005; Tushman & Rosenkopf, 1996). Recently, scholars have started to suggest that ambidextrous organizations should use lower-level integration mechanisms to stimulate the lateral knowledge flow (Raisch & Birkinshaw, 2008).

Conversely, critics of the integration approach argue that integrative contexts are constrained by individuals taking on exploitative and explorative tasks (Inkpen, 2005)}. They therefore rely on the same basic experiences, values, and capabilities to carry out both tasks, which makes exploring knowledge bases that are fundamentally different very difficult. Adler et al. (Adler, Goldoftas, & Levine, 1999) suggest complementing integrated contexts with “tactical” differentiation. They describe how production workers switch between two tasks supported by “parallel” organizational structures, such as quality circles. These structures enable people from the same unit to move back and forth between a bureaucratic structure for routine tasks and an organic structure for non-routine tasks.

The need to combine processes for differentiation and integration creates a paradox that is difficult to resolve. Managing a paradox requires “a creative way that captures both extremes” rather than a simple either/or trade-off (Eisenhardt, 2000). However, it is still unclear how the tensions between differentiation and integration should be managed. Combining structural differentiation with tactical integration bears the risk of destroying the “pragmatic boundaries” that protect exploratory activities from being affected by the mainstream units’ inertial forces (Carlile, 2004; Christensen et al., 2009; Westerman, McFarlan, & Iansiti, 2006). Combining integration with tactical differentiation requires individuals to work in different "thought worlds" (Dougherty, 1992; Kostova & Zaheer, 1999), which is often beyond their cognitive limits (Inkpen & Tsang, 2005). Therefore, neither solution may allow for maximizing both exploitation and exploration. When differentiation is combined with integration, exploitation and exploration need to be conceptualized as two ends of a continuum (Gupta et al., 2006). Thus the managerial task is to determine the right degree of differentiation and integration. It is likely that the right balance between differentiation and integration depends on the relative importance of exploitative and explorative activities (Gulati & Puranam, 2009).

Contextual Ambidexterity

As highlighted so far, ambidexterity research has usually described organizational mechanisms that enable firms to simultaneously address exploitation and exploration (Raisch & Birkinshaw, 2008). For instance, the literature has widely investigated the role of formal structures and lateral coordination mechanisms (Fang et al., 2010; Mihm, Loch, Wilkinson, & Huberman, 2010; Rivkin & Siggelkow, 2003, 2007; Siggelkow & Levinthal, 2003; Siggelkow & Rivkin, 2005, 2006). Conversely, some studies—that explored so-called contextual ambidexterity—have indicated that ambidexterity is rooted in an individual's ability to explore and exploit. Thus, ambidextrous individuals may be vital to the usefulness of organizational mechanisms. This is coherent with studies in the R&D management field that emphasize the role of gatekeepers and people in a dual ladder position (Allen & Katz, 1986; Katz, Tushman, & Allen, 1995; Roberts & Fusfeld, 1982). There is, therefore, a need for theories that capture ambidexterity across multiple levels of analysis (Gupta, Tesluk, & Taylor, 2007).

As recently observed by Raisch and Birkinshaw (Raisch & Birkinshaw, 2008) the tensions that ambidexterity creates are resolved at the "next organizational level." In this line of reasoning, a business unit may become ambidextrous by creating two functions or subdivisions with different foci (Benner & Tushman, 2003). A manufacturing plant may become ambidextrous by creating two different teams—one in charge of exploration and another in charge of exploitation (Adler et al., 1999)—and a single team may become ambidextrous by allocating different roles to each individual. In sum, research has suggested that structural mechanisms are used to enable ambidexterity whereas most individuals are seen as focused on either exploration or exploitation activities (Smith & Tushman, 2005). However, the individual dimension of ambidexterity has not been explored further. Although studies on contextual ambidexterity describe cultural rather than structural characteristics, they take a similar stance on organizational mechanisms. Gibson and Birkinshaw (Gibson & Birkinshaw, 2004), for example, described business unit contexts that enable employees to conduct both exploration and exploitation activities. The important difference is that these studies assume that ambidexterity is rooted in an individual's ability to explore and exploit. Similarly, Mom et al. (Mom, Van den Bosch, & Volberda, 2007) showed that some managers simultaneously engage in high levels of exploitation and exploration activities. In these studies, individuals are important sources of organizational ambidexterity.

The possibility that individuals can take on both exploitative and explorative tasks creates a number of challenges. Ambidextrous managers must manage contradictions and conflicting goals (O'reilly & Tushman, 2008; Smith & Tushman, 2005), engage in paradoxical thinking (Gibson & Birkinshaw, 2004), and fulfill multiple roles (Floyd & Lane, 2000). Several factors have been related to "ambidextrous behaviors" at the individual level. For instance, Amabile (Amabile, Conti, Coon, Lazenby, & Herron, 1996) suggested that individuals who focus on creativity and exploration differ—even in personality—from those who emphasize implementation or exploitation activities. Focusing on prior experiences, Mom and colleagues (2007) found that the more a manager acquires top-down and bottom-up knowledge flows or top-down and horizontal knowledge flows, the higher the levels of exploration and exploitation activities that this manager may undertake. Cohen and Levinthal (1990) argued that individuals need prior related knowledge to assimilate and use new knowledge. Individuals with a breadth of prior knowledge categories as well as various linkages across them may be better prepared to take on both tasks. Moreover, temporal orientation of individuals has been found to be an important predictor of ambidextrous behaviors (O'reilly & Tushman, 2004).

In addition to personal characteristics, organizational factors affect individuals' ability to act ambidextrously. Ghoshal and Bartlett described socialization, recognition, and team-building practices to help individuals think and act ambidextrously. Gibson and Birkinshaw (Gibson & Birkinshaw, 2004) presented contexts that allow managers to divide their time between alignment- and adaptability-oriented activities. Lubatkin and colleagues (Lubatkin et al., 2006) noted that behavioral integration—i.e., the senior team's wholeness and unity of effort—can help process disparate demands. Jansen and colleagues (Jansen, George, Van den Bosch, & Volberda, 2008) cited formal senior-team contingency rewards and informal senior-team social integration as important mechanisms to enable senior teams to host contradictory forces.

All of these studies provide a strong indication that organizational factors have to be considered alongside personal characteristics when explaining individuals' ambidexterity. Further, personal and organizational factors may be closely related. For example, organizational contexts that provide managers with decision-making authority are likely to stimulate richer sense-making and cognitive processes at the personal level. Conversely, individuals' ability to act ambidextrously will have a cumulative effect on the organization's ambidexterity. However, organizational ambidexterity is different from the sum of its members' personal ambidexterity. As described by Tushman and O'Reilly (Tushman & O'Reilly III, 2006), a relatively small number of ambidextrous managers may be able to integrate exploitative and explorative outcomes that are generated in different parts of the firm by individuals who are focused on either exploitation or exploration.

Reactions to Institutional Pluralism and Organizational Implications

Institutional pluralism creates the potential for fragmentation, incoherence, conflict, goal-ambiguity, and organizational instability (Glynn et al., 2000). But institutional pluralism may also create opportunities for organizational change and adaptation (Clemens, 2003). At present, only a few works have adopted an organization-centric perspective of the relation between institutional pluralism and its consequences. However, the conceptual model of Kraatz and Block (2008) can be fruitfully used to underscore possible connections between institutional literature and organizing-for-innovation literature.

A compartmentalization response sequentially attends to different institutional pressures by creating separate units and initiatives that demonstrate its commitments to the values and beliefs of particular institutional logics. Thus, such initiatives can be viewed as decoupled from the core of the organization or as merely symbolic rather than substantive in nature (Meyer & Rowan, 1977; Westphal & Zajac, 1994, 1998). Such a logic can be criticized if one considers that there are no peripheral practices that are inconsequential for the organization. As argued by Pisano (Pisano, 2006a) science-based businesses have to face two fundamental challenges: integration of disparate knowledge bases and organizational learning. High levels of decoupling may decrease conflict levels in the organization, reducing goal ability and enabling individuals to fill socially derived roles. Conversely, under high levels of decoupling, no one in the organization is able to control number, quality, and timing of flows of new ideas and proposals for innovation. This may also influence the direction of organizational change, which often depends on "accidents." Furthermore, a compartmentalization strategy may impede cross-unit or cross-initiative knowledge transfer. For this reason, science-based firms may fail to integrate different knowledge bases and, at the same time, organizational learning may be seriously inhibited.

By contrast, organizational responses that try to balance conflicting institutional claims may incur other problems. Institutional logics may collide within organizational boundaries and tensions abide. Scientists, for instance, may be unable to verify their collective identity in the day-to-day work with negative impacts on goal clarity and role conflict. Furthermore, these individual-level consequences may affect organizational-level outcomes through the interpersonal structure of decision making. The implications of balancing institutional pressures for knowledge transfer are ambiguous. The increased level of communication imposed by organizational coupling may be insufficient to compensate for the negative consequences that identity differences have on knowledge-transfer practices (Kane, 2010). But a more serious problem may emerge in the presence of tight coupling. Scientists may be unable to verify their collective identity, which derives from the epistemic community, thus sanctioning such a form of organizational structure. This, in the long term, may prevent the firm from attracting scientists with a strong collective identity.

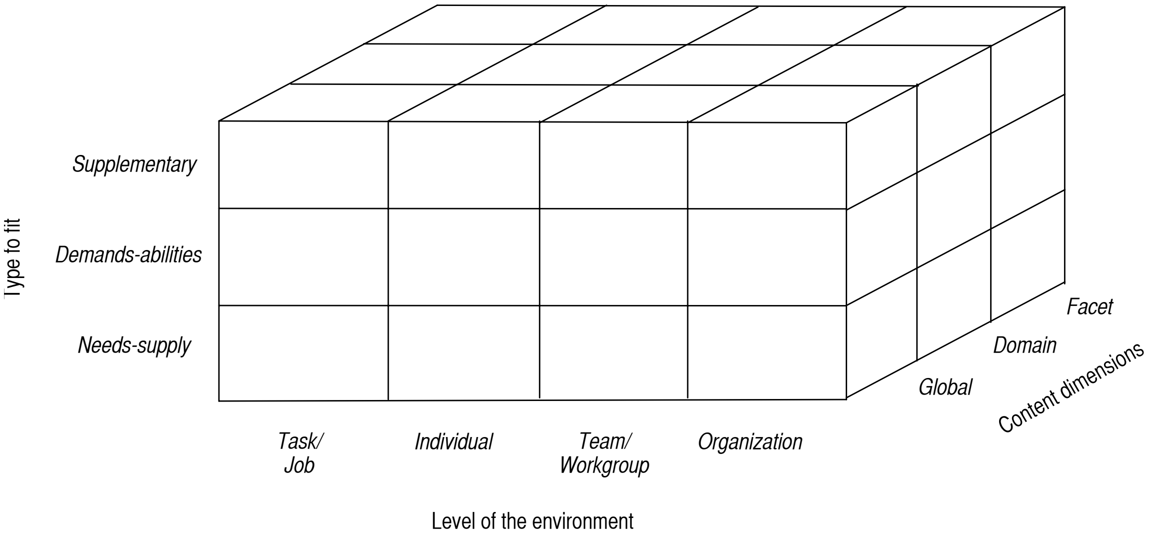
2.4 - Institutional Pluralism and Intra-Organizational Heterogeneity

As highlighted so far, science-based firms operate at the crossroads of different knowledge production institutions, paired with many logics and values. Thus, the organization of the innovation process poses unique challenges and specific functional requirements (Gittelman & Kogut, 2003; Pisano, 2006b, 2010). As in a technology-intensive context, science-based organizations strive to set an appropriate balance of differentiation and integration; however, integration is much more difficult to achieve in a science-based setting because decisional premises of scientists are—to a certain degree—exogenous to the organization (i.e., they are affected by the epistemic community). The literature on person–environment may serve as an elegant and effective tool for underscoring the intra-organizational heterogeneity that characterizes science-based firms, and its implications for organizational behavior. Furthermore, PE fit can be used to underline "when" and "why" different logics of knowledge production collide in science-based organizations.

In general terms, research in the PE-fit stream attempts to link characteristics of individuals with the organizational environment, and to derive implications for attitudes and behaviors of organizational members. The basic premise of PE-fit theory and research is that, when characteristics of people and the work environment are similar, aligned, or fit together, positive outcomes for individuals—such as satisfaction, adjustment, commitment, performance, and lower turnover intentions—result. This view parallels the macro-organizational research on fit, which argues that components of the organizational system such as structure, goals, and culture must fit together or complement one another to foster effectiveness, organizational adaptation, and survival in the larger environment within which the organization operates. However, PE-fit research moves away from macro-organizational works on fit because conceptual models are cross-level in nature; characteristics of individuals are examined in conjunction with some characteristics of their work environment. Analogously, outcomes of PE fit are typically investigated at the individual level of analysis. The theoretical basis of PE-fit research is rooted in the interactions perspective, which contends that neither traits nor situations are the primary determiners of individuals' responses but, rather, the interaction between the two influences responses (Schneider, 1983; Terborg, 1981). PE fit has developed this intuition by specifying how the person and the situational or environmental elements should interact when influencing responses. A considerable amount of research has leveraged the concept of PE fit. Both narrative reviews (Edwards, 1991; Katzell, 1964; Kristof, 1996; Meglino & Ravlin, 1998; Pervin, 1968; Spokane, 1985; Spokane, Meir, & Catalano, 2000) and meta-analyses (Arthur, Bell, Villado, & Doverspike, 2006; Assouline & Meir, 1987; Chapman, Uggerslev, Carroll, Piasentin, & Jones, 2005; Hoffman & Woehr, 2006; Kristof-Brown, Zimmerman, & Johnson, 2005; Tranberg, Slane, & Ekeberg, 1993; Tsabari, Tziner, & Meir, 2005; Verquer, Beehr, & Wagner, 2003) have summarized this wide literature, highlighting the fact that strong empirical findings have been gathered but a number of theoretical issues remain largely unaddressed. Another striking feature of the literature on PE fit is its scope: contributions span across several disciplines such as organizational behavior, education, vocation, counseling, and social and industrial/organizational psychology. Here I limit my focus to fit as it applies to organizational settings—for this reason, I do not discuss person–occupation or person–vocation fits.

As widely noted, PE fit has been conceptualized in various ways. Generally speaking, fit is defined as the congruence, match, similarity, or correspondence between micro or macro organizational components. Within this broad definition of fit, various conceptualizations of PE fit have been proposed. Recent contributions have tried to build systematic conceptual frameworks that solve ambiguities and inconsistencies. To review the salient literature, I rely on the conceptual model recently proposed by Edwards and Shipp (Edwards & Shipp, 2007), which typifies the contributions according to three dimensions: the way in which fit is conceptualized, the level of the environment that is taken into account, and the content of fit (see Figure 2.6).

Figure 2.6 – An Integrative Conceptualization of PE Fit



Source: Edwards & Shipp (2007: 218)

Supplementary and complementary fit

A widely accepted approach in PE fit distinguishes between supplementary fit and complementary fit (Kristof, 1996; Muchinsky & Monohan, 1987). Supplementary fit primarily relies on the concept of homogeneity; it occurs when the person supplements, embellishes, or possesses characteristics that are similar to those of the other individuals in the environment (Muchinsky and Monahan, 1987: 269). As pointed out by Edwards and Shipp (2007), although the terms supplement and embellish imply that the person brings something unique to the social environment, further discussions of supplementary fit have equated it with interpersonal similarity (Cable & DeRue, 2002; Day & Bedeian, 1995).

Complementary fit is grounded in the idea of heterogeneity in the individual and the environmental dimensions. Complementary fit occurs when a "weakness or need of the environment is offset by the strength of the individual and vice versa" (Muchinsky and Monahan, 1987: 271). Also in this line of reasoning, Cable and Edwards (Cable & Edwards, 2004) argued that complementary fit concerns the "desired" number of individual or organization attributes. Two sub-types of complementary fit may be distinguished in terms of whether requirements are imposed by the environment or the person (Kristof, 1996). The requirements of the person reflect her needs, which include biological as well as psychological aspects. The degree to which the person's needs are fulfilled by the supplies in the environment represents the needs–supplies fit. The requirements of the environment concern the demands that are placed on the person and may reflect the nature of a task, role, or broader social context. The degree to which these demands are fulfilled by the knowledge, skills, abilities, and resources of the person equates to the demands–abilities fit.

It is widely acknowledged in the PE-fit stream that these distinctions have often been overlooked (Edwards & Shipp, 2007; Ostroff & Schulte, 2007). In some studies, different types of fit have been combined into a summary index. On other occasions, respondents have been asked how well a job or organization fit with them, disregarding whether fit should be interpreted as supplementary or complementary. Without a proper conceptual distinction of different types of fit, no implications can be derived for individuals' attitudes and behaviors. Peculiar mechanisms through which distinct types of fit affect outcome may be confounded and the effect obscured.

Levels of the environment

The level at which the environment is conceptualized is another dimension to distinguish PE fit. As noted, PE-fit research is cross-level in nature. The "P" component is always conceptualized at the individual level. On the other hand, the "E" component can be conceptualized at different levels. Therefore, individuals can fit different hierarchical levels, such as their job, team, division, or organization, producing different types of fit. For example, an individual's personal values (P) could be compared to the values of her supervisors (I), to the values among members in the same job category (J), to the values among members in the workgroup (G), or to values of other members in the organization (O).

For supplementary fit, the environment refers to the people in it (Muchinsky & Monohan, 1987) so environmental levels concern varying degrees of aggregation of people in the environment. For example, research on supplementary fit has dealt with the similarities among the person and other individuals, such as supervisors (Barrett, 1995; Tsui, Porter, & Egan, 2002), subordinates (Engle & Lord, 1997; Yukl & Fu, 1999), and coworkers (Antonioni & Park, 2001; Schaubroeck & Lam, 2002), and between the person and social collectives, such as incumbents of a particular job (Chatman, Caldwell, & O'Reilly, 1999) and members of workgroups (Ferris, Youngblood, & Yates, 1985; Hollenbeck et al., 2002; Kristof-Brown et al., 2002; Kristof-Brown & Stevens, 2001), departments (Enz, 1988), and organizations (Chatman, 1991; Chatman & Barsade, 1995; Kristof, 1996; Oreilly et al., 1991; Verquer et al., 2003).

Analogously, different levels of the environment have been considered in complementary-fit research. In the case of needs–supply fit, supplies can be framed at levels analogous to those of demands. As pointed out (Edwards & Shipp, 2007), supplies are typically conceived at the individual level, such that the needs–supplies fit concerns the supplies that are available to a particular person irrespective of whether those supplies are available to other people (Cable & DeRue, 2002; Edwards, 1996; French, Caplan, & Van Harrison, 1982) whereas other works investigate supplies at the organizational level (Bretz & Judge, 1994; Chatman, 1991; Christiansen, Villanova, & Mikulay, 1997; Tziner & Falbe, 1990; Van Vianen, 2000; Vigoda, 2002). Research that focuses on the demands–abilities fit usually distinguishes between the case in which demands are unique to the experiences of an individual and the case in which demands are shared by individuals in the same workgroup, department, or vocation. A first group of studies have examined demands at the job level: for example, when job seekers rate the fit between their abilities and the demands of the potential employer with whom they interviewed (Cable & Judge, 1996) or when raters assess the demands of a position or job (Caldwell & Oreilly, 1990; Higgins & Judge, 2004; Kristof-Brown, 2000). This research reflects the premise that the same demands are encountered by all incumbents for the position or job. Studies also frame demands at higher levels, such as teams (Hollenbeck et al., 2002), and functions (Chan, 1996).

Ostroff and Schulte (Ostroff & Schulte, 2007) provided an in-depth discussion of issues in PE-fit research. Relying on the rich methodological literature on levels (Klein, Tosi, & Cannella, 1999; Kozlowski & Klein, 2000; Rousseau, 1985), the authors proposed that the concepts of composition and compilation—when combined with different conceptualizations of the environment (person- or situation-based)—provide a more coherent means for distinguishing between different modes and types of fit. According to Kozlowsky and Klein (Kozlowski & Klein, 2000), composition and compilation processes are two qualitatively distinct processes that pertain to how lower-level characteristics or elements emerge into higher-level constructs or collective phenomena. These notions, as argued by the authors, are particularly relevant in fit research because the E in PE fit is often based on a combination of lower-level elements (e.g., aggregated individual characteristics or arrays of personal characteristic across members of the group). Composition models refer to situations in which lower-level elements or characteristics converge and coalesce to produce a higher property that is, essentially, the same as the elements that comprise it. A compositional perspective of fit is based largely on the notion that the person characteristic is compared to a higher-level characteristic that is functionally similar and has the same content or same meaning as the lower-level construct (i.e., individual values compared to organizational values). Compilation is based on the notion that a particular configuration or profile of lower-level elements or characteristics yields the higher-level construct (Kozlowski & Klein, 2000). Here, the assumption is that different amounts or types of lower-level element properties combine to reveal the higher-level property. The lower-level characteristics vary within a unit, but the pattern or configuration of these lower-level characteristics produces a higher-level attribute and characterizes the unit as a whole. The lower- and higher-level constructs are functionally similar in that they occupy essentially the same role in models at different levels of analysis, but they are not the same or completely isomorphic. Thus, a compilation perspective of fit is based on the notion that elements or characteristics vary, but, nevertheless, they combine in such a way as to complement and fit with one another (e.g., different personality characteristics across individuals combine to form a team composed of complementary personality types).

All in all, the rigorous conceptual framework proposed by Ostroff and Schulte (Ostroff & Schulte, 2007) suggests that the composition and compilation concepts can be used to characterize the relationship between P and E by describing different ways that the higher-level E element can be constructed from lower-level elements. According to this view, supplementary fit is related to the notion of composition in that the environment is composed of people with identical or very similar characteristics. Therefore, fit is achieved when the characteristics of a focal person are identical or very similar to them. Complementary fit and compilation have in common the fact that the environment is defined as a system or configuration based on heterogenous characteristics. In this case, fit is achieved when the characteristics of a focal person make the system whole so that a higher-order gestalt can emerge or when elements of E fit together to create a coherent whole.

Considering the individual level of analysis in fit research (i.e., the P factor and outcomes are both at the individual level), Ostroff and Shulte (Ostroff & Schulte, 2007) showed four different modes of PE fit that result from the combination of composition and compilation assumptions with person-based and situation-based conceptualizations of the environment. The four types of fit are detailed in Table 2.3.

Table 2.3 – PE Fit at the Individual Level of Analysis

Mode by subtype of fit	General description	Levels of Analysis Type	E Factor
PP compositional	Degree of similarity between the personal attributes of focal individual and the personal attributes of:	Composition and identical: identical P and E elements	Shared or similar collective personal attributes of others (e.g., personal skills, goals, personality and attitudes)
PI fit	A peer, supervisor, recruiter		
PJ fit	Individuals within a job category		
PG fit	Individuals within a group, unit		
PO fit	Individuals within the organization		
Social PS	Degree of fit between the personal attributes of focal individual and the socio-psychological context defined through converging cognitions, perceptions, affects, or behaviours of:	Composition and referent shift: homologous P and E elements but referent for factors shifts from individual to situation	Attribute of the social-psychological context (e.g., culture, climate, espoused goals) that its theoretical foundation in the cognitions, perceptions, affects, attitudes, or behavior of people in the context
PI fit	A peer, supervisor, recruiter		
PJ fit	Individuals within a job category		
PG fit	Individuals within a group, unit		
PO fit	Individuals within the organization		
PP compilation	Degree to which the personal attributes of focal individual complements the array of personal attributes of others, where the array is derived from:	Compilation	Profile, pattern or configuration of personal attributes of others (e.g., configuration of different skills, personalities and goals)
PI fit	A peer, supervisor, recruiter		
PJ fit	Individuals within a job category		
PG fit	Individuals within a group, unit		
PO fit	Individuals within the organization		
Structural PS	Degree of fit or alignment between personal attributes of focal individual and structural-technical environment defined as:		Attribute of the structural-technical context (e.g., job demands, work structure, practices, and reward systems) that has its theoretical foundation in the design and structure of the work context, independent of the personal characteristics of those in the environment
PJ fit	A job category		
PG fit	A group, unit		
PO fit	An organization		

Source: Ostroff and Schulte (2007: 23)

Content of the person and environment dimensions

Different conceptualizations of PE fit can derive from the dimensions in which the person and the environment are compared. Edwards and Shipp (Edwards & Shipp, 2007) focused on three kinds of dimensions—global, domain, and facet levels—which are arranged in a continuum ranging from general to specific. In the case of supplementary fit, the global level refers to similarity in a general sense without reference to any dimension of comparison. For example, several studies have investigated the perceived overall similarity between the person and other people whereas other studies have combined broad areas of comparison such as values, beliefs, and attitudes (Turban, Dougherty, & Lee, 2002; Turban & Jones, 1988; Wayne & Liden, 1995; Zalesny & Highhouse, 1992). When the person and the environment are compared at the domain level, broad areas of comparison are taken into account without distinguishing dimensions within each area. Many works have investigated the similarity among persons and environment in terms of values, goals, personality, and demographic characteristics. At the facet level, similarity is assessed using specific dimensions within a broader area (Tsui & Oreilly, 1989; Vecchio & Bullis, 2001), such as when demographic characteristics are separately investigated or various personality traits are used (Antonioni & Park, 2001; Day & Bedeian, 1995).

In the case of the needs–supplies fit, the global level is illustrated by studies of the overall fit between needs and supplies that assess general perceptions of need fulfillment (Cable & DeRue, 2002; Saks & Ashforth, 1997) or aggregate needs–supplies fit across a broad set of dimensions (Hollenbeck, 1989; Rounds, Dawis, & Lofquist, 1987). The domain level concerns fit in general need and supply dimensions such as job complexity (Edwards & Harrison, 1993), job enrichment (Cherrington & Lynn England, 1980; Greenhaus, Seidel, & Marinis, 1983), and social relationships (Edwards, Scully, & Brtek, 1999). The facet level involves the needs–supplies fit in terms of specific aspects of work, such as when job scopes are separated into autonomy, variety, task identity, and participation in decision making (Alutto & Acito, 1974; Cook & Wall, 1980; O'Brien & Dowling, 1980; Wanous & Lawler, 1972).

For the demands–abilities fit, the global level refers to the general congruence among environmental requirements and individual abilities, such as when perceptions of overall fit are assessed (Cable & DeRue, 2002; Cable & Judge, 1996; Kristof-Brown, 2000; Saks & Ashforth, 1997) and when various dimensions are collapsed in a single index (Caldwell & Oreilly, 1990). Education, training, experience, and workload are, instead, possible dimensions of comparison at the domain level. The facet level concerns the demands–abilities fit for specific tasks or activities: for example, generating new ideas (Choi, 2004; Livingstone, Nelson, & Barr, 1997) and playing a musical instrument in an orchestra (Parasuraman & Purohit, 2000).

Prior empirical evidence

As observed so far, the literature on PE fit spans different disciplines. As a consequence, various outcomes have been analyzed (Kristof, 1996; Kristof-Brown et al., 2005; Spokane, Meir, & Catalano, 2000; Verquer et al., 2003). Here, I limit my focus to post-entry outcomes (Kristof, 1996), and I categorize them into two classes: attitudes (e.g., organizational commitment, identification with the organization or workgroup, job satisfaction, perceived conflict, and so on), and behaviors (e.g., task and contextual performance, knowledge-transfer, communication, and so on). This distinction is combined with the aforementioned distinction concerning kinds of fit so as to highlight which outcomes have been traditionally put in causal connection with which kinds of PE fit.

A widely addressed topic in this area is the effect that PE fit has on organizational commitment. Organizational commitment has been defined in the literature in various ways, such as "the psychological attachment felt by the person for the organization" (Oreilly & Chatman, 1986) or, in a more general sense, as "a bond between the individual and the organizations" (Mathieu & Zajac, 1990). The underlying idea is that, when employees believe that their values match an organization's values and the values of other employees in the organization, they should feel invested in the broader mission of the organization. As suggested by Saks and Ashforth (Saks & Ashforth, 1997), people who perceive a good fit with their organization are likely to at least partly define themselves in terms of their organization.

Task performance refers to the recurring set of activities or expected behaviors of an individual that are typically described by formal job descriptions. These behaviors tend to be "highly elaborated, relatively stab, and defined to a considerable extent in explicit or even written terms." Task performance is usually considered to depend on both abilities and motivations (Hunter, 1983; Motowildo, Borman, & Schmit, 1997; Organ & Ryan, 1995; Wanous, Poland, Premack, & Davis, 1992). Along this line of reasoning, several authors have linked task performance to the match between abilities and job requirements (Dawis & Lofquist, 1984; Motowidlo, 2003). Discussion of task performance has also involved the need–supplies fit. In this case, the positive effect on task performance relates to the motivating properties of supplies that are expected to fulfill needs. In particular, a current, unfulfilled need would motivate performance when anticipated supplies are expected to fulfill this need (Edwards & Shipp, 2007). Supplementary fit can affect task performance by facilitating communication and coordination with co-workers (Day & Bedeian, 1995; Edwards & Cable, 2009; Neuman & Wright, 1999), which increases knowledge acquisition, role clarity, and predictability of behavior (Motowidlo, 2003). As a result, individuals may be better able to meet task demands, which, in turn, should increase task performance. On the other hand, supplementary fit can reduce variation in perspectives and approaches to problem solving, which can hinder the person's ability to meet demands of tasks that are non-routine or require different perspectives (Adkins, Ravlin, & Meglino, 1996; Ancona & Caldwell, 1992; Caldwell, Herold, & Fedor, 2004; Chatman, 1989). Moreover, the effects of supplementary fit on task performance should depend on the degree to which the person is interdependent with others in the environment (Ancona & Caldwell, 1992). When the person is highly interdependent with others, the effects of supplementary fit should be accentuated.

Contextual performance refers to behavior that contributes to organizational effectiveness through its effects on the psychological, social, and organizational work context (Borman & Motowidlo, 1993). As observed, the concept of contextual performance largely overlaps with the concept of organizational citizenship behavior (OCB). The latter, in fact, has been defined in terms of "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward systems, and that in the aggregate promotes the effective functioning of the organization" (Smith, Organ, & Near, 1983). Dimensions typically related to contextual performance comprise following rules and organizational policies, volunteering to carry out tasks, and helping others (Borman & Motowidlo, 1993). Contextual performance is primarily a function of attitudes (Organ & Ryan, 1995). Members in an organization are more likely to engage in contextual performance when they are satisfied with their job or when they feel committed to the organization (Podsakoff, MacKenzie, Paine, & Bachrach, 2000). As mentioned above, satisfaction and commitment result from the fit between needs and supplies. It follows that the needs–supplies fit can affect contextual performance indirectly because it is mediated by attitudes (Edwards & Shipp, 2007). However, other scholars contend that contextual performance can result directly from the evaluation of job characteristics relative to needs, independent of job attitudes (Organ, 1990; Organ & Konovsky, 1989; Organ & Ryan, 1995). Finally, supplementary fit can influence contextual performance through different mechanisms. Similarity can affect contextual performance through the needs–supplies fit. The basic argument is that supplementary fit can increase needs–supplies fit when similarity provides supplies for the need for affiliation, belonging, closure, or clarity when the person and the environment constructs involved in supplementary fit influence needs and supplies, and when supplementary fit enhances job performance and brings rewards that fulfill needs. To the extent that needs are fulfilled, satisfaction increases and contextual performance is enhanced (Morrison, 1994; Podsakoff et al., 2000). On the other hand, supplementary fit can influence contextual performance because individuals prefer to help others who are similar to themselves (Graf & Riddell, 1972), and because helping is an important dimension of contextual performance (Podsakoff et al., 2000).

All in all, empirical evidence shows that the effects of PE fit on outcomes concern combinations of different types of fit. In the case of task performance, the effects of the demands–abilities fit and the needs–supplies fit are interactive such that both types of fit are required for task performance to occur. These effects underscore the value of adopting an integrative view of fit and casting different types of fit as elements of a broader theoretical model.

2.5 - Summary, Assessment, and Research Opportunities

This literature review has spanned several domains so as to clarify the organizational challenges faced by science-based firms. First, I focused on the behavioral theory of organization, highlighting possible intersections with the literature on organizing for innovation. Second, I reviewed some facets of institutional theory to clarify the influence that a broader social structure can exert on decisional premises of individuals within organizations. Third, I highlighted the implications of institutional pluralism—the presence of multiple and conflicting institutional pressures—for internal organizational practices. Finally, I focused on the vast literature on PE fit, presenting this stream as a tool to evaluate possible collisions of different institutional logics and, simultaneously, to highlight their implications for organizational behavior.

Behavioral View of the Innovation Process

Studies on search behaviors, despite having clear roots in the Carnegie School, have shifted away from issues of decision making and, even more pronouncedly, an organizational level of analysis (Argote & Greve, 2007). More specifically, the theory has left two gaps: the relation between alternative generation and alternative evaluation tasks is largely unaddressed; works have treated organizations as unitary actors, thus disregarding the problem of how actors with different beliefs, values, and socially derived organizing templates collectively evaluate alternatives. Thus, the first gap raises a series of questions. Are alternative generation and alternative evaluation loosely coupled activities? Is it reasonable to assume that alternative generation and alternative evaluation are loosely coupled activities? Are there some similarities in the ways in which alternatives are generated and/or searched and, once identified, evaluated? Finally, if these two tasks cannot be decoupled, what is the role played by individuals who move across different task environments? What are the consequences for organizational behavior? What the consequences for organizational success?

Moreover, the view of organizations as "organized anarchies" (March & Olsen, 1976) is almost extraneous to the literature of organizing for innovation. Sometimes, loose coupling has been assumed to be a source of variation, experimentation, and change in organization, but its consequences for the internal processes of organizations have been largely underexplored. Analogously, several works have dealt with the "choice problem" in science-based settings—in particular, biotech and pharmaceuticals—but have neglected the fundamental problems posed by ambiguity (Arora et al., 2009; Chandy et al., 2006; Fleming & Sorenson, 2004; Gittelman & Kogut, 2003). The epistemological approach of these works is evident in their terminology. For instance, the term "behavior" is not associated with an individual but, rather, the organization as a whole. This ascribes agency to organizations; organizations do not behave—people do.

Institutional Pluralism and Boundary Organizations

This review of recent works in the institutional literature has highlighted the fact that decision premises emanate, in part, from sources external to the organization (DiMaggio & Powell, 1983). In particular, institutional logics provide individuals with collective identities that are composed of values, beliefs, and organizing templates (Thornton & Ocasio, 1999). In this sense, science-based firms are permeated by multiple logics that work across different institutional spheres such as science and the intellectual property logic. Despite the common awareness of the existence of institutional pluralism, there has, to date, been little apparent effort to systematically assess its practical and theoretical implications for organizations (Glynn, 2000). That which has been done has been limited to the argument that organizations may have multiple institutionally given identities, and, as a consequence, they represent the structural embodiment of multiple logics where different values and beliefs may be simultaneously taken for granted. At the same time, works have largely relied on the assumption that intra-organizational processes are important factors for explaining how institutional demands are filtered (George et al., 2006; Greenwood & Hinings, 1996; Hirsch & Lounsbury, 1997; Kim et al., 2007; Selznick, 1996; Seo & Creed, 2002). Finally, sub-groups within the organization are recognized as playing key roles in filtering institutional pressures, but works on this topic have encountered the same limits as earlier formulations of institutional theory: they assume that groups are composed of homogeneous individuals who respond in the same way in the face of institutional pressures. Putting these elements in perspective, it may be promising to address the consequences that institutional pluralism has on organizational behavior empirically.

Institutional Pluralism and Internal Organizations

Various works have dealt with the responses that organizations can put in place to face institutional pluralism (D'Aunno, 1991; Oliver, 1991; Pache & Santos, 2010). However, these studies have left a gap about the micro-level implications of responses. A micro perspective, with its focus on organizational behavior aspects, may bring to light important aspects of responses' sustainability. To the best of my knowledge, no works have tried to highlight the implications of different responses for the success of the organization, its sub-parts, or individuals. According to the focus of this dissertation study, I try to elucidate the consequences that different responses have on the innovation process—especially in science-based settings—by focusing on the antecedents of scientists' attitudes and behaviors as well as the performance achieved in different task environments. My attention has been limited to responses based on organizational solutions: in particular, "compartmentalizing" sources of conflicting institutional demands and "balancing" them. The basic idea that I explore here is that the choice of which response to put in place has serious implications for organization of the innovation process, especially the ways in which a firm can manage the well-known differentiation–integration dilemma (Duncan, 1976; Lawrence & Lorsch, 1967).

The review of recent contributions on ambidexterity and organizing for innovation has also underscored the presence of unaddressed issues. First, in searching for generality, the literature has moved away from the concrete meanings of "exploration" and "exploitation." The conceptualization of these activities as "separate activities or domains" has primarily considered only top-level management. Does the distinction hold across different organizational levels? Is the tension among exploration and exploitation more salient at the top or bottom levels of organizations? How do different people at different organizational levels make sense of "exploratory" and "exploitative" activities? Finally, do R&D departments of science-based firms really "exploit" something? At a lower level, to what extent are corporate scientists actually required to engage in "exploitative" activities? All of these questions may be very important to address if one considers that involvement in decisions is not attractive for everyone in all relevant choice situations all the time. Individuals, in fact, are seen to allocate available energy by attending to choice situations with the highest expected return, which, in turn, is a function of socially derived beliefs, values, and organizing templates.

Lastly, the literature has pointed out that individuals may play a key role in balancing exploratory and exploitative tensions (Mom et al., 2007; Mom, van den Bosch, & Volberda, 2009), and that ambidextrous behaviors may be rooted in contextual elements. Putting these features in perspective, the organizational ability to exploit and explore seems to depend on the interactions among individual-level attributes and contextual-level attributes. A number of recent works support this view (Andriopoulos & Lewis, 2009; Gotsi, Andriopoulos, Lewis, & Ingram, 2010; Groysberg & Lee, 2009; Jansen, Tempelaar, van den Bosch, & Volberda, 2009; Taylor & Helfat, 2009), but empirical research is still needed to address related questions. For instance, what are the similarities, contradictions, and interrelations between an individual's, a group's, and an organization's activities that affect ambidexterity? Alternatively, are there contradictory exploitative and explorative activities that enable ambidexterity across multiple levels? How do supervisory boards contribute to an organization's ambidextrous orientation?

Institutional Pluralism and Intra-Organizational Heterogeneity

The literature on PE fit remarks on the centrality of intra-organizational heterogeneity to explain both individual-level outcomes and, at a higher-level, organizational-level outcomes. The summary that I conducted updates previous narrative reviews and meta-analyses but is not exhaustive of the entire PE field. Actually, my focus is limited to specific outcomes of PE fit that are relevant for this dissertation study: in particular, the relation among intra-organizational heterogeneity and different dimensions of performance (e.g., task-performance vs. contextual performance). From my perspective, two key tenets emerge. First, different types of PE fit simultaneously affect task and contextual performance, exerting an influence that is both direct and mediated by other variables. Second, PE fit raises interesting organizational-level implications for the innovation process. In particular, although fit as homogeneity has beneficial effects for communication and knowledge transfer, it also produces homogeneity in characteristics of individuals in the organization. This is likely to lead to conformity in outlook and an inability to approach key issues from diverse perspectives, which ultimately lessens the ability of the organization to solve problems, adapt, and change. The summary has also underscored the presence of unaddressed or under-investigated areas. From a substantive point of view, a nominal number of works have explicitly focused on innovation-related problems (Choi, 2004; Livingstone et al., 1997). Second, there is lack of research on multiple-fit problems (Doty, Glick, & Huber, 1993; Drazin & Van-deven, 1986). In the recent past, various works have studied the influence that different types of fit have on certain outcomes (Cable & DeRue, 2002; Kristof-Brown et al., 2002; Lauver & Kristof-Brown, 2001). However, more complex relationships should be taken into account (Ostroff & Schulte, 2007) to explore the reality that different types of fit may reinforce each other or, perhaps, operate in a substitutive form. According to my knowledge, the study by Kristof-Brown, Jansen, and Colbert (2002), is the only study that deals with such a problem. Their findings suggested that different types and modes of fit may be more or less important to different individuals, depending on their background and personal attributes. Furthermore, Ostroff and Schulte (2007:46) highlighted the need for "more idiographic analyses that take into account the configuration across types of fit and that consider the differences in the importance of the mode or type of fit."

CHAPTER 3

Conceptual Model

3.1 - Goals of the Dissertation and Framework

The purpose of this dissertation study is to explore the relation among science and business from a novel perspective, that combines micro-organizational arguments and macro-level insights, from the emerging stream of institutional pluralism (Kraatz & Block, 2008) and the sociology of science (Cetina, 1987; Knorr-Cetina, 1999; Latour & Woolgar, 1979). Figure 3.1 depicts the basic theoretical framework of the dissertation study. The thesis has two primary goals:

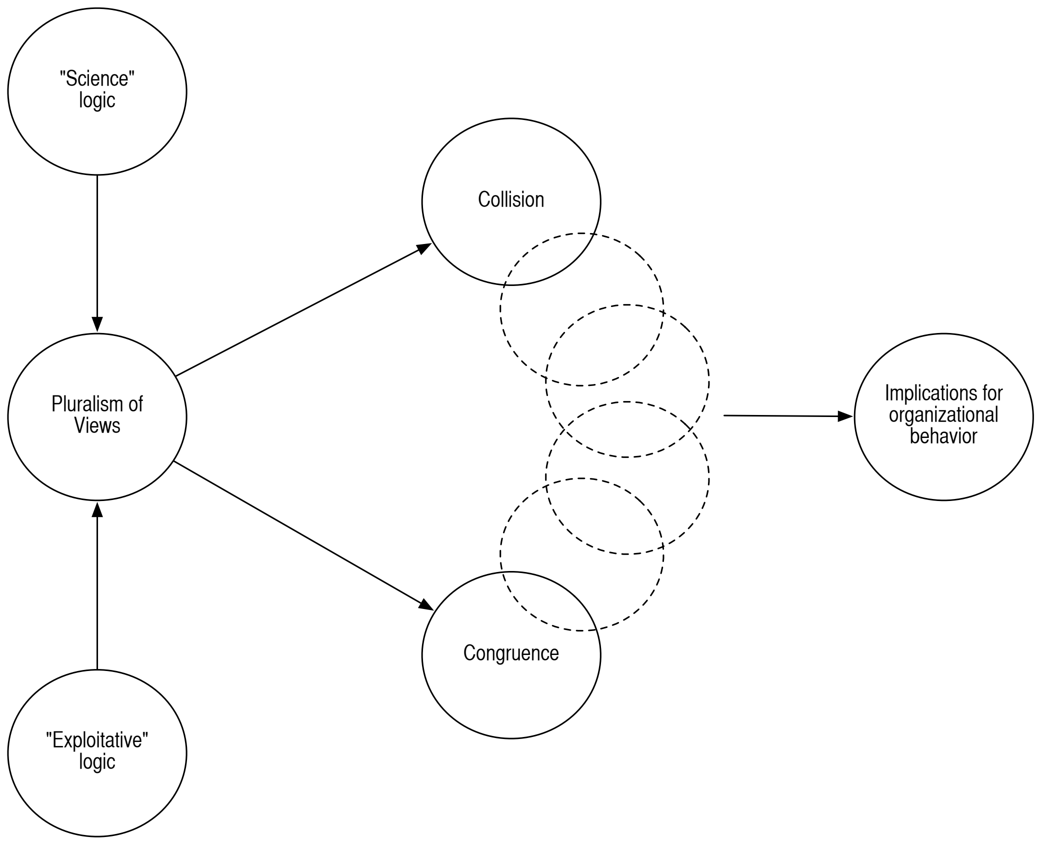
- *Explaining why and when different institutional of knowledge production —science Vs. exploitative logic— collide in science-based firms;*

- *Bringing to light the consequences of collisions of different institutional logics for organizational behavior, and, at a higher level, for the innovation process.*

In order to accomplish these two goals, I focus on the cross-level determinants of attitudes and behaviours of scientists who work in R&D departments of science-based firms — where scientists and managers work side by side to generate scientific advancements and, together, retain "best quality" proposals of innovation—. It is widely recognized in fact that decisional premises —i.e. values, beliefs, and organizing templates— of professionals are shaped by a multiplicity of institutions that operate at different levels (March & Simon 1958). On the one hand attitudes and behaviours of scientists are embedded in the broader epistemic community (Knorr-Cetina, 1999); on the other hand scientists are exposed to formal and informal organizational practices that coordinate actions in the R&D department (Cardinal, 2001). Therefore, the study of these multiple sources of regulation of attention, attitudes and behaviours may offer the unique chance to explore potential collisions of different institutional logics of knowledge production.

Within this logic, the interactionist perspective, and the related concept of fit, lie at the core of the conceptual model (Lewin, 1951). In particular a situation of "fit" is equated to congruence, match or similarity (Chatman, 1989; Muchinsky & Monohan, 1987; Schneider, 1987), between beliefs, values and organizing templates that drive scientits' action and values and organizational practices in their company. In contrast a misfit condition parallels to a divergence —i.e., collision— between scientists' attributes and various facets of the environment.

Figure 3.1 – The Framework of the Dissertation



Contrarily to early formulations of the institutional theory (DiMaggio & Powell, 1983; Meyer & Rowan, 1977) I do not assume that individuals passively react to institutional pressures, by conforming to requirements. Conversely, the work starts from the premises that institutional pressures heterogeneously permeate individuals. Thus scientits are thought to differ in terms of: (i) closeness to the epistemic community; and (ii) the extent to which their action reflects institutionally-derived beliefs about means-ends chains. Such a perspective is coherent with recent developments of the institutional logic literature (Thornton, 2004; Thornton & Ocasio, 2008), that have tried to link environmental pressures to concrete actions within organizations.

In this dissertation the environment is conceptualized at different levels, so as to capture the influence of institutional logics on several task-environments. Such an approach tries to respond to a recent call for contributions in the field of PE to address multiple fit problems (Ostroff & Schulte, 2007). First, scientist is compared with other members of the workgroup along "taste for science" —that is the tension to adopt prescriptions of the epistemic community—. Second, the dyadic fit between scientist and supervisor is evaluated, in terms of the cues that render an idea —or proposal of innovation— an "attractive choice". Third, scientist' claims for decision autonomy, formalization of decision activities and scientific inducements are compared with actual characteristics of the job. Fourth, scientists are compared to their "companies" in terms of higher-level values. Examples of higher level values are importance of contributing to humanity, importance of gaining status, importance of economic inducements.

The primary theoretical contribution of the dissertation study is to link institutional pluralism to organizational behavior, and, in turn, to innovation processes. Thus, the dissertation contributes to the organizational behavior literature, by highlighting the antecedents of well known phenomena as multiple collective identities, role stressors, knowledge transfer, and work outcomes. But the dissertation contributes also to organizational theory, by highlighting the antecedents of choice activities in organized anarchies, and stressing the role of ambiguity for innovation processes. Furthermore, the dissertation contributes to the institutional pluralism literature, by showing that multiple logics permeate the individuals in the organization with different magnitude. Thus, a between person approach that draws on perception can put into light the risks and benefits of organizational responses to institutional pluralism —e.g., compartmentalization and balancing— for the performance of individuals and activities they participate.

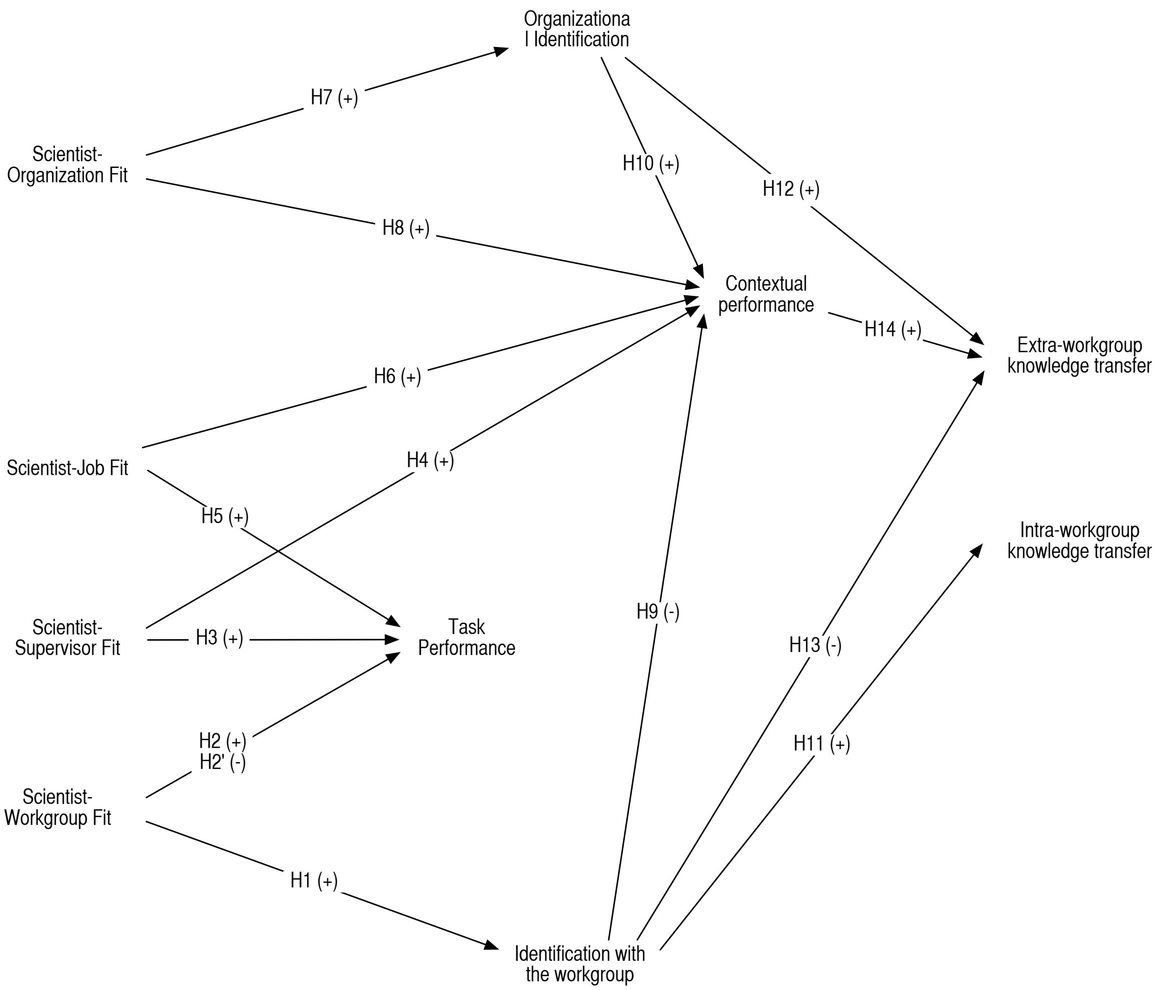
The context of science-based setting serves as a "laboratory" where to address the research questions. Though, the conceptual model can provides a novel perspective on management of science-based business that accounts of specific micro-organizational challenges and rooted their origins in the broader social structure. Several works have dealt with tangle problem of R&D project selection in presence of high technological uncertainty. By now, techniques continue to perform poorly, and organizations tend to favor unstructured approaches —usually defined "strategic approaches"—. Moreover, this problem is especially acute in science-based settings were projects are also scientific artifacts, that are inherently ambiguous objects. An interpersonal approach to decision making that emphasizes the role of scientists may also clarify how R&D projects are selected in the "real world", and what determines satisficing choices.

The first objective of the dissertation —highlighting fit-misfit conditions between scientist and the environment— is eminently explorative in nature, simply relying on the framework depicted in Figure 3.1. Following sections instead try to link institutional pluralism and organizational behavior, within more rigorous conceptual models. Paragraph 3.2 concentrates on the relation among scientists-environment fit, knowledge transfer activities and performance. Paragraph 3.3 relates scientists-environment fit to boundary span role stressors -i.e., role ambiguity and role conflict—. In paragraph 3.4 I step back to an exploratory approach, so as to investigate the problem of multiple fit —that is simultaneous fit with different facets of the environment— using a within person approach.

3.2 - Scientist-Environment Fit: Implications for Knowledge Transfer and Performance

The conceptual model I develop to explain the effects of scientist-environment fit on knowledge transfer and performance is depicted in Figure 3.2. This model incorporates mediating variables as attitudes —e.g, identification— and behaviors —e.g., task performance— that account for the explanation of fit effect. The mediators chosen for the model resulted from literature review on correlates of fit at the individual level, from which I distilled explanations into common themes and ruled out explanations that had weak justification or were redundant with other explanations (Edwards, 2010; Edwards & Berry, 2010). I also address effects of the mediators on one another, as these effects often underlie the reasons given as to why fit influences the mediators (Edwards, 2008; Edwards, Cable, Williamson, Lambert, & Shipp, 2006). Outcomes selected for the model include task performance —i.e., scientific performance and project contribution—, contextual performance —or extra role behaviors— and knowledge transfer. Thus, my model considers direct effects of fit as well as indirect effects that are carried by relationships between the mediators.

Figure 3.2 – Conceptual Model Relating Fit to Performance and Knowledge Transfer



Explanation of Scientist-Workgroup Fit Effects

I conceptualize scientist-workgroup (SW) fit in terms of similarity among individual and workgroup taste for science —that is, the degree to which a scientist adopts norms of the epistemic community—.

Workgroup Identification. Identification, as the the perception of oneness or belongingness to some human aggregate (Ashforth & Mael, 1989), is frequently examined in PE fit research (Cable & Edwards, 2004; Edwards & Cable, 2009). I expect that supplementary fit can influence identification at workgroup level through its effects on needs-supply fit (Edwards & Shipp, 2007). As suggested by Meyer and Allen (Meyer, Bobocel, & Allen, 1991), supplementary fit provides supplies that can fulfill needs for affiliation, belonging, closure and clarity. If these needs are stronger than need to be different, than fit should enhance needs-supplies fit. Furthermore, scientists-workgroup fit may generate normative commitment when the person has values of loyalty and reciprocity similar to to those of others (Mathieu & Zajac, 1990). Being in the company of others who espouse these values makes them salient and creates social pressures that promotes the internalization of values expressed by others as personal desires, which can be fulfilled by remaining with the organization. Thus, I hypothesize the following:

> Hypothesis 1: Fit between scientist and workgroup taste for science is positively related to workgroup identification.

Task Performance. Fit in terms of taste for science can facilitate communication (Tsui & Oreilly, 1989) and coordination among scientists (Chatman, 1989) which increase knowledge acquisition and predictability of behaviors (Edwards & Cable, 2009). As a result, scientists may be better able to meet high performance standards. On the other hand, supplementary fit can reduce variation in perspectives and approaches to problem solving (Adkins, Ravlin, & Meglino, 1996; Ancona & Caldwell, 1992; Schneider, Goldstein, & Smith, 1995), which can hinder the ability to meet the demands of task that are nonroutine or require different perspectives. Thus, I propose paired hypotheses, one that posits a positive effect of SW fit on task performance and one that posits a negative effect —that is the competing hypothesis—:

> Hypothesis 2: Fit between scientist and workgroup taste for science is positively related to task performance (i.e., scientific performance and project contribution).
>
> Hypothesis 2′: Fit between scientist and workgroup taste for science is positively related to task performance (i.e., scientific performance and project contribution).

Explanation of SS Fit Effects

Scientist-supervisor (SS) fit variable refers to the match, as needs-supplies, among knowledge production preferences that characterize scientist and supervisor.

Task Performance. The effect of SS fit on task performance can be attributed to the motivating properties of supplies that are expected to fulfill needs (Edwards & Shipp, 2007). For instance, scientists may be motivated by knowing that a proposal of innovation will be “properly” evaluated by supervisors. On the contrary if scientists expect that “bad criteria” of evaluation will be employed, then a negative effect is expected on motivation, and this, in turn, may negatively affect task performance. On the basis of this reasoning, I offer the following hypothesis directly linking fit to performance:

> Hypothesis 3: Fit between scientist and supervisor knowledge production preferences is positively related to task performance (i.e., scientific performance and project contribution).

Contextual Performance. As widely acknowledged in the literature, contextual performance is primarily linked to attitudes (Organ, 1990; Organ & Ryan, 1995). For instance, individuals are more likely to involve in contextual performance when they feel satisfied or are affectively committed to the organization (Organ & Ryan, 1995; Podsakoff, Whiting, Podsakoff, & Blume, 2009; Podsakoff, MacKenzie, Paine, & Bachrach, 2000). I expect that individuals who share operational goals with the employer may be motivated to reciprocate as part of the exchange relationship with the employer. In addition individuals who perceive fit on knowledge production objectives may tend to define their job responsability broadly, viewing contextual performance as part of their role. Thus, I hypothesize the following:

> Hypothesis 4: Fit between scientist and supervisor knowledge production preferences is positively related to contextual performance.

Explanation of SJ Fit Effects

I conceptualize scientist-job (SJ) fit fit in terms of match, as needs-supply, among scientist’s organizing templates and templates implied by job features.

Task Performance. As for SS fit, I expect that beneficial effect of SJ fit is related to the motivating properties of supplies that are expected to fulfill needs. For this reason, appropriate organizing templates from the point of view of scientist, may increase motivation, in that effort are expected to lead to positive individual and organizational outcome as well. I therefore hypothesize the following:

Hypothesis 5: Fit between scientist and job features is positively related to task performance (i.e., scientific performance and project contribution).

Contextual Performance. The mechanism though which SJ fit influence contextual performance traces the relationship between SS fit and contextual performance. Again, the basic idea is that individuals are more likely to involve in contextual performance when they feel satisfied or are affectively committed to the organization (Organ & Ryan, 1995; Podsakoff et al., 2009; Podsakoff et al., 2000), in this case the way decision activities are arranged within the R&D department, and the degree to scientific inducements are used. This reasoning leads to the following hypotheses:

Hypothesis 6: Fit between scientist and job features is positively related to contextual performance.

Explanation of SO Fit Effects

I conceptualize scientist-organization (SO) fit as the degree of similarity among scientist's values and organizational values.

Organizational Identity. When employees believe that their values match an organization's values and the values of other employees in the organization, they should feel involved with the broader mission of the organization (Cable & DeRue, 2002; Edwards & Cable, 2009). As suggested by Saks and Ashforth (Saks & Ashforth, 1997), people who perceive a good fit with their organization are likely to at least partly define themselves in terms of their organization. Thus, I propose the following hypothesis:

Hypothesis 7: Fit between scientist and organizational values is positively related to organizational identification.

Contextual Performance. SO fit should be related to contextual performance (Podsakoff et al., 2009; Podsakoff, Ahearne, & MacKenzie, 1997; Podsakoff et al., 2000), that is behaviors not directly specified by an individual's job description and that primarily benefit the organization as opposed to the individual —e.g., attending voluntary meetings, engaging in corporate spin-outs—. I predicted that an individual would be more likely to help the larger causes of an organization when he or she shares the organization's values. Similarly, Chatman (Chatman, 1989) noted that people who share an organization's values should be more likely to contribute to the firm in constructive ways, while Lauver and Kristof-Brown (Lauver & Kristof-Brown, 2001) found that perceived person- organization fit predicted employee's extra-role behaviors. Based on this reasoning, I propose the following hypothesis:

Hypothesis 8: Fit between scientist and organizational values is positively related to contextual performance.

Relations Among Mediators

Workgroup Identification → Contextual Performance. Workgroups of professionals often use socially-derived values, beliefs and symbols to shape their identity within the organization (Bartel, 2001; Glynn, 2008). To the extent that different workgroups with different identities emerge within the company, I expect that different notions of appropriate behaviors come face-to-face. This may reduce the expected reciprocity, potentially leading to parochialist behaviors (Simon & March, 1958). Taking into account that contextual performance is conceptualized at the organizational level —not at the level of workgroup—, I propose the following hypothesis:

Hypothesis 9: Workgroup identification is negatively correlated to contextual performance.

Organizational Identification → Contextual Performance. Social Identity Theory suggests that social identification with organizations serves the individual's needs for belonging, safety, or self-enhancement . This in turn, elicits a sense of oneness with the organization (Glynn, 2000), which makes the individual take the organization's perspective and goals as his or her own (Ellemers, De Gilder, & Haslam, 2004). Thus, expected positive effect of identification on performance should be marked for forms of contextual performance or extra-role behaviours (Riketta, 2005). Moreovoer, this effect may be reinforced by the sense of reciprocity. Thus, I propose the following hypothesis:

Hypothesis 10: Organizational identification is negatively correlated to contextual performance.

Relations Among Mediating Variables and Knowledge Transfer

To complete the development of my conceptual model, I now consider the effects of workgroup identification, organizational identification and contextual performance on knowledge transfer. The model does not include direct effects of fit variables on knowledge transfer, given that the goal of the model is to explain how fit influences the outcomes via mediating mechanisms. According to previous study (Allen, 1977; Cummings, 2004; Hansen, 1999), knowledge transfer is defined here as the provision or receipt of task information, know-how, and feedback regarding a product or procedure (Hansen, 1999). Along with verbal communication about the task and the exchange of tangible artifacts, knowledge sharing includes the implicit coordination of expertise (Faraj & Sproull, 2000; Faraj & Xiao, 2006) and information about who knows what in the group (Rulke & Galaskiewicz, 2000). Intra-workgroup knowledge transfer refers to knowledge exchange with people forming a relatively stable group, which work on similar topics of research. Extra-workgroup knowledge transfer refers to knowledge sharing with people which are in other parts of the the organization —independently if they are researchers, technicians or managers—.

Different factors elicit knowledge transfer, as the trust among parties, expectations of reciprocity, the presence of shared symbols, beliefs and meanings. In this line of reasoning a shared socially identity may be crucial in order to assure an effective knowledge transfer among individuals (Kramer, 1999; Mayer, Davis, & Schoorman, 1995; Rousseau, Sitkin, Burt, & Camerer, 1998). Based on this simple argument, I hypothesize the following:

Hypothesis 11: Workgroup identification is positively related to intra-workgroup knowledge transfer.

Hypothesis 12: Organization identification is positively related to extra-workgroup knowledge transfer.

Notably, people tend to treat their groups more favorably than other groups. This own group favoritism is particularly strong within small groups, such as one's work group or team (Griffeth, Hom, & Gaertner, 2000). People evaluate ingroup members as more trustworthy, honest, loyal, cooperative, and valuable to the group than outgroup members. As a result of these evaluations, individuals may feel more comfortable sharing knowledge with groups with whom they share a social identity than with groups with whom they do not share a social identity (Argote, Ingram, Levine, & Moreland, 2000; Kane, 2010; Kane, Argote, & Levine, 2005; Levine, Higgins, & Choi, 2000). If one conceptualizes time and energy as scarce resources, then it is reasonable to expect that scientist has to decide to which extent transfer knowledge within and across the boundaries of their workgroup. Thus, from an individual point of view, workgroup identification may be a key factor in determining the choice of the appropriate blend of knowledge transfer activities. This reasoning leads to the following hypothesis:

Hypothesis 13: Organization identification is negatively related to extra-workgroup knowledge transfer.

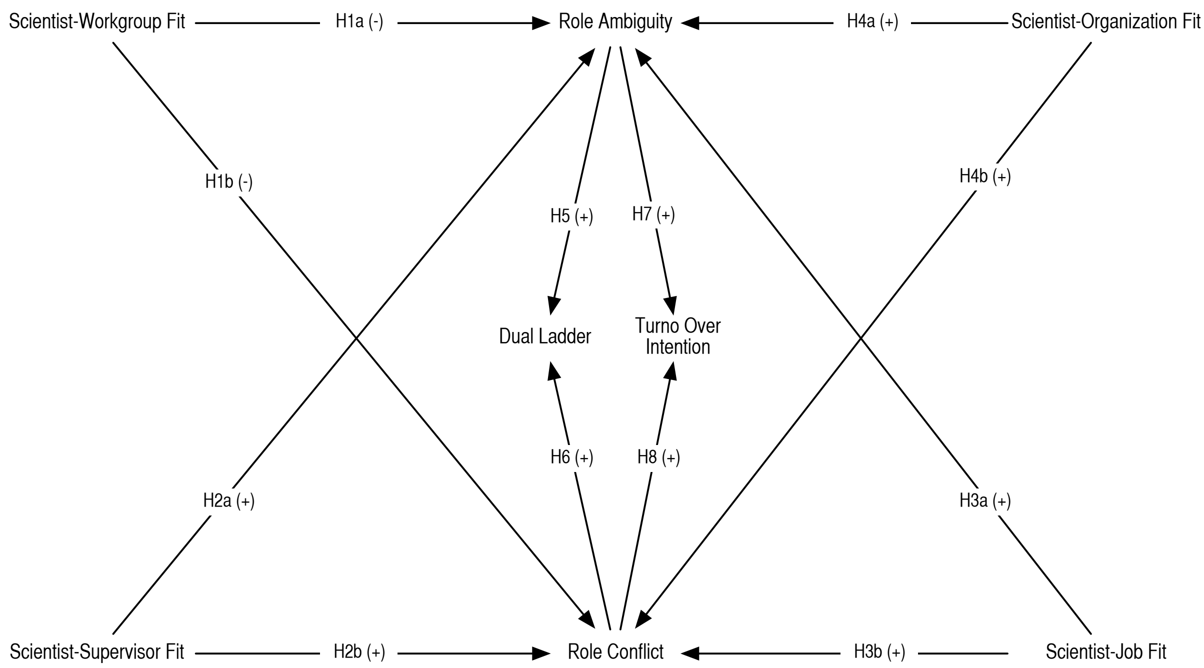
On top of the role played by shared identity, an additional mechanism may influence extra-workgroup knowledge transfer. In my research setting for instance, extra-workgroup knowledge transfer primarily concerned internal practices of internal technology transfer, from basic research to applied/divisional research. Therefore, this kind of knowledge transfer primarily benefits the organization, improving the effectiveness and efficiency of projects. In this line of reasoning contextual performance may have a unique effect on extra-workgroup knowledge transfer, reflecting the motivational effect induced by SW, SS and SJ fit. Thus, I hypothesize the following:

Hypothesis 14: Contextual performance is positively related to extra-workgroup knowledge transfer.

3.3 - Scientist-Environment Fit and Boundary Span Role Stress

Figure 3.3 depicts the conceptual model that relates scientist-environment fit constructs to boundary span role stressors —i.e., role ambiguity and role conflict—. Outcomes selected for the model include turnover intention —i.e., the Turnover intention the organization— and dual ladder orientation —i.e., scientist's orientation to accomplish both managerial tasks and technical/scientific tasks—. Thus, my model considers direct effects of fit on boundary span role stressors as well as indirect effects on outcome, that are carried by relationships with mediators. Conceptually, a role is a pattern of behaviors perceived by an employee as behaviors that are expected (Ilgen & Hollenbeck, 1991). Role ambiguity is defined as a lack of clarity regarding role expectations, while role conflict, defined as role expectations that conflict with one another . These role stressors have been found to be consistently and negatively related to a variety of important employee job outcomes such as performance and work attitudes such as job satisfaction (Gilboa, Shirom, Fried, & Cooper, 2008; Tubre & Collins, 2000).

Figure 3.3 Conceptual Model Relating Fit to Boundary Spanner Role Stressors, Turn Over Intent and Dual Ladder Orientation



The choice to address the relation between scientist-environment fit and boundary-span role stressors resulted from literature review on organizational implications of institutional pluralism, and on correlates of fit at the individual level. The literature review shed to light two striking features. First, role stressors have traditionally been investigated in complex organizations (Rizzo, House, & Lirtzman, 1970), as professional organizations, typically lacking a "clear chain of command" (Katz & Robert, 1978). Moreover, a special attention has been paid to those individual in boundary-spanning roles, who operate between organizational boundaries (Richter, West, Van Dick, & Dawson, 2006; Stamper & Johlke, 2003). However, empirical works have been primarily focused on boundary-spanners, as customer service representatives, professional buyers, service/repair technicians, retail employees, delivery personnel, and particularly salespeople, independently of institutions affecting attitudes and behaviors of these individuals. Second, some studies have demonstrated that environmental elements have an impact on perceptions of role ambiguity and role conflict. High quality leader-member-exchange, demonstration of consideration and feedback behaviors were found to be related with lower levels of role stressors (Odriscoll & Beehr, 1994; Schaubroeck, Ganster, Sime, & Ditman, 1993). In addition, prior research has underscored that both individual level elements and environmental level elements affect role ambiguity and role conflict. On the individual level side, researchers have focused on the potential moderating role of personal factors, as personality characteristics (Brief, Burke, Robinson, George, & Webster, 1988; Burke, Brief, & George, 1993). On the organizational side scholars have examined socialization processes as strategies to reduce role conflict and ambiguity, perceived organizational support, and inter-personal factors sources of support (Ganster, Fusilier, & Mayes, 1986; Kaufmann & Beehr, 1986). However, few researchers have investigated the interactions among environmental and individual components in predicting role ambiguity and role conflict.

I begin the development of my conceptual model model by considering the effects of fit on role ambiguity and role stress. I develop explanations of these effects by drawing from Institutional Theory as well as the broader organizational and psychological literatures concerning the effects of interpersonal and social similarity. My model considers direct effects of fit on the mediators as well as indirect effects that are carried by relationships between the mediators.

Explanation of SW Fit Effects

Recall that I conceptualize SW fit in terms of similarity among individual and workgroup taste for science —that is the degree to which a scientist adopts norms of the epistemic community—.

Role Ambiguity. Role theory states (Katz & Robert, 1978) that role ambiguity determines lack of information necessary to solve problems, and increases the use of defense mechanisms in inter-personal decision making (Simon & March, 1958). High-levels of similarity with colleagues in the workgroup may promote role ambiguity with reference to the broader organizational environment. This effect may be reinforced when different groups within the organization promulgate conflciting demands that stems from different environments (Glynn, 2000; Glynn, Barr, & Dacin, 2000; Kraatz & Block, 2008). Thus, I hypothesize the following:

Hypothesis 1a: Scientist workgroup fit is positively correlated to role ambiguity.

Role Conflict. Role conflict has been defined in terms of congruency-incongruency in the requirements of the role, where congruency is judged relative to a set of —internal or external—standards or conditions which impinge role performance (Rizzo et al., 1970). I expect that similarity among scientist and colleagues in the workgroup may reinforce standards, symbols and practices that are not necessarily shared with other parts in the organization. This in turn may expose scientists to incompatible expectations (Pache & Santos, 2010). Thus, I propose the following hypothesis:

Hypothesis 1b: Scientist workgroup fit is positively correlated to role conflict.

Explanation of SS Fit Effects

Recall that SS fit variable refers to the match, as needs-supplies, between scientist and supervisor knowledge production preferences.

Role Ambiguity. The literature on management of professionals in R&D settings suggests that technologists and scientists may have heterogeneous preferences about which projects to undertake and which projects to kill (Brunner, MacCormack, & Zinner, 2008). I expect that effect of fit among scientist and supervisor tension toward knowledge production may arise from the operational level —i.e., the level of decision activities— to higher levels concerning the set of relatively stable role expectations (Corley & Gioia, 2004; Pratt & Rafaeli, 1997). Thus, I hypothesize the following:

Hypothesis 2a: Scientist supervisor fit is negatively correlated to role ambiguity.

Role Clarity. Drawing on previous reasoning about role ambiguity, I expect that scientist-supervisor fit may also affect role conflict. For instance, criteria of project selection used by supervisors —especially the way a potential project relates to a previous body of knowledge— may collide with socially derived prescriptions. Actually, science is a knowledge production institution (Dasgupta & David, 1994) in that it directs energy and attention (Hoffman & Ocasio, 2001; Ocasio, 1997; Thornton & Ocasio, 2008), by stating the characteristics of a desirable research project. Thus, criteria of project selection proposed by supervisor may violate the role of scientist as an active contributor to science (Stern, 2004). Based on this reasoning, I propose the following hypothesis:

Hypothesis 2a: Scientist supervisor fit is negatively correlated to role conflict.

Explanation of SJ Fit Effects

Recall that I conceptualize SJ fit in terms of match, as needs-supply, among scientist's organizing templates and templates implied by job features.

Role Ambiguity. I expect that SJ fit affect role ambiguity according to a mechanism which is very similar to the way SS fit affect role ambiguity. When socially derived organizing templates —i.e., organizing templates derived from the epistemic community— deviate from templates implied by job features -e.g.in terms of formalization of decision activities— then multiple roles and multiple expectations may arise (Fiol, Pratt, & O'Connor, 2009). To the extent that no dominant way of organizing emerge, role ambiguity may also arise. Thus, I hypothesize the following:

Hypothesis 3a: Scientist-job fit is negatively correlated to role ambiguity.

Role Clarity. As the absence of dominant organizing templates may induce role ambiguity, the collision of different organizing templates —that promulgate alternative environmental instances— may generate role conflict. For instance, scientists may value autonomy, as well as low bureaucratization of decision activities. To the extent that structure of decision activities implied by job features deviates from template that are legitimated by the epistemic community, then scientist may perceive he or she is not filling role expectation. Thus, I propose the following hyptohesis:

Hypothesis 3a: Scientist-job fit is negatively correlated to role conflict.

Explanation of SO Fit Effects

Recall that I conceptualize SO fit as the degree of similarity between scientist and organizational values.

Role Ambiguity. Value fit should reduce role ambiguity in that individual who hold share values have similar motives, set similar goals, and respond to events in similar ways ((Oreilly, Chatman, & Caldwell, 1991). These similarities may help scientists to predict what will occur, because employees can use their own motives and goals to anticipate the actions of the organization and its members, but also to derive expectations about their own behavior (Edwards & Cable, 2009). This theoretical logic resonates with research on relational demography (Tsui, Egan, & Oreilly, 1992), which suggests that interpersonal similarity promotes mutual understanding and reduces uncertainty concerning how others will behave. Thus, I hypothesize the following:

Hypothesis 4a: Scientist-organization fit is negatively correlated to role ambiguity.

Role Conflict. Theoretically, value fit may act to attenuate perceived role conflict (Pratt & Foreman, 2000), by circumscribing conflict to operational goals that are situational in natural. Following this reasoning, I propose the following hypothesis:

Hypothesis 4b: Scientist-organization fit is negatively correlated to role conflict.

Relations Among Scientist-Environment Fit Constructs and Outcomes

To complete the development of the concpetual model, I now consider the effects of role ambiguity and role conflict on two potential reactions to boundary span role stressors, that are turn over intention and orientation toward a dual ladder career. The model does not include direct effects of fit variables on turnover intent and dual ladder orientation, given that the goal of the model is to explain how fit influences the outcomes via mediating mechanisms.

Dual Ladder Career Orientation. Scientists and technologists in general often undertake managerial tasks during their career, but without abandoning technical-scientific roles. Allen and Katz (Allen & Katz, 1986) referred to such a career path as "dual ladder". While there is a considerable literature that links dual ladders to organizational performance, the research is quite scant about antecedents to move across task environments, and, thus, to exchange both symbols, and resources with different segments of the environments. According to my conceptual model scientist's orientation toward a dual ladder career may reflect individual level differences, but also interactions between individual and environmental components. Based on Identity Verification Theory (Burke, 1997), that states that individual seek to validate or affirm their identities through process of symbolic exchange with different segments of their environment, I expect that scientists may want intentionally choose a dual ladder career in order to attenuate role ambiguity and/or role conflict. Thus I hypothesize the following:

Hypothesis 5: Role ambiguity fit is positively correlated to a dual ladder career orientation.

Hypothesis 6: Role conflict fit is positively correlated to a dual ladder career orientation.

Turnover intention. The final relationships specified in my model indicate that role ambiguity and role conflict influence intent to stay in the organization. Theoretical and empirical research on employee turnover consistently emphasize job satisfaction as a primary determinant of whether employees remain in or leave an organization (Griffeth et al., 2000). However, role stressors and job satisfaction have been found to be strongly correlated (Griffeth et al., 2000). Based on the argument presented above, about identity verification, the decision to leave can represent a "radical choice" to remove the undesired cognitive state related to role ambiguity and/or role conflict. Based on thus reasoning, I propose the following hypotheses:

Hypothesis 7: Role ambiguity fit is positively correlated to a Turnover intention.

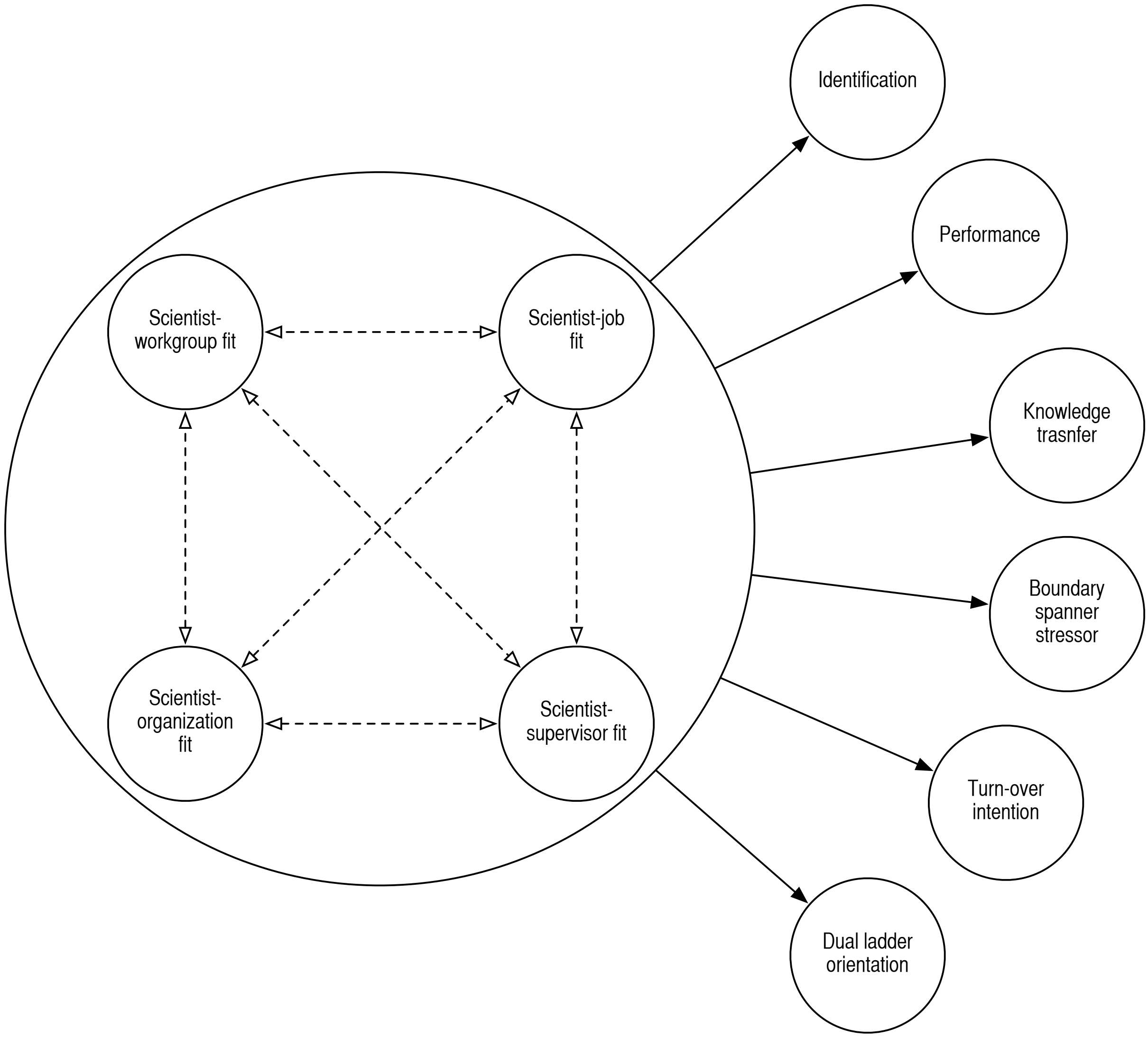
Hypothesis 8: Role conflict fit is positively correlated to Turnover intention.

3.4 - Patterns of Scientist-Environment Fit

The basic premise of PE fit theory and research is that when characteristics of people and the environment are similar, aligned or fit together, positive outcome are expected both at the individual (Kristof, 1996; Tinsley, 2000) and the organization level (Chatman & Barsade, 1995). However, just a couple of works have have gone beyond bivariate forms of fit, by simultaneously considering interactions among different kind of fit (Cable & DeRue, 2002; Kristof-Brown, Jansen, & Colbert, 2002). Figure 3.4 depicts a configurational model of fit, where outcomes emerge from the complex interaction of different kinds of fit. The philosophy that underlies configurational approach is that higher effectiveness results from the multiple interaction of contextual and individual or organizational characteristics, rather than one or two primary contingencies (Doty, Glick, & Huber, 1993; Drazin & Vandeven, 1986; Gresov & Drazin, 1997; Meyer, Tsui, & Hinings, 1993). Configuration lies at the core of this approach, denoting any multidimensional constellation of conceptually distinct characteristics that commonly occur together (Meyer, et al., 1993).

I argue that a configurational perspective on PE fit may provide solid implications on the theoretical side and on the managerial side as well. For instance, an exclusive focus on one level of scientist-environment fit may be conducive to erroneous conclusions or policy suggestions (Kristof-Brown & Jansen, 2007). As highlighted by March and Simon (1958) members of the organization may disagree about high-level values or end-states, and/or lower level values, that is how to reach an end-state. This differentiation is not without implications for organizational process and decision making. Translated in the context of the dissertation it is reasonable to think that the agreement with high-level values of the company may attenuate negative effects due to disagreeing about what constitutes a "good", "excellent" and "poor" proposal of innovation. On the contrary a disagreement about high-level values may exacerbate the conflict about the perceived value of a proposal of innovation, with negative impacts on internal technology transfer and contextual performance in general (the scientist may want to re-allocate her attention and energy, reducing the engagement in activities outside research). Therefore, we can have reliable results about fit-misfit consequences only by analyzing patterns or configurations of fit conditions (Drazin & Vandeven, 1986; Fiss, 2007; Gresov & Drazin, 1997; Meyer et al., 1993) that span across levels and contents.

Figure 3.4 – Scientist Environment Fit: A Configurational Perspective



CHAPTER 4

Data and Methods

The dissertation study is based on survey data gathered at two multinational companies that operate in science-based settings. This chapter describes the research design of the dissertation study, the empirical setting and techniques used to analyze data.

4.1 - Levels of Analysis

The dissertation study has a cross-level nature, in that "fit" is composed of a person-level component and an environmental-level component. Conversely outcome variables refer to the individual-level, being concerned with attitudes —e.g., social identification or role stressors— and behaviors —e.g., task-performance, contextual performance, knowledge transfer—. In spite of this, organizational-level implications arise from the study. First, fit (misfit) conditions simply underscore the (mis)alignment between the person and the environment, suggesting that the congruence (collision) of different institutional logics. Therefore, fit (misfit) offers direct implications for organizational responses to institutional pluralism. Second, several individual-level outcomes included in the study have been found to foster —to inhibit— organizational effectiveness. In particular, a number of meta-analytic reviews have shown that knowledge transfer has a positive effect on innovation (van Wijk, Jansen, & Lyles, 2008). Analogously, contextual performance has been found to increase organizational effectiveness in a broader sense (Podsakoff, Whiting, Podsakoff, & Blume, 2009). On the other hand role ambiguity and role conflict have been found to negatively affect organizational-level outcomes via communication (Gong, Shenkar, Luo, & Nyaw, 2001).

Cross-level models are nested in the broader family of multilevel models (key features have been pinpointed in the methodological literature on levels of analysis, see (Hitt, Beamish, Jackson, & Mathieu, 2007; Klein, Tosi, & Cannella, 1999; Kozlowski & Klein, 2000; Rousseau, 1985)special issue of Journal of Management, in press). At the core of multi-level models —and theories as well— there is the idea that organizations are multilevel systems (von Bartalannfy, 1968), whose understanding requires to organization science to focus on phenomena that unfold across levels. Fundamental to the levels perspective is the recognition that micro phenomena are embedded in macro contexts and that macro phenomena often emerge through interaction and dynamics of lower-level elements (Kozlowski & Klein, 2000). The widely acknowledged problem is that organizational scholars have tended to emphasize either a micro or macro respective (Klein et al., 1999). The macro perspective is rooted in it sociological origins and assumes that there are substantial regularities in social behavior that transcend the apparent difference among social actors (wellman). In other words, given a particular set of situational constraints and demographics, people will behave similarly. Therefore, scholars can consistently focus on aggregate or collective responses and to ignore sources of variation. In contrast the micro perspective is rooted in psychology origins. It assumes that there are variations in individual behavior ant that a focus on aggregates will mask important individual differences that are meaningful in their own right. All in all the focus of micro studies is on variations among individual characteristics that affect individual reactions.

Distinguished scholars (Klein et al., 1999; Kozlowski & Klein, 2000; Ostroff & Schulte, 2007) have argued that neither single-level perspective can adequately account for organizational behavior. The macro-perspective neglects the means by which individual behavior, perceptions, affect, and interactions give rise to higher-level phenomena. There is a danger of superficiality and triviality inherent in antropormophization (Kozlowski & Klein, 2000). Organization do not behave; individuals do. In contrast, the micro-perspective has been guilty of neglecting contextual factors that can significantly constraint the effects of individual differences that lead to collective responses, which ultimately constitute macro-level phenomena (Rousseau, 1985).

But single-level studies may also suggest inconsistent policy implications. Macro research tend to deal with global measures or data aggregates that are actual or theoretical representation of lower level phenomena, but they cannot generalize to those lower levels without committing errors of misspecification. Relationships among aggregate data tend to be higher than corresponding relationship among individual data element, and ecological correlation issues emerge (Roberts, 1950). This fact continues to be a significantly difficult for macro-oriented policy disciplines —sociology, political science, economics, education policy, and so forth— that attempt to draw individual level differences from aggregate data (Kozlowski & Klein, 2000). Micro researches suffer "atomistic fallacies", since often suggest team or organizational level interventions based on individual-level evidences (notably exceptions are (Hollenbeck et al., 1995; Hollenbeck et al., 2002; LePine, Hollenbeck, Ilgen, & Hedlund, 1997)).

For these reasons a "meso" organization science that bridges the micro-macro gap is able to provide a more complete comprehension and better predictions of organizational phenomena. Still scholars' efforts to cross the divide have been sporadic, and macro–micro rapprochement remains uncertain (see (Hitt et al., 2007)). The limited diffusion of multi-level models may be attributable to technical factors, as the computational complexity of multi-level techniques (JoM, 2011) and the actual fit between multi-level techniques and multi-level conceptual models (ref). Yet, more salient issues seem to be conceptual in nature. Both internal validity and external validity in multi-levels models are conditional to the assumptions made by scholars about "emergence", that is how micro phenomena unfold to shape macro phenomena. Klein and Kozlowski (Kozlowski & Klein, 2000) pointed out that emergence can be characterized by two qualitatively distinct process which are "composition" and "compilation" (see Table 4.1). Composition is based on isomorphism and describes phenomena that are essentially the same as they emerge upward across levels. Composition processes describe the coalescence of identical lower-level properties —that is the convergence of similar lower-level characteristics to yield a higher level property that is essentially the same as its constituent elements—. Compilation is based on the assumption of discontinuity and describes the phenomena that comprise a common domain but are distinctively different as they emerge across levels. In this case emergence refers to the combination of related but different lower-level properties —that is, the configuration of different lower-level characteristics to yield a higher level property that is functionally equivalent to its constituent elements. Unfortunately, attempts to multi-level modeling are rarely explicit on this point, and validity of results is seriously undermined. Lower level elements, as behaviors and perception may not coalesce. Instead, behaviors and perceptions may vary within a group or organization, and yet the configuration or pattern or lower-level behaviors and perceptions may nevertheless merge, bottom up to characterize the group or organization as a whole.

Table 4.1 – Theoretical Underpinnings of Emergence

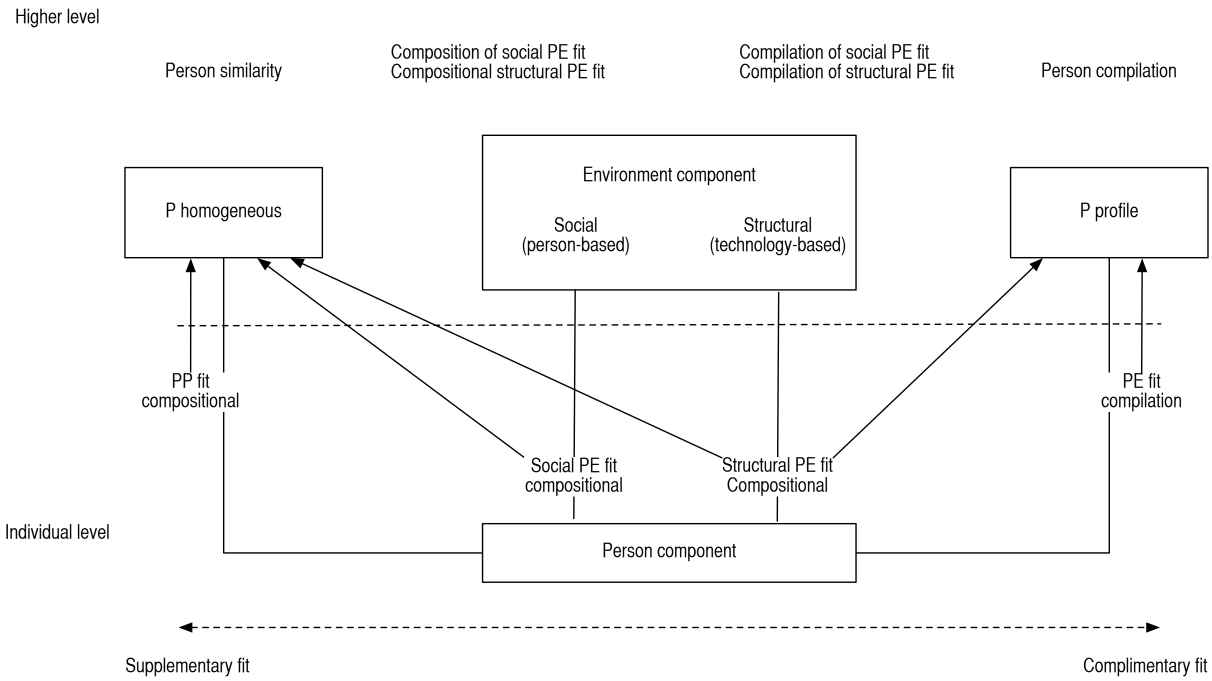
Emergent Process	Composition	Compilation
Variation in Emergence	• Personality similarity • Shared mental models • Classic decision making • Pooled team performance • Organizational learning (sum of individual knowledge)	• Personality diversity • Compatible mental models • Naturalistic decision making • Adaptive team networks • Organizational learning (knowledge spirals)
Theoretical Assumptions		
Model	Isomorphism	Discontinuity
Elemental contribution		
Type	Similar	Dissimilar
Amount	Similar	Dissimilar
Interaction Processes and Dynamics	Stable Low dispersion Uniform	Irregular High dispersion Nonuniform
Combination	Linear	Nonlinear
Emergent Representation	Converge point	Pattern

Source: Kozlowski and Klein (2000: 60)

Neoinstitutionalism and its recent development on institutional logics can be considered as a form of multi-level theorizing. Institutions that operate at field level constraint organizational action (Meyer & Rowan, 1977) and organizational behavior as well (Glynn, 2000), by prescribing socially accepted beliefs (Thornton & Ocasio, 1999), values and ways of organizing (Greenwood, Diaz, Li, & Lorente, 2010). Yet, the emerging stream on organizational responses to institutional pressures (Kraatz & Block, 2008; Pache & Santos, 2010) has highlighted the presence of a certain latitude for strategic responses and organizational-level variation. If we put in perspective these two features, we see that the earlier formulations of neoinstitutional theory are closer to composition assumptions. The unique sources of organizational heterogeneity are the institutional pressures that derive from the field. In other words, organizations embedded in the same field are supposed to be equivalent. Conversely recent works on organizational responses to institutional pressures are closer to compilation assumption. Tough organizations operate in the same field —and thus face similar pressures— a certain variation is maintained at organizational levels.

Scholars in the PE fit stream have recently tried to overcome the weaknesses of unclear and/or ambiguous assumptions, proposing a multi-level conceptualization of fit that distinguishes among composition and compilation fit. The rigorous conceptual framework proposed by Ostroff and Schulte (Ostroff & Schulte, 2007) suggests that composition and compilation concept can be used to characterize the relationship between P and E by describing different ways that the higher-level E element can be combined from lower level elements. According to this view, supplementary fit is related to the notion of composition in that the environment is composed of people with an identical or very similar characteristic. Therefore, fit is achieved when the characteristic of a focal person is identical or very smiler to them. Complementary fit and compilation have in common the fat that the environment is defined as a system or configuration based on heterogenous characteristics. In this case, fit is achieved when the characteristics of a focal person makes the system whole so that a higher-order gestalt can emerge or when elements of E fit together to create a coherent whole. Different types of fit across levels of analysis are depicted in Figure 4.1. The dashed arrows in the figure depict how a particular mode of fit at the individual level provides the basis for the the mergence of a P construct at higher level of analysis.

Figure 4.1 – A Multilevel Model of PE Fit



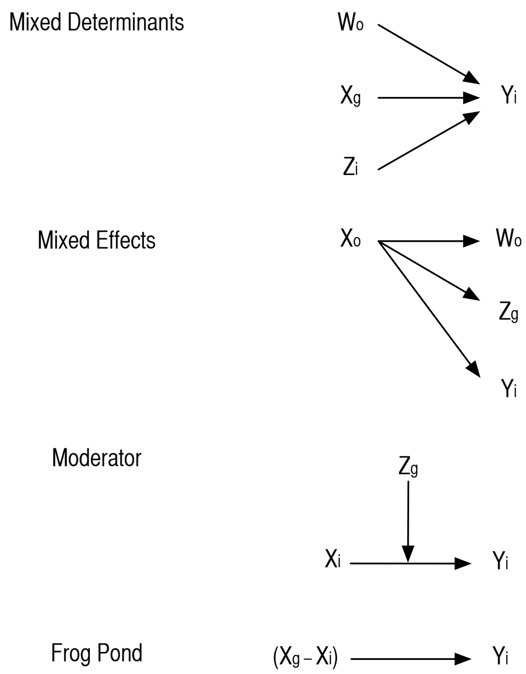
Source: Ostroff and Schulte (2007: 35)

As stated above, this dissertation study is committed to a multi-level view of the environment, where workgroups, supervisors, organizations and the epistemic community are distinguished. I rely on composition assumptions to detect the actual similarity among scientists that are in the same workgroup (SW fit). The argument to use a composition assumption is that all scientists have been exposed to the same institutional logic via academic training. Analogously, composition process of emergence is invoked to evaluate the similarity among scientists' high-level values and organizational values (SO fit). On the contrary compilation assumptions are used to evaluate the fit between scientists' claims for organizing templates and job features (SJ fit). Compilation assumptions are also used to evaluate the fit between scientist and supervisor preferences for knowledge production (SS fit).

From an analytical point of view the dissertation study is based on a cross-level model. Figure 4.2 depicts the family of cross-level models. In particular a frog-pond model is used to highlight the effects of a lower-level entity's relative standing within a higher-level entity. The term frog-pond captures the comparative or relative effects that is central to theories of this type: depending on the size of the pond, the vey same frog may be small —if the pond is large— or large —if the pond is small—. Frog-pond models are also known as the individuals within the group models (Dansereu et al. 1984; Glick and Roberts, 19984; Klein et al.

1994), and can be considered as cross-level modes in that the consequences of some lower-level contract —typically individual-level— depends on the higher-level average of this construct —typically group- or organizational-level—. Examples of frog-pond model are present in works that address the influence of an individual's amount of education and his or her influence in problem solving discussion within a group. The group average specified in a frog-pond model is not conceptualized as a shared property of the unit, in that it would make no conceptual or empirical sense to assess individual standing on the construct relative to the mean.

Figure 4.2 – Model Specification in Cross-Level Research



Source: Kozlowsky and Klein (2000: 39)

4.2 - Exploratory Pilot Studies

A series of exploratory pilot studies preceded the elaboration of the research design. Pilot studies were undertaken in two companies with a twofold objective. First, assessing the fit between the setting offered by candidate companies and the research problem of the study —this evaluation primarily concerned the actual engagement of the two companies in science—. Second, I aimed at gathering information, so as to fine tune the research design.

Pilot studies concerned a series of interviews and meetings with people working at different levels in the company. Table 4.2 provides an account of activities related to pilot studies. Initially a kick-off meeting was organized in each company in order to illustrate goals of the research project, its milestones and a schedule of tasks —with a specific focus on timing and effort required to members of the organization—. At the same time benefits related to project involvement were highlighted. Top management —CEOs— and middle-level management —human resources managers, evaluation managers, workgroups supervisors— participated in the meeting, together with some senior scientists. Each meeting lasted about two hours. The first part of the meeting dealt with the features of the research projects, while the second part was articulated in form of an open discussion on the topic of the problem. During the open discussion salient questions for the project were touched, including the relationship of the company with the public knowledge domain and the epistemic community as well. Aspects concerning R&D management were also faced. Participants provided a quite detailed account of how proposals of innovation flow from R&D laboratories to higher levels in the organization. Moreover, participants reported their judgment about several aspects of extent R&D project selection techniques, as limitations, underlying assumptions, and their relationships with individual intuition.

Table 4.2 – Pilot Study

Activity	Informant		Goal
	Company“A”	Company“B”	
Kick-off Meeting	N=7 CEO(1) R&D functionalist (3) Scientists(3)	N=12 CEO(1) R&D functionalist (8) Scientists (3)	Get a company account Assess the company’s view of science-business relation Characterize R&D policies and organizational practices in the setting
Individual Interview	N=5 Scientists (4) R&D functionalist (1)	N=7 R&D functionalist (2) Scientists (5)	Get a detailed description of how proposal of innovation flow throughout the organization Assessing the perceived fit between scientists' attributes and environmental attributes Assessing the nature of the decision making in the R&D lab Assessing the perceived effectiveness of decision activities int he R&D lab

As a second step, individual interviews were conducted with people working at different levels in the organization. Globally 12 interviews were undertaken with scientists and managers working in the R&D department. Each interview was articulated around four topics: how proposals of innovation flow throughout the company; the perceived fit of scientists with the environment; the nature of the decision processes in the R&D laboratory; the perceived effectiveness of decision activities in the R&D laboratory. The interviewer's guide is reported in the Appendix A. Individual interviews dealt also with an additional aspect. Each informant was required to describe how certain ideas —in the recent past— became R&D projects. In particular informants provided a summary of 4 cases each, recalled according to specific stimulus of the interviewer. Indeed, informants were required to describe both cases of disruptive proposals of innovation and conservative proposals of innovation. The basic idea is that different internal processes may be observable to the extent to which the project represents major or minor departures from the organization existing competencies (Sobrero & Roberts, 2001, 2002). An additional requirement about cases to recall was about the stage reached by proposals of innovation. In particular informants were required to form sort of twin set cases that were as similar as possible in terms of the underlying technological attributes, but juts one of which successfully went through the filtering stage.

Interviews' length ranged form from 1 hour and thirty to 2 hours and thirty and permitted to get a summary of about 28 independent projects —multiple informants provided information on a same case—. Dialogues were digitally recored and coded for content analysis. Information gathered concern different aspects as idea or project level attributes (e.g. radicalness of the project with respect to prior technological competencies of the firm; market novelty); organizational aspects (e.g. team composition at project level; authority aspects; within-team and extra-team coordination practices; etc.); interaction among the scientist and her/his environment (e.g. degree of similarity among scientist's expectations and goals with respect to peers, supervisors and organizational level latu sensu).

4.3 - Research Design

Almost the totality of empirical works on institutional theory have leveraged on inductive case studies. Conversely the large majority of works in PE fit stream have drawn on survey-based data, and scholars —primarily organizational psychologists— have adopted fine-grained modeling techniques. For this reason the choice about which research design to use was not constrained in a well established path. I decided to use survey-based techniques for two reasons. First, works in the institutional logics have primarily dealt with a theory generation goal, while this dissertation moves from theory falsification premises. Second, fit measurement aspects have been largely discussed scholars in the PE fit stream, and rigorous techniques have been provided.

Given the choice to use survey based methods, the next logical question was "How should I measure fit"? This area is in fact a particular fertile research area in the PE fit stream. How an individual experiences fit can be determined in a number of different ways. Seminal work in the person-organization fit stream (Oreilly, Chatman, & Caldwell, 1991) assessed the fit between individuals an the organizational environment as is "actually" existed, rather than as it is perceived to exist by the individual. The actual environment can be measured in a number of ways, including using objective organizational characteristics —e.g., incentive schemes or organizational structure—, aggregated ratings of the organization —e.g., aggregates of individual scores about organizational values—, or a single other's view of the firm —e.g., the recruiter's report of organizational values—. Meta-analytic reviews (Kristof-Brown, Zimmerman, & Johnson, 2005) underscore that objective fit measures typically have lower correlations with outcomes than subjective fit measures, where individual are required to report their perception of fit with the environment.

Seminal research on person-job fit and strain dedifferentiated between subjective fit as it is perceived by an individual and fit as it objectively exists in the environment. Researchers in this area concluded that actual fit only has an impact on someone if the person perceives that the fit exists (French, Caplan, & Van Harrison, 1982). Subjective fit can be measured in two primary ways, but it is always individual-level measurement, because a single person evaluates both "P" and "E". Edwards et al. (Edwards, Cable, Williamson, Lambert, & Shipp, 2006) has recently labeled this approach as "molar", in that it asks respondents to report an overall assessment of the fit between themselves and their organization. Various works have used this measurement approach (Cable & Judge, 1996, 1997). Example of questions are: "To what degree your values, goals, and personality match or fit these organization and the current employee in this organization?" and "To what degree did the applicant match or fit your organization and the current employees in the organization?" Direct assessment has also been within complementary fit framework (Saks & Ashforth, 2002), including items as "To what extent does the organization fulfills your needs?" and "To what extent is the organization a good match for you?". Meta-analytic reviews demonstrate that direct measures have the strongest relationships with outcomes, particularly attitudinal outcome (Arthur, Bell, Villado, & Doverspike, 2006; Kristof-Brown et al., 2005; Verquer, Beehr, & Wagner, 2003). Despite strong results, direct measures of perceived fit have been criticized because they are subject to strong halo and constancy biases, and pose potential issues of common-method, single sources bias when used to predict other self-reported variables such as attitudes.

Table 4.3 – Alternative Strategies of PE Fit Measurement

		Person and Environment Components Separately Assessed	
		No	Yes
Fit is based on individual's perception	Yes	Subjective-Indirect fit measure	Subjective-indirect fit measure
	No	–	Objective-indirect fit measure

An alternative way to assess subjective fit is using indirect measures —i.e., separate assessments of self and environment— collected from the same person. This involves the person reporting his or her own characteristics and then reporting the characteristics of her organization. The basic idea of this approach —labelled also "atomistic approach"— is to capture the person's fit with the perceived environment, rather than the overall level of experienced fit. Halo and consistency biases continue to operate within this approach, yet they tend to focus on more specific dimensions —e.g., value for prestige, value for autonomy, and so forth—, rather than on an overall assessment of fit on values. The potential for common method bias is also reduced in that the components are separately assessed. Unfortunately, single sources bias is not removed in in this approach. Kristof-Brown and her colleagues (Kristof-Brown et al., 2005) in their meta-analysis underscored that indirect measures have the second highest correlations with nearly all outcome measures, but these can be as much as .20-.30 lower than the correlations of direct measures of perceived fit with attitudinal outcomes.

The indirect approach is also the approach used in this dissertation study. Objective fit measures do not suffer single-source bias —contrarily to subjective measures— but their application relies on the assumption that organizational characteristics are the simple aggregation of other's perceptions. Moreover objective measures suffer an additional problem that is related to "scale equivalence" —meaning the person and the environment are assessed in the same metric—. For example Organizational Culture Profile framework (OCP) proposed by Chatman and her colleagues (Chatman, 1989, 1991; Oreilly et al., 1991) investigates value congruence comparing the characteristicness of organizational values to the importance or desirability of personal values. In these cases person and environment components are not commensurable. Although characteristicness and importance are on the same dimensions —thus, filling nominal equivalence— these dimensions are assessed on different metric.

Within subjective measures of fit, the indirect approach was preferred to a direct one. As noted earlier, if the person component and the environment component are not distinguished th effect of PE fit on outcome variable is oversimplified. In fact, suing the difference between the person and the environment as a predictor the functional relationship between fit and outcome implies that the absolute levels of the person and the environment are irrelevant.

The common method bias —that potentially affects a subjective measure of fit— problem has been faced during the design of the questionnaire. As far as single source bias, this has been limited using supervisor-rated measures for outcome variables —e.g., task-performance and contextual-performance—.

4.4 - Measures

The dissertation study relies on measures previously developed in the literature. Scales were identified combining literature searches with information present in "Measures Toolchest" (http://measures.kammeyer-uf.com/wiki/Main_Page), a web-based collector of scales sponsored by the Research Methods Division of the Academy of Management. Scales employed in the study are described by groups according to the nature of the construct. In particular I distinguish among fit variables —i.e., SW, SS, SJ, SO fit— outcome variables —e.g., task performance- and mediating variables —e.g., organizational identification—. For each measure I report the set of items composing the scale and the study source.

Scientist-Environment Fit Variables

The dissertation study concerns different kinds of PE fit constructs. This follows the decision to capture the fit between scientists' attributes and various facets of the environment —i.e., the organization as a whole, the supervisor, the job and the workgroup—.

Scientits-workgroup fit (SW fit). Scientists are compared to their workgroup along taste for science, that is the individual tension to engage in science, addressing puzzling problems and signaling achievements in the epistemic community. Items were derived from Andrews and Pelz (Pelz & Andrews, 1966) and Morgeson and Humphrey (Morgeson & Humphrey, 2006). SW fit relies on a conceptualization of fit as similarity. For individual taste for science, respondents rated each item in terms of "How important is this to you?" on a 5-point scale ranging from 1 (not important at all) to 5 (extremely important). For perceived workgroup taste for science, respondents indicated “How important is this at your organization?” on a 5-point scale again ranging from 1 (not important at all) to 5 (extremely important).

Scientist-supervisor fit (SS fit). Scientists are compared with their (direct) supervisors along the cues employed to evaluate the attractiveness of a proposal of innovation. Two cues are considered: knowledge enhancing/destroying character of the innovation —the degree to which the innovation builds on existing competences or the degree to which it makes them obsolete — and knowledge acquisition character —which concerns the extent to which the innovation requires the firm to reach beyond its existing experience base to acquire new competences—. The constructs were assessed using the scales of measurement proposed by Gatignon et al. (Gatignon, Tushman, Smith, & Anderson, 2002). In this case fit is conceptualized in terms of “complementarity” between the demands posed by the supervisors and the abilities of scientists. For individual abilities, respondents rated each knowledge enhancing/ destroying and knowledge acquisition item in terms of “How much you would like to provide of this?” on a 5-point scale ranging from 1 (none) to 5 (a very great amount). For supervisor’s demands, respondents indicated “How much your supervisor demand of you of this” on a 5-point scale again ranging from 1 (none) to 5 (a very great amount).

Scientist-job fit (SJ fit). Scientists’ organizing templates are compared with the perceived characteristics of their job. In particular I focus on three characteristics of the job: centralization of decision activities —the degree to which scientits’ work carry on their own decisions—, formalization of decision activities —the degree to which scientits’ work is disciplined by standard operating procedures—, professional guilds —the extent to which scientists are encouraged to participate in the epistemic community, by rewarding contributions and affiliation to professional communities—. Decision autonomy was operationalized using a set of items from (Aiken & Hage, 1968), subsequently employed in Cardinal’s study (Cardinal, 2001) on organizational control practices in the pharmaceutical sector. Formalization of decision activities was operationalized according to Dewar and Werbel scale (Dewar & Werbel, 1979). The scale used for professional guild incentives combines items from Stern (Stern, 2004), Aiken and Hage (1968) and Kimberley and Evanisko (Kimberly & Evanisko, 1981). In this case fit is conceptualized in terms of “complementarity” between scientists’ claims to apply socially-derived organizing templates and the extent to which actual job characteristics fulfill these claims. For individual claims, respondents rated each job feature in terms of “What would be the right amount of this feature for you?” on a 5-point scale ranging from 1 (none) to 5 (a very great amount). For job actual characteristic, respondents indicated “How much each feature is present in your job” on a 5-point scale again ranging from 1 (none) to 5 (a very great amount).

Scientist-organization fit (SO fit). Scientists are compared to the organization as a whole —company— along higher-level values. To assess subjective value congruence, I used the Work Values Survey (Cable & Edwards, 2004), which was based on Schwartz's (Schwartz, 1992) circumplex model of human values. The WVS measures eight core work values: altruism, relationships, pay, security, authority, prestige, variety, and autonomy. I decided to include in the questionnaire four of the core values included in the WVS so to reduce the overlap with other kinds of scientist-environment fit included in the study. Therefore, altruism, pay, security and prestige items were retained for the questionnaire. For individual values, respondents rated each WVS item in terms of "How important is this to you?" on a 5-point scale ranging from 1 (not important at all) to 5 (extremely important). For perceived organizational values, respondents indicated "How important is this at your organization?" on a 5-point scale again ranging from 1 (not important at all) to 5 (extremely important). These measures are consistent with value congruence research, in which values are measured in terms of the importance of attributes to the person and organization (Kristof, 1996; Meglino & Ravlin, 1998).

Table 4.4 – Scales of Measurement: Scientist-Environment Fit Variables

Construct	Content of fit	Scale of measurement: Item	Scale of measurement: Source
Scientist-workgroup fit	Similarity along "taste for science"	The following statements refer to goals that a scientist may want to pursue by engaging in a new technical project. Now consider how important each of the goals stated below is at your workgroup (people with whom you work) and to you. Remember that the scale ranges from 1 "Not important at all" to 5 "Extremely important".	Moregenson & Humphrey (2006) Stephan & Everhart (1998) Andrews & Pelz (1966)
		Work on problems that have no obvious correct answers – How important is this at YOUR WORKGROUP?	
		Work on problems that have no obvious correct answers – How important is this to YOU?	
		Be involved in problems not met before – How important is this at YOUR WORKGROUP?	
		Be involved in problems not met before – How important is this to YOU?	
		Work on problems requiring unique ideas or solutions – How important is this at YOUR WORKGROUP?	
		Work on problems requiring unique ideas or solutions – How important is this to YOU?	
		Increase your scientific contribution in your area of expertise – How important is this at YOUR WORKGROUP?	
		Increase your scientific contribution in your area of expertise – How important is this to YOU?	
		Increase your reputation outside the company – How important is this at YOUR WORKGROUP?	
		Increase your reputation outside the company – How important is this to YOU?	
		Work frequently with academics – How important is this at YOUR WORKGROUP?	
		Work frequently with academics – How important is this to YOU?	
Scientist-supervisor fit	Similarity along "tension toward knowledge acquisition"	As a scientist you are constantly engaged in the generation of promising ideas for product innovation. The following statements refer to some categories of new ideas. Now, consider how much of the following categories your direct supervisor demands of you and how much you would like to provide (the scale ranges from 1 "None" to 5 "A very great amount").	Gatignon et al. (2002)
		Ideas that involve fundamentally new concepts or principles for the research unit – How much your SUPERVISOR DEMANDS of you?	
		Ideas that involve fundamentally new concepts or principles for the research unit – How much YOU WOULD LIKE to provide?	
		Ideas whose implementation requires new skills which the research unit do not possess – How much your SUPERVISOR DEMANDS of you?	
		Ideas whose implementation requires new skills which the research unit do not possess – How much YOU WOULD LIKE to provide?	
		Ideas whose implementation requires research unit to develop many new skills – How much your SUPERVISOR DEMANDS of you?	
		Ideas whose implementation requires research unit to develop many new skills – How much YOU WOULD LIKE to provide?	
		Ideas whose implementation requires research unit to learn from completely new or different knowledge bases – How much your SUPERVISOR DEMANDS of you?	
		Ideas whose implementation requires research unit to learn from completely new or different knowledge bases – How much YOU WOULD LIKE to provide?	
		Ideas whose implementation requires research unit to adopt different methods and procedures – How much your SUPERVISOR DEMANDS of you?	
		Ideas whose implementation requires research unit to adopt different methods and procedures – How much YOU WOULD LIKE to provide?	
		Ideas whose implementation requires research unit to carry out great deal of training – How much your SUPERVISOR DEMANDS of you?	
		Ideas whose implementation requires research unit to carry out great deal of training – How much YOU WOULD LIKE to provide?	
	Similarity along "tension toward knowledge enhancement" competence destroying"	Ideas that build a great deal on research unit prior scientific skills – How much your SUPERVISOR DEMANDS of you?	Gatignon et al. (2002)
		Ideas that build a great deal on research unit prior scientific skills – How much YOU WOULD LIKE to provide?	
		Ideas that build heavily on research unit existing experience base – How much your SUPERVISOR DEMANDS of you?	
		Ideas that build heavily on research unit existing experience base – How much YOU WOULD LIKE to provide?	
		Ideas that render research unit experience base obsolete – How much your SUPERVISOR DEMANDS of you? (reverse code)	
		Ideas that render research unit experience base obsolete – How much YOU WOULD LIKE to provide? (reverse code)	

Table 4.4 – Scales of Measurement: Scientist-Environment Fit Variables

Construct	Content of fit	Scale of measurement	
		Item	**Source**
		Ideas that build heavily on research unit existing scientific knowledge – How much your SUPERVISOR DEMANDS of you?	
		Ideas that build heavily on research unit existing scientific knowledge – How much YOU WOULD LIKE to provide?	
Scientist-job fit	Needs-supply along "scientitfic induce-ments"	The following statements refer to a series of job level incentives. Consider how much of each incentive is present in your job and what would be the right amount for you (the scale ranges from 1 "None" to 5 "A very great amount").	Aiken & Hage (1968) Kimberly & Evanisko, 1981
		Becoming members in professional organizations – How much is PRESENT in your work?	
		Becoming members in professional organizations – How much is the RIGHT AMOUNT for you?	
		Attending professional meetings – How much is PRESENT in your work?	
		Attending professional meetings – How much is the RIGHT AMOUNT for you?	
		Acquiring additional in-house educational/ Developmental training – How much is PRESENT in your work?	
		Acquiring additional in-house educational/ Developmental training – How much is the RIGHT AMOUNT for you?	
		Acquiring additional external/degree education – How much is PRESENT in your work?	
		Acquiring additional external/degree education – How much is the RIGHT AMOUNT for you?	
		Publish on external journals – How much is PRESENT in your work?	
		Publish on external journals – How much is the RIGHT AMOUNT for you?	
	Needs-supply along "decision autonomy"	The following statements refer to some aspects of the decision making process in a R&D laboratory. Consider how much of each aspect is present in your job and what is the right amount for you (the scale ranges from 1 "None" to 5 "A very great amount").	Cardinal (2001)
		Choosing R&D project to works on – How much is PRESENT in your work?	
		Choosing R&D project to works on – How much is the RIGHT AMOUNT for you?	
		Promoting R&D staff – How much is PRESENT in your work?	
		Promoting R&D staff – How much is the RIGHT AMOUNT for you?	
		Allocating raises – How much is PRESENT in your work?	
		Allocating raises – How much is the RIGHT AMOUNT for you?	
		Making major capital expenditures – How much is PRESENT in your work?	
		Making major capital expenditures – How much is the RIGHT AMOUNT for you?	
		Making minor capital expenditures – How much is PRESENT in your work?	
		Making minor capital expenditures – How much is the RIGHT AMOUNT for you?	
	Needs-supply along "formalization of decision activities"	The following statements refer to practices that discipline your job. Consider how much of each aspect is present in your job and what is the right amount for you (the scale ranges from 1 "None" to 5 "A very great amount").	Cardinal (2001)
		Written rules about laboratory procedures existed – How much is PRESENT in your work?	
		Written rules about laboratory procedures existed – How much is the RIGHT AMOUNT for you?	
		We had rules and procedures stating how to perform normal daily activities – How much is PRESENT in your work?	
		We had rules and procedures stating how to perform normal daily activities – How much is the RIGHT AMOUNT for you?	
		There are standard procedures for individual tasks – How much is PRESENT in your work?	
		There are standard procedures for individual tasks – How much is the RIGHT AMOUNT for you?	
		There are strict enforcement of written rules and procedures – How much is PRESENT in your work?	
		There are strict enforcement of written rules and procedures – How much is the RIGHT AMOUNT for you?	
Scientist-organization fit		The following statements refer to values inspiring the behavior of individuals and organizations in a broader sense. Now indicate how important each of the statements respectively is to you and at your company (the scale ranges from 1 "Not important at all" to 5 "Extremely important")	

Table 4.4 – Scales of Measurement: Scientist-Environment Fit Variables

Construct	Content of fit	Scale of measurement	
		Item	Source
	Similarity along "altruism"	Making the world a better place – How important is this to YOU?	
		Making the world a better place – How important is this at YOUR COMPANY?	
		Being of service to society – How important is this to YOU?	
		Being of service to society – How important is this at YOUR COMPANY?	
		Contributing to humanity – How important is this to YOU?	
		Contributing to humanity – How important is this at YOUR COMPANY?	
	Similarity along "economic achievements"	Salary level – How important is this to YOU?	Schwartz (1992) Cable and Judge (2004)
		Salary level – How important is this at YOUR COMPANY?	
		Total compensation – How important is this to YOU?	
		Total compensation – How important is this at YOUR COMPANY?	
		The amount of pay – How important is this to YOU?	
		The amount of pay – How important is this at YOUR COMPANY?	
	Similarity along "prestige"	Gaining respect – How important is this to YOU?	Schwartz (1992) Cable and Judge (2004)
		Gaining respect – How important is this at YOUR COMPANY?	
		Obtaining status – How important is this to YOU?	
		Obtaining status – How important is this at YOUR COMPANY?	
		Being looked up to by others – How important is this to YOU?	
		Being looked up to by others – How important is this at YOUR COMPANY?	
	Similarity along "security"	Being certain of keeping my job – How important is this to YOU?	Schwartz (1992) Cable and Judge (2004)
		Being certain of keeping my job – How important is this at YOUR COMPANY?	
		Being sure I will always have a job – How important is this to YOU?	
		Being sure I will always have a job – How important is this at YOUR COMPANY?	
		Being certain my job will last – How important is this to YOU?	
		Being certain my job will last – How important is this at YOUR COMPANY?	

Outcome Variables

Knowledge transfer was assessed using the scale developed by Cummings (Cummings, 2004). Based on literature reviews (Hansen 1999, Szulanski 1996, Zander and Kogut 1995) and interviews the author suggests that knowledge sharing concerns general overviews, specific requirements, analytical techniques, progress reports, and project results. Thus, the frequency of knowledge sharing within and outside of the group was assessed on a 5-point scale ranging from 1 (never) to 5 (a lot). The question was framed as follows: "Think to your last completed project. How often did you share each type of knowledge during the project with members of your workgroup/people outside you workgroup?" The explicit focus on a las completed project was important to capture the influence of fit which is eminently situational. Alpha coefficient was .80 for intra-group knowledge transfer, and .90 for extra-group knowledge transfer. Performance in the task-domain refers to scientific performance and project contribution.

Performance. Obtaining objective performance measures proved impossible in science-based settings, where information is extremely volatile, and failures —that are the rule, rather than the exception— are difficult to track . Companies included in the study collect some productivity data. However I decided to not employ these internal indicators for two reasons. First, indicators were partially consistent across companies. Second, temporal window of reference did not match the requirements of the research design —productivity was assessed yearly—. Therefore, I used supervisor ratings of scientist performance as the effectiveness measure. This approach is coherent with previous literature that draws on the premises that there is no strictly objective measure of performance in organizations. Each supervisor rated the performance of a number of scientists ranging from a minimum of 2 scientists to a maximum of 12 scientits. Immediate supervisors were identified based on organizational charts provided by companies. *Contextual performance* was assessed using four-items that compose the conscientiousness sub-scale proposed by Podsakoff et al. (Farh, Podsakoff, & Organ, 1990). Direct supervisors rated the contextual performance of scientists on a 5-point scale, ranging from 1 (very uncharacteristic) to 5 (very characteristic). task performance —that comprises scientific performance and project contribution— was measured by using a seven-item scale of task performance that is based on earlier research (Erdogan & Enders, 2007; Janssen & Van Yperen, 2004; Mayer & Gavin, 2005). The immediate supervisors of scientists were asked to separately rate performance of scientist on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). A sample item for scientific performance is "Scientist has produced a great number of scientific ideas". A sample item for project contribution is "Scientist has provided a unique contribution to project advancement".

Dual ladder orientation was measured with a three-items scale developed by Katz and Allen (Allen & Katz, 1986). Respondents rated each item a 7-point scale ranging from 1 (not important at all) to 5 (to a very great extent); alpha coefficient was These questions ask engineers their preference in terms of progression on either the managerial or technical ladders or in lieu of these, the opportunity to engage in challenging and exciting projects irrespective of promotion. The third question was included just for what was expected to be those few engineers who might not be interested in the traditional paths of organizational progress. *Turn over intent* was measured with a three items scales developed by Mitchell et. al (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001).

Table 4.5 - Scales of Measurement: Outcomes Variables

Construct		Scale of measurement: Item	Source	Informant: Self-reported	Informant: Supervisor rated
Job satisfaction		Think to all aspect of your job. Now consider to what extent you agree with the following statement (1=strongly disagree; 5=absolutely agree).	Edwards and Rothbard (1999)		
		Most days I am enthusiastic about my work		✓	
		I feel fairly satisfied with my present job		✓	
		I find real enjoyment in my work		✓	
		Each day at work seems like it will never end		✓	
		I consider my job rather unpleasant		✓	
Knowledge transfer	Intra-workgroup knowledge transfer	Think to your last completed project. How often did you share each type of knowledge during the project with MEMBERS OF YOUR WORKGROUP (1=never; 5=a lot)?			
		General overviews (e.g., project goals, milestone estimates, or member responsibilities)	Cummings (2004)	✓	
		Specific requirements (e.g., numerical projections, technical feasibility, or patentability criteria)		✓	
		"Analytical techniques (e.g., statistical tools, detailed methods, or testing procedures)"		✓	
		"Progress reports (e.g., status updates, resource problems, or personnel evaluations)"		✓	
		Project results (e.g., preliminary findings, unexpected outcomes, or clear recommendations)		✓	
	Intra-workgroup knowledge transfer	Think to your last completed project. How often did you share each type of knowledge during the project with PEOPLE OUTSIDE YOUR WORKGROUP (1=never; 5=a lot)?			
		General overviews (e.g., project goals, milestone estimates, or member responsibilities)	Cummings (2004)	✓	
		Specific requirements (e.g., numerical projections, technical feasibility, or patentability criteria)		✓	
		"Analytical techniques (e.g., statistical tools, detailed methods, or testing procedures)"		✓	
		"Progress reports (e.g., status updates, resource problems, or personnel evaluations)"		✓	
		Project results (e.g., preliminary findings, unexpected outcomes, or clear recommendations)		✓	
Dual ladder scale		To what extent would you like your career to be (1=not at all; 7=to a very great extent):	Katz and Allen (1978)		
		A progression up to the technical professional ladder to a higher-level position		✓	
		A progression up to managerial ladder to a higher level position		✓	
		The opportunity to engage in those challenging and exciting research activities and projects you are most interested, irrespective of promotion		✓	
Performance	Scientific performance	Think about the last year at work. Now, consider the number and quality of ideas produced by each scientist (1=poor; 5=excellent).	Robinson (1996)		
		How would you rate his/her own performance?			✓
		How would he/she probably rate your performance?			✓
	New product introduction	Think about the last year at work. Now, consider your contribution in terms of new product introduction (1=poor; 5=excellent).	Robinson (1996)		
		How would you rate his/her own performance?			✓
		How would he/she probably rate your performance?			✓

	Advancement of existing projects	Think about the last year at work. Now, consider your contribution in terms of advancement of existing project (1=poor; 5=excellent).	Robinson (1996)	
		How would you rate his/her own performance?		✓
		How would he/she probably rate your performance?		✓
Contextual perform-ance		Think about the last year at work. Now, indicate how characteristic each of four statements was of your behavior at work. (1=very uncharacteristic; 5=very characteristic)	Podsakoff (1990)	
		Attending meetings that are not mandatory, but are considered important		✓
		Attend functions that are not required, but help the company to take good decisions		✓
		Keep abreast of changes in the organization		✓
		Read and keep up with the organization announcement, memos and so on		✓

Mediating Variables

Identification was measured with a six-item scale (Mael & Ashforth, 1992); identification with each target was measured by inserting the words vaccine research/robotics/energy research, organization, and workgroup in the place of organization in each identification item. For example, an item began with the stem, "I am very interested in what others think about" and ended with "vaccine research," "my organization," or "my workgroup" on the professional, organizational, and workgroup scales, respectively. Because the formal definition of workgroups may vary across organizations, workgroup was operationalized on the survey as "the people with whom you work; coworkers." Responses were given on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Coefficient alpha was .84 for professional identification, .87 for organizational identification, and .86 for workgroup identification. *Role conflict* and *role ambiguity* constructs were operationalized using the scales of Rizzo and colleagues (Rizzo, House, & Lirtzman, 1970), two widely used scales whose properties are well established (Gonzalez-Roma, Schaufeli, Bakker, & Lloret, 2006). Role conflict scale is composed of 9 items; coefficient alpha was .79. Role ambiguity is composed of 8 items; coefficient alpha was .82. In both cases responses were given on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 4.6 - Scales of Measurement: Mediating Variables

Construct	Scale of measurement	
	Item	Source
Organizational identification	Think to your company in a broader sense and express your agreement with the following statements (note that scale ranges from 1 "Strongly disagree" to 5 "Strongly agree").	Mael and Ashfort (1992)
	When someone criticises STMicroelectronics, it feels like a personal insult	
	I am very interested in what others think about STMicroelectronics	
	When I talk about STMicroelectronics, I usually say 'we' rather than 'they'	
	The successes of STMicroelectronics are my successes	
	When someone praises STMicroelectronics, it feels like a personal compliment	
	If a story in the media criticised STMicroelectronics, I would feel embarrassed	
Professional identification	Think to your profession (people which work in your area of technical expertise, as COMPUTER SCIENCE or ELECTRONIC ENGINEERING, no matter if they work at other companies or universities) and express your agreement with the following statements (note that scale ranges from 1 "Strongly disagree" to 5 "Strongly agree").	Mael and Ashfort (1992) Mergenson et al. (2006)
	When someone criticises my area of expertise, it feels like personal insult	
	I am very interested in what others think about my area of expertise	
	When I talk about my area of expertise, I usually say 'we' rather than 'they'	
	The successes of my area of expertise are my successes	
	When someone praises my area of expertise, it feels like a personal compliment	
	If a story in the media criticised my area of expertise, I would feel embarrassed	
Workgroup identification	Think to your workgroup (people with whom you work) and express your agreement with the following statements (note that scale ranges from 1 "Strongly disagree" to 5 "Strongly agree").	Mael and Ashfort (1992)
	When someone criticises my workgroup, it feels like a personal insult	
	I am very interested in what others think about my workgroup	
	When I talk about my workgroup, I usually say 'we' rather than 'they'	
	The successes of my workgroup are my successes	
	When someone praises my workgroup, it feels like a personal compliment	
Role conflict	Consider the goals you deal with in your job. Express your agreement with the following statements (1=strongly disagree; 5=strongly agree).	Rizzo (1970)
	I have too many goals on this job (I am too overloaded)	
	Some of my goals conflict with my personal values	
	I am given incompatible or conflicting goals by different people (or even by the same person)	
	I have unclear goals on this job	
	My job goals lead me to take excessive risks	
	My job goals serve to limit rather than raise my performance	
	The goals I have on this job lead me to ignore other important aspects of my job	
	The goals I have on this job focus only on short-range accomplishment and ignore important long-range consequences	
Role ambiguity	The following statements refer to a series of job-level responsibilities and organizational prescriptions. Think to your present job and consider to what extent you agree with the statements (1=strongly disagree; 5=strongly agree).	Rizzo (1970)
	I feel certain about how much authority I have	
	I have clear, planned goals and objectives for my job	
	I know that I have divided my time properly	
	I know what my responsibilities are	

I know exactly what is expected of me
I have to do things that should be done differently
Lack of policies and guidelines to help me
I work under incompatible policies and guidelines
I receive an assignment without the resources to complete it
I have to buck a rule or policy in order to carryout an assignment
I receive incompatible requests from two or more people

Control Variables

Individual-level controls. Trait goal orientation of scientits was assessed using three sub-scales of Van de Walle study (VandeWalle & Cummings, 1997). The *Mastery Orientation* scale consisted of 5 items. A sample item is "I enjoy challenging and difficult tasks where I'll learn new skills." Coefficient alpha for this scale was .88. The *performance-avoid orientation* measure consisted of 4 items. A sample item is "I prefer to avoid situations where I might perform poorly."Coefficient alpha was . 86. *Performance-prove orientation* was assessed with 4 items. A sample item is "I try to figure out what it takes to prove my ability to others." Coefficient alpha was .79. Respondents rated the set of items on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Other control variables at the individual level were assessed. I included scientists' age (in years), education (Ph.D. Vs non Ph.D.), experience in the field (number of years spent in the current research topic), workgroup and organizational tenure (in years).

Task-level controls were also included in the study. Work Design Questionnaire (Morgeson & Humphrey, 2006) sub-scales were used to assess the interdependencies, that is the degree to which the job depends on others and others depend on it to complete the work As such, interdependence reflects the "connectedness" of jobs to each other. Integral to this definition are two distinct forms of interdependence: the extent to which work flows from one job to other jobs —initiated interdependence— and; the extent to which a job is affected by work from other jobs —received interdependence—. For both initiated interdependence and received interdependence scientists rated three items on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Alpha coefficients were respectively .80 and .81.

Table 4.7 - Scales of Measurement: Control Variables

Construct		Scale of measurement: Item	Source
Goal orientation	Learning-orientation	Individuals and organizations learn by doing things (being engaged in projects, drawing up documents, formulating plans, and so on). Think to your experience and express your agreement with the following items (1=strongly disagree; 7=strongly agree).	Button and al. (1996) Vand and Walle (1997) Bell and Kozwolosky (2008) Horvath et al. (2001) Elliot and McGregor (2001)
		I enjoy challenging and difficult tasks where I learn new skills	
		I want to learn as much as possible	
		The opportunity to learn new skills and knowledge is important to me	
		I prefer to work on tasks that force me to learn new things	
		The opportunity to extend the range of my abilities is important to me	
		I like best when something I learn makes me want to find out more	
		When I fail to complete a difficult task, I plan to try harder the next time I work on it	
		The opportunity to learn new things is important to me	
	Performance-orientation prove	The following statements refer how people confront with goals in a work context. Think to your experience and express your agreement with the following statements (1=strongly disagree; 7=strongly agree).	Button and al. (1996) Vand and Walle (1997) Bell and Kozwolosky (2008) Horvath et al. (2001) Elliot and McGregor (2001)
		I prefer to work on projects in which I can prove my ability to others	
		I want others to think I am smart	
		I enjoy proving my ability to others	
		I am motivated by the thought of outperforming my peers	
		The opinions of others about how well I do certain things are important to me	
		I strive to demonstrate my ability relative to others	
	Performance-orientation avoid	The things that I enjoy most are the things I do best	
		I prefer to do things that I can do well rather than things that I do poorly	
		I like to work on tasks that I have done well in the past	
		Because I know my work will be compared to others, I get nervous	
		My fear of performing poorly is often what motivates me	
		I prefer to avoid situations in which I might perform poorly	
		I like to be fairly confident that I can successfully perform a task before I attempt it	
Task characteristics		The following statements concern task partitioning aspects. Please, consider to what extent you agree with the statements (1=strongly disagree; 5=strongly agree).	Morgeson and Humphrey (2006)
	Sent interdependence	The job requires me to accomplish my job before others complete their job	
		Other jobs depend directly on my job	
		Unless my job gets done, other jobs cannot be completed	
	Received interdependence	The job activities are greatly affected by the work of other people	Morgeson and Humphrey (2006)
		The job depends on the work of many different people for its completion	
		My job cannot be done unless others do their work	

4.5 - Data Sources

This dissertation study uses several data sources: (i) qualitative insights from semi-structured interviews conducted in pilot studies; (ii) survey-based data, and (iii) internally archival data and materials provided by the two organizations. I began research with 2 kick-off meetings —involving around 30 individuals— and 12 pilot interviews to explore the feasibility of studying interactions between scientist and their environment. These interviews indicate that meaningful data about interaction could be collected using a survey-based approach, which moved the study quickly into the formal design stage. Formal data collection took approximately 6 months, from the pilot study to the completion of the survey.

The survey was managed according to the Tailored Design Method proposed by Dillman (Dillman, 2007). The philosophy underlying this method is to work on participants' perceptions, so as to reduced perceived costs of survey participation and maximize perceived benefits. General managers of the companies sent a first e-mail to announce the launch of the survey. After three days I sent a cover letter via e-mails providing details about operational aspects of the survey. In the mail I assured that information would have been treated preserving confidentiality. Cover letter communicated also that participants would have received a small personalized report indicating their position in the context of their company. After three days, general managers sent an e-mail inviting 474 scientists to complete the survey via the Internet. Candidates to participate in the survey were identified with the aid of middle level-management in the R&D department, so as to focus on individuals actually working at the forefront of science. About the 95% of technicians employed in R&D departments of the two companies were not eligible for the survey —being primarily focused on new product development—. Data gathering stopped after 3 waves. A first recall was accomplished via e-mail by general managers after one week from the launch of the survey. A second recall occured two weeks after the launch of the survey following the same procedure. At the completion of the survey, I collected data about 307 scientists involved in pure research. Response rate was .63 for Company "A" —on an initial set of 259 individuals— and .67 for Company "B"—on an initial set of 215 individuals—. A first screening of data indicated the presence of missing values. Questionnaires with missing values exceeding 5% of total items (198) were eliminated. Remaining cases were treated as follows (Hair, Black, Babin, Anderson, & Tatham, 2006): (i) when missing values involved an endogenous variable I eliminated the questionnaire; (ii) missing items referring to an exogenous variable were replaced using information on items blocking in the same scale for the same observation. This strategy led to a sample of 264 usable questionnaires. Companies provided also secondary data about scientists. Examples of information provided are workgroup affiliation, immediate supervisor, location of the R&D site, e-mail contacts and demographic variables. Key features of the final sample are describe in Table 4.8.

Table 4.8 - Sample

Variable	Mean
Age	38.68
Technical Experience in the Field	10.61
Ph.D. (1=Yes)	68%
Organizational Tenure	18.90
Workgroup Tenure	9.60
Dual Ladder Scientist	41%

N=264

4.6 Data Analysis

Data were analyzed with different techniques. Descriptives statistics and graphical representations were used to highlight fit-misfit conditions. Local polynomial regression and path analysis have been employed to derive micro-organizational implications of institutional pluralism. Cluster analysis was applied to characterize configurations of scientist-environment fit constructs.

Descriptive Statistics and Visual Inspection

Patterns of fit-misfit between scientist and different facets of the environment were shed to light using simple descriptive statistics and graphics that better illustrate the distribution of constructs. Evidences were reported for both separate components —i.e., scientist and environment— and the algebraic difference of the components —i.e., environment-scientist—. When fit regards more than one content of fit —e.g., SJ fit, dealing with decision autonomy, formalization of decision activities, scientific inducements— statistics are separately reported for each dimension. Descriptive statistics are complemented with graphics depicting the univariate distribution of scientist and environment components as well as their joint distribution.

Figure 4.3 – Relationships among Research Questions and Techniques

Goal	Technique
(1) Highlighting patterns of fit-misfit conditions	Descriptives Statistics
	Visual Inspection
(2) Deriving implications of institutional pluralism for organizational behavior	Local Polynomial Regression
	Surface Response Modelling
	Path Analysis within Bock Recursive Models
(3) Analyzing configurations of fit conditons	Cluster Analysis
	Profile Analysis

Local Polynomial Regression and Surface Response Models

The congruence between two constructs —treated as a concept in its own right— has traditionally been computed as a "difference score". Difference scores are prevalent in the study of person-job fit (Edwards & Baglioni, 1991; Spokane, Meir, & Catalano, 2000), the similarity between employee and organizational values (Chatman, 1991; Kristof, 1996), the match between employee expectations and experiences (Wanous, Poland, Premack, & Davis, 1992), and the agreement between performance ratings (London & Wohlers, 1991). Bu difference scores have been widely in organization theory, especially in studies of organizational configurations (Doty, Glick, & Huber, 1993).

Typically, these scores have consisted of the algebraic, absolute, or squared difference between two component measures (Dougherty & Pritchard, 1985; French et al., 1982; Rice, Bennett, & Mcfarlin, 1989) or the sum of absolute or squared differences between profiles of component measures (Drazin & Vandeven, 1986; Gresov, 1989; Vancouver & Schmitt, 1991). In most cases, difference scores are used to represent congruence —i.e., fit, match, similarity, or agreement— between two constructs, which is then viewed as a predictor of some outcome (Drazin & Vandeven, 1986).

Despite their widespread use, difference scores suffer from numerous methodological problems (Edwards, 1993, 1994a, b, 2001a, b; Edwards & Harrison, 1993; Edwards & Parry, 1993). These problems can be ameliorated or avoided with polynomial regression analysis, which uses components of difference scores supplemented by higher-order terms to represent relationships of interest in congruence research. This is illustrated by the following regression equation, which uses an algebraic difference as a single predictor —e.g., French et al., 1982; Kernan & Lord, 1990; Vance & Colella, 1990; Wanous & Lawler, 1972—:

$$Z = b_0 + b_1(XY) + e$$

(A)

In this equation, X and Y represent the two component measures comprising the difference, Z represents an outcome measure, and e represents a random disturbance term. The positive sign on b_1 indicates that the difference between X and Y is positively related to Z. Expanding this equation yields:

$$Z = b_0 + b_1X - b_1Y + e$$

(B)

This expansion shows that Equation "A" implies a positive relationship between X and Z and a negative relationship between Y and Z, with the constraint that the coefficients on X and Y are equal in magnitude but opposite in sign (Edwards, 1993). The following equation relaxes this constraint, allowing the coefficients on X and Y to take on whatever values maximize the variance explained in Z:

$$Z = b_0 + b_1X + b_2Y + e$$

(C)

A somewhat more complicated equation uses the squared difference between two component measures —e.g., Caplan, Cobb, French, Harrison, & Pinneau, 1980; Dougherty & Pritchard, 1985; Tsui & O'Reilly, 1989—:

$$Z = b_0 + b_1(X - Y)^2 + e$$

(D)

The positive sign on b_1 indicates that Z increases as the difference between X and Y increases in either direction. Expanding this equation yields:

$$Z = b_0 + b_1X^2 + 2b_1XY + b_1Y^2 + e$$

(E)

This equation shows that a squared difference implies positive coefficients of equal magnitude on X^2 and Y^2 along with a negative coefficient twice as large in absolute magnitude on XY. This equation also shows that Equation E implicitly contains curvilinear and interactive terms without appropriate lower-order terms (Cohen, 1978). Relaxing the constraints in Equation F and adding lower-order terms yields the polynomial function:

$$Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + e$$

(F)

This equation shows that a squared difference imposes four constraints: (i) The coefficient on X is 0, (ii) the coefficient on Y is 0, (ii) the coefficients on X^2 and Y^2 are equal, and (iii) the coefficients on X^2, XY and Y^2 sum to 0; given the third constraint, this is equivalent to stating that the coefficient on XY is twice as large as the coefficient on either X^2 or Y^2, but opposite in sign (Edwards, 1994a, b, 1995).

Equation "F" can be used to test these constraints as well as to depict surfaces relating triplets of X, Y and Z values. However, simply inspecting the signs and magnitudes of the coefficients achieved via polynomial regression reveals little as to the shape of the the surface they represent. Response surface methodology (Box & Draper, 1987) provides the basis necessary for describing and testing the essential features of surfaces corresponding to quadratic regression equations. Edwards and Perry (Edwards, Baglioni, & Cooper, 1990; Edwards & Parry, 1993) have introduced this technique in PE fit research about 20 years ago, indicating how to test hypothesis concerning "fit" using estimated parameters of surfaces. In particular the authors have focused on three key features of surfaces. The first is the stationary point— i.e., the point at which the slope of the surface is 0 in all directions—, which corresponds to the overall minimum, maximum, or saddle point of the surface. The second feature is the principal axes of the surface, which run perpendicular to one another and intersect at the stationary point. For convex surfaces, the upward curvature is greatest along the first principal axis and least along the second principal axis. For concave surfaces, the downward curvature is least along the first principal axis and greatest along the second principal axis. For saddle-shaped surfaces, the upward curvature is greatest along the first principal axis, and the downward curvature is greatest along the second principal axis. Finally, the third feature is the slope of the surface along various lines of interest, such as the principal axes and the line along which the component variables are equal —that is the Y = X line—.

Deriving Stationery Point and Principal Axes. Formulas expressing the stationary point and principal axes in terms of regression coefficients reported reported by Khuri and Cornell (Khuri & John, 1987). For a quadratic regression equation, the X,Y coordinates of the stationary point (X_0, Y_0) are:

$$X_0 = (b_2b_4 - 2b_1b_5) / (4b_3b_5 - b_4^2)$$

(G)

$$Y_0 = (b_1b_4 - 2b_2b_3) / (4b_3b_5 - b_4^2)$$

(G′)

Note that when the equality $4b_3b_5 = b_2$ holds, Equations G and G′ are undefined, meaning that the surface has no stationary point. This condition implies one of two types of surface, depending on the values of b_3, b_4, and b_5. If any of these coefficients is nonzero, the surface is either a ridge with a constant slope along its first principal axis or a trough with a constant slope along its second principal axis. If b_3, b_4, and b_5 equal 0 simultaneously, the surface is a plane.

The first and second principal axes can be expressed as lines in the X,Y plane. The equation for the first principal axis can be written as

$$Y = p_{10} + p_{11}X$$

(H)

The equation for p_{11} is:

$$P_{11}= (b_5 - b_3 + ((b_3 - b_5)^2 + b_4^2)^{1/2})/b_4$$

(I)

Two properties of Equation "I" are worth noting. First, when b_3 and b_5 are equal, equation reduces to b_4/b_4. In this case, p11 equals either 1 or 1, depending upon whether the sign of b_4 is positive or negative. Second, when b_4 equals 0, both the numerator and denominator of equation become 0, rendering it undefined. In that case, one of three implications regarding the first principal axis of the surface pertains: if b_3 is greater than b_5, the first principal axis has a slope of 0 and runs parallel to the X-axis. If b_3 is less than b_5, the first principal axis has a slope of infinity and runs parallel to the y-axis. Finally, if b_3 and b_5 are equal, the surface is a symmetric bowl or cap —depending on whether b_4 and b_4 are positive or negative—, and no unique set of axes can be identified. Once X_0, Y_0, and p,1 have been calculated, P1o can be calculated using the following formula:

$$p_{10} = Y_0 - p_{11}X_0$$

(J)

The equation for the second principal axis can be written as

$$Y = p_{20} + p_{21}X$$

(K)

The equation for p_{21} is:

$$P_{21}= (b_5 – b_3 - ((b_3 - b_5)^2 + b_4^2)^{1/2})/b_4$$

(L)

Note that the equation for p_{21} is identical to that for p_{11}, except that the sign of the third addend is reversed. Hence, when b_3 and b_5 are equal, equation reduces to b_4/b_4. It follows that if b_4 is positive, p_{21} equals -1, whereas if b_4 is negative, p_{21} equals -1. Furthermore, if b_4 equals 0 and b_3 is greater than b_5, the slope of the second principal axis is infinity, whereas if b_4 equals 0 and b_3 is less than b_5, the slope of the second principal axis is 0. As for Equation I, if b_4 equals 0 and b_3 and b_4 are equal principal axes equations are not determined. Once X_0, Y_0, and p,1 have been calculated, P1o can be calculated using the following formula:

$$p_{20} = Y_0 - p_{21}X_0$$

(M)

The preceding equations can be used to locate the principal axes in reference to the x and y-axes. However, other information regarding the location of the principal axes may also be relevant. For example, congruence researchers often hypothesize that some outcome, such as job satisfaction or company performance, is maximized at the point of "perfect fit". This hypothesis implies a ridge with its first principal axis running along the Y = X line, meaning that $p_{10} = 0$ and $p_{11} = 1$. If p_{11} differs from 1, the surface is rotated off the Y = X line. If the quantity $p_{10}/(l + p_{11})$ differs from 0, the surface is shifted laterally along the Y = -X line. In either case, the hypothesis that the first principal axis runs along the Y = X line is rejected.

Path Analysis

Hypothesis included in conceptual model —see Figure 3.2 and Figure 3.3- involved direct relationships among fit variables and outcomes, but also relationships indirectly relating fit to outcomes, through mediating variables. These hypothesis were tested using path analysis. The choice to model a system of equations with path analysis rather than structural equation models (SEM) is easy to argument. To date, SEM cannot be applied to model triplets of person-environment-outcome differently to local polynomial regression. To the best of my knowledge two papers have dealt with the pernicious question of SEM application to PE fit data. One of these papers is by Cheung (Cheung, 2009), who has tried to model PE fit as a second-order latent construct —using the latent congruence model (LCM)— so as to take into account measurement error. The second paper is a study on response to Chen's work published by Edwards (Edwards, 2009) where the author has argued that although the LCM takes measurement error into account and allows tests of measurement equivalence, it is framed around the mean and algebraic difference of the components of fit —e. g., the person and organization—, which creates various interpretational problems —on this point see § 2.4—.

The estimation approach was strait-forward. For mediator constructs, the sole predictors were scientist component and environmental component, and therefore the regression equation was as follows:

$$M = b_{m0} + b_{m1}E + b_{m2}S + b_{m3}E^2 + b_{m4}ES + b_{m5}S^2 + e$$

(N)

where "M" represents the mediation variable, and "E" and "S" are environmental and scientist components for different fit contents. The higher order terms were included along with first-order terms to determine whether the effects of scientist and environmental component can be interpreted as a fit effect, as described later.

For outcomes, the regression equation alternatively included the mediator (equation x), or the mediator as well as scientist and environmental components as well as mediator (equation x), as shown below:

$$O = b_{o0} + b_{o1}M + e$$

(O)

$$O = b_{o0} + b_{o1}E + b_{o2}S + b_{o3}E^2 + b_{o4}ES + b_{o5}S^2 + b_{o6}M + e$$

(O′)

where “O” refers to the outcome variable. Results from Equations N-O′ are used to obtain path coefficients for my model. For predictors represented as single variables—such as organizational identification → contextual performance—standardized regression coefficients for the variables were used as path coefficients (Pedhazur, 1982). For scientist and environmental components—which were represented by the five terms E, S, E^2, ES, and S^2— a path coefficient is obtained by treating the five terms as a block variable (Heise, 1972; Igra, 1979), thus estimating a block recursive model. This approach is not new for the PE fit stream, as shown by Edward and Cable’s study on individual-organization value congruence (Edwards & Cable, 2009). A block variable is a weighted linear composite of the variables that constitute the block, in which the weights are the estimated regression coefficients for the variables in the block. The five quadratic terms are then replaced with the block variable, the regression equation is re-estimated, and the standardized coefficient on the block variable serves as a path coefficient. As shown by Igra (1979) the coefficients on the other predictors in the equation are unaffected, and the variance explained by the equation using the block variable is identical to that explained by the equation using the original quadratic terms, given that the block variable is computed from the coefficient estimates for the quadratic terms themselves.

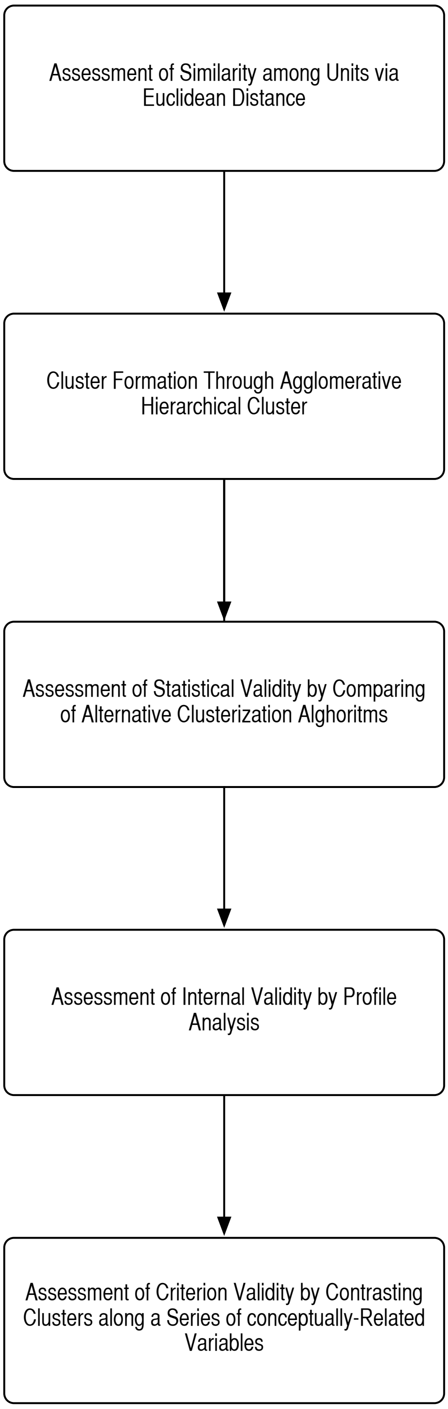
The path coefficients obtained from these procedures are used to assess the direct, indirect, and total effects associated with my model, allowing to determine the extent to which each of the mediators carried the effects of individual and organizational values on the outcomes. The indirect and total effects involved products of path coefficients, which we tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrap samples (Efron & Tibshirani, 1993).

Cluster Analysis

One of the objective of this study is the identification of patterns of fit-misfit condition at the individual level. The related empirical problem concerns the formation of group of scientists which exhibit high internal —i.e., within cluster— homogeneity and high external —i.e., between clusters— heterogeneity based on selected characteristics. To this end I emploied cluster analysis, a multivariate technique whose primary purpose is to group units or objects based on the characteristics they possess. As highlighted in the literature (Hair et al., 2006) cluster analyze may serves different goals, as data simplification —i.e., developing a simplified perspective by growing observations for further analysis—, relationship identification —i.e., revealing the relationships among observations—, or hypothesis testing —i.e., the empirical test of an existing typology—. In this study I used cluster analysis with the exploratory purpose to form a taxonomy —i.e, a typology that is grounded in empirical evidences—. Cluster analysis techniques is not new in the field of fit research as evidenced by the number of work that apply this technique (Bailetti & Callahan, 1993; Baker & Cullen, 1993; Burgers, Hill, & Kim, 1993; Doty et al., 1993; Drazin & Kazanjian, 1993; Drazin & Vandeven, 1986; Ketchen, Thomas, & Snow, 1993; Markovsky, Skvoretz, Willer, Lovaglia, & Erger, 1993; Meyer, Tsui, & Hinings, 1993) or underscore its merit (Drazin, Glynn, & Kazanjian, 2000; Gresov & Drazin, 1997).

Cluster variates are represented by fit variables, that are SW-, SS-, SJ- and SO-fit. In order to form "fit scores" scientist components were subtracted from environmental components for each relevant dimension of the environment. When fit involved more contents —e.g., SJ touching decision autonomy, centralization of decision activities, and scientific inducements— scores were averaged. Before conducting clustering procedures two data transformations were applied. First, difference scores were standardized before similarities between units were determined. The basic rational to use standardized scores in place of absolute values is that similarity measures are quite sensitive to differing scales of magnitudes among the variables (Hair et al., 2006). In general variables with larger dispersion have more impact on the final similarity value. Second, outliers in the sample were dropped, so as to avoid distortion in the actual structure of clusters and preserve representativeness of cluster structure in the population of origin. Once determined distances, units were grouped drawing on agglomerative hierarchical clustering, according to which each unit starts out as its own cluster, and results at an earlier stage are always nested within the results at a later stage creating a sort tree graph. The empirical strategy surrounding the cluster analysis is depicted in Figure 4.4.

Figure 4.4 – Empirical Strategy Underlying Cluster Analysis



CHAPTER 5

Results

This chapter deals with empirical evidences of the dissertation study. First, I present descriptive statistics on scientist-environment fit, so as tot highlight the relationship among different institutional logics that are present in science-based firms. Second, I report results concerning the influence of scientist-environment fit on performance and knowledge transfer —see the conceptual model depicted in Figure 3.2—. Third, I report evidences relating scientist environment fit to boundary-spanning role stressors —see the conceptual model depicted in Figure 3.3—. Finally, I report evidences on complex patterns of scientist-environment fit, assuming a within person approach.

5.1 - Descriptives Evidences on Scientist-Environment Fit

Table 5.1 presents means, standard deviations, coefficients of variation and ranges of variation for scientist and environmental components. The variable means and standard deviations indicated good dispersion and little evidence of floor or ceiling effects. Furthermore, coefficients of variation highlighted that standard deviation accounts for a remarkable portion of the variable mean, ranging from 18% —taste for science at scientist level— to 35% —centralization of decision activities at job level. It is important to note that variables at the environment level varied as much as variables concerning the individual level. This suggested that "fit" in this study reflects actual interactions of individual level and environmental level attributes rather than individual differences only. Furthermore, variation in environment level attributes may be attributable to two sources: (i) differences in scientists' perceptions about the environment; and (ii) actual differences of the environment —in that observations come from distinct companies, and scientists operate in relatively independent workgroups across the world—.

Table 5.1 – Descriptive Statistics

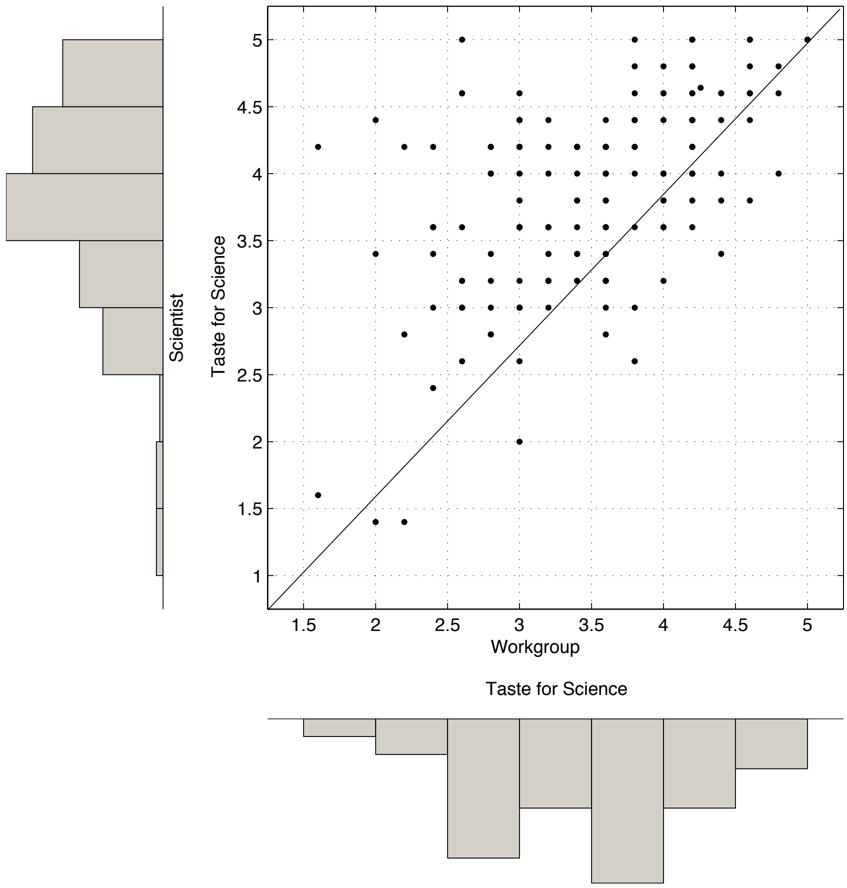
Level of the Environment	Content of Fit	Mean	Std.Dev.	Coef.Var.	Max-Min
Workgroup	Taste for Science				
	Environment (E)	3.49	0.73	20.80	3.40
	Scientist (S)	3.85	0.72	18.60	3.60
	Difference of Components (E-S)	-0.36	0.69	-	3.80
Supervisor	Knowledge Acquisition Tension				
	Environment (E)	3.05	0.72	23.76	3.83
	Scientist (S)	3.64	0.70	19.29	3.83
	Difference of Components (E-S)	-0.60	0.64	-	3.50
	Knowledge Enhancement Tension				
	Environment (E)	3.70	0.78	21.17	4.00
	Scientist (S)	3.79	0.77	20.35	4.00
	Difference of Components (E-S)	-0.09	0.64	-	4.33
Job	Scientific Inducements				
	Environment (E)	2.49	0.73	29.17	4.00
	Scientist (S)	3.40	0.83	24.54	3.80
	Difference of Components (E-S)	-0.90	0.85	-	5.20
	Decision Autonomy				
	Environment (E)	2.44	0.82	33.53	3.40
	Scientist (S)	3.18	0.81	25.50	4.00
	Difference of Components (E-S)	-0.74	0.74	-	4.20
	Formalization of Decision Activities				
	Environment (E)	2.40	0.94	39.30	4.00
	Scientist (S)	2.80	0.92	32.66	4.00
	Difference of Components (E-S)	-0.40	0.94	-	5.75
Organization	Altruism				
	Environment (E)	3.89	0.83	21.45	4.00
	Scientist (S)	3.60	0.83	22.99	4.00
	Difference of Components (E-S)	-0.29	0.90	-	6.33
	Economic Achievements				
	Environment (E)	3.96	0.60	15.26	3.00
	Scientist (S)	3.05	0.83	27.38	4.00
	Difference of Components (E-S)	-0.91	1.09	-	6.67
	Prestige				
	Environment (E)	3.58	0.73	20.27	3.33
	Scientist (S)	3.56	0.72	20.36	3.67
	Difference of Components (E-S)	-0.03	0.96	-	6.00
	Security				
	Environment (E)	3.88	0.84	21.63	3.67
	Scientist (S)	3.17	0.93	29.24	4.00
	Difference of Components (E-S)	-0.71	1.16	-	7.00

N=264

Scales range from 1 to 5; Scientist-Workgroup fit and Scientist-Organization are expressed in terms of "importance" (individual Vs. perceived at the level of the environment); Scientists-Supervisor and Scientists-Job fit are expressed in terms of "amount" (actual Vs. desired amount).

For scientist-workgroup fit, the individual component exceeded —on average— the environmental level one, meaning that average scientist perceives colleagues in the work-group to have a lower taste for science —that is, engaging in puzzling problems, contributing to the advancement of the scientific knowledge, participating in the epistemic community—. Figure 5.1 depicts the distribution of scientists' taste for science and workgroup's taste for science. The importance of taste for science for the workgroup —measured as individual perceptions— is reported along the x axis. The taste for science at individual level is reported along the y axis. The figure accounts of the distribution of each variable —the two histograms positioned on the bottom-right and top-left of the figure— and the joint distribution of the variables as well —the scatter diagram—. A line runs along the X,Y plan to indicate the congruence among workgroup and scientist level components. Deviations from this line can be interpreted as deviations from a condition of fit. In comparison to workgroup level, individual taste for science was markedly asymmetric, in that a large number of units concentrated on the upper tail of the distribution (3.5 and above). Conversely the distribution of the workgroup level construct was homogenous and the concentration in the upper tail was modest. The joint distribution indicated that scientist who attributed high levels of taste for science to their workgroup, had in turn high levels of taste for science. The opposite was not verified. A cluster of units concentrated on the bottom-right of the figure, suggesting that a considerable number of scientists with high taste for science perceive to be situated in work-groups with low taste for science. Coherently deviations from "fit" were primarily negative in signs.

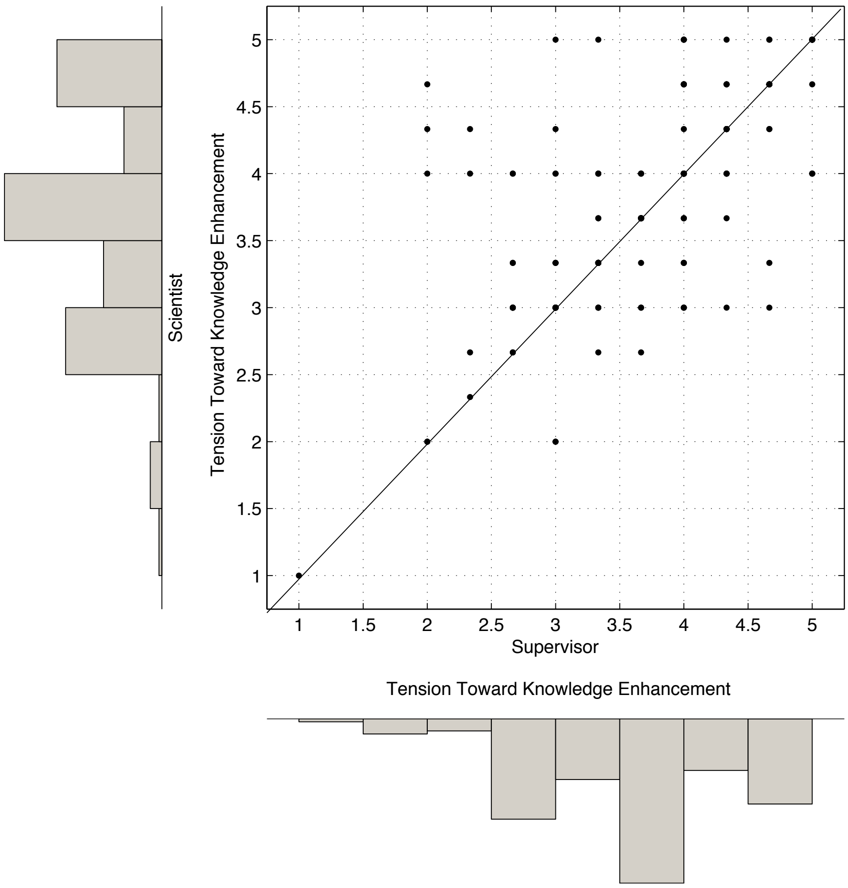
Figure 5.1 – Scientist-Workgroup Fit



N=264

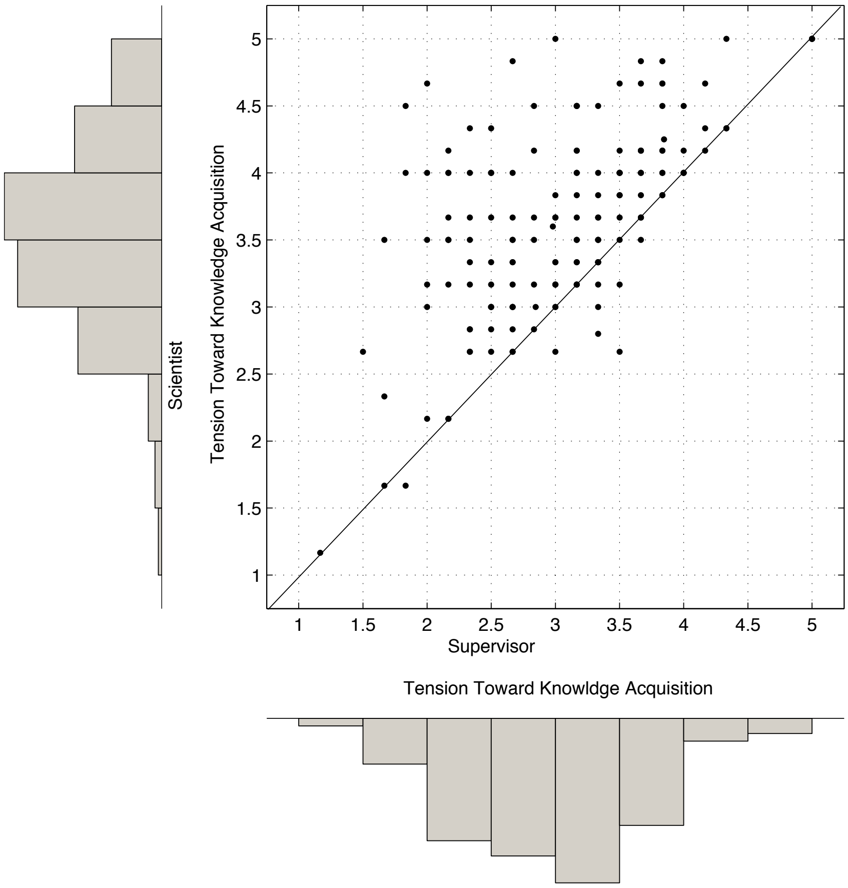
Figure 5.2a depicts the distribution of scientists' and supervisors' tension toward enhancing knowledge embedded in the workgroup. Results indicated that scientist and supervisor level distributions did not markedly differ —in both cases a negative skewness emerged—. Furthermore, both negative deviations —the situation where supervisor claims exceed scientists preference to work on ideas which reinforce a given knowledge set— and positive deviations—the opposite situation— can be observed. This result was confirmed by statistics of scientist- and supervisor level variables,that have a very similar average value (respectively 3.79 and 3.70), and similar dispersion as well (.19 Vs. .24 if coefficients of variation are considered). Figure 5.2b depicts the distribution of variables concerning the tension toward the acquisition of knowledge —that is , the production of knowledge that significantly departs from the existing body of scientific and technical skills in the workgroup—. The histogram suggests that scientist- and supervisor level variables followed a normal distribution. As far as the joint distribution, two striking features emerged. First, deviations from fit conditions were mainly negative, meaning that scientists' claims to work on knowledge acquisition projects go beyond supervisors' claims for this kind of project. The second feature is that deviations tended to be small in terms of magnitude for a considerable number of units in the sample —the 50^{th} percentile is about .40—

Figure 5.2a – Scientist-Supervisor Fit: Knowledge Enhancement



N=264

Figure 5.2b – Scientist-Supervisor Fit: Knowledge Acquisition



N=264

Figure 5.3a depicts the distribution concerning the decision autonomy of scientists. Scientists' claims for autonomy had a uniform distribution, with a considerable range of variation. Perceived autonomy provided by the job was skewed, with a positive asymmetry. The joint distribution underscored that scientists claims for autonomy exceeded autonomy granted by job characteristics. Moreover, negative deviations from fit conditions occurred across different levels of scientist claims for decision autonomy. Figure 5.3b depicts the distribution concerning formalization of decision activities. Scientists' claims for formalization (or absence of formalization) of decision activities had a moderate positive asymmetry. Conversely, actual centralization was markedly skewed, showing a concentration on the lower tail. The joint distribution of scientist and job level variables underscored the huge variation of fit-misfit conditions. Both negative and positive deviations were present, and, moreover, occured across different absolute levels of components. This result challenges the idea that scientists homogeneously adopt socially-derived organizing templates, concerning, for example, formalization of decision activities. Figure 5.3c depicts the distribution of scientific inducements required by scientists and scientific inducements provided by the job. The distribution of scientists' claims for provision of scientific inducements presented a moderate negative asymmetry. Conversely, the actual scientific inducements provided by the job resulted in a asymmetric distribution, with a concentration on the lower tail. The joint distribution revealed that deviations from "fit" tend to locate at low-moderate levels of actual scientific inducements. Just a few units had a positive deviation from fit —that is the case where scientific inducements provided by the job exceed scientists' claims—.

Figure 5.3a – Scientist-Job Fit: Decision Autonomy

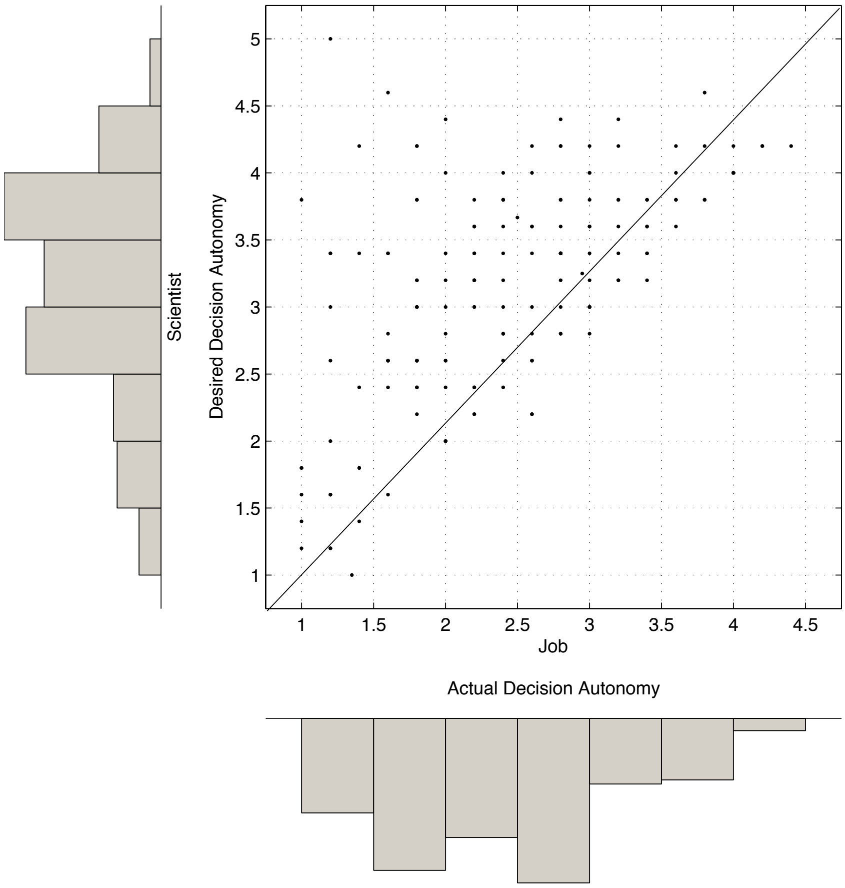


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Figure 5.3b – Scientist-Job Fit: Centralization of Decision Activities

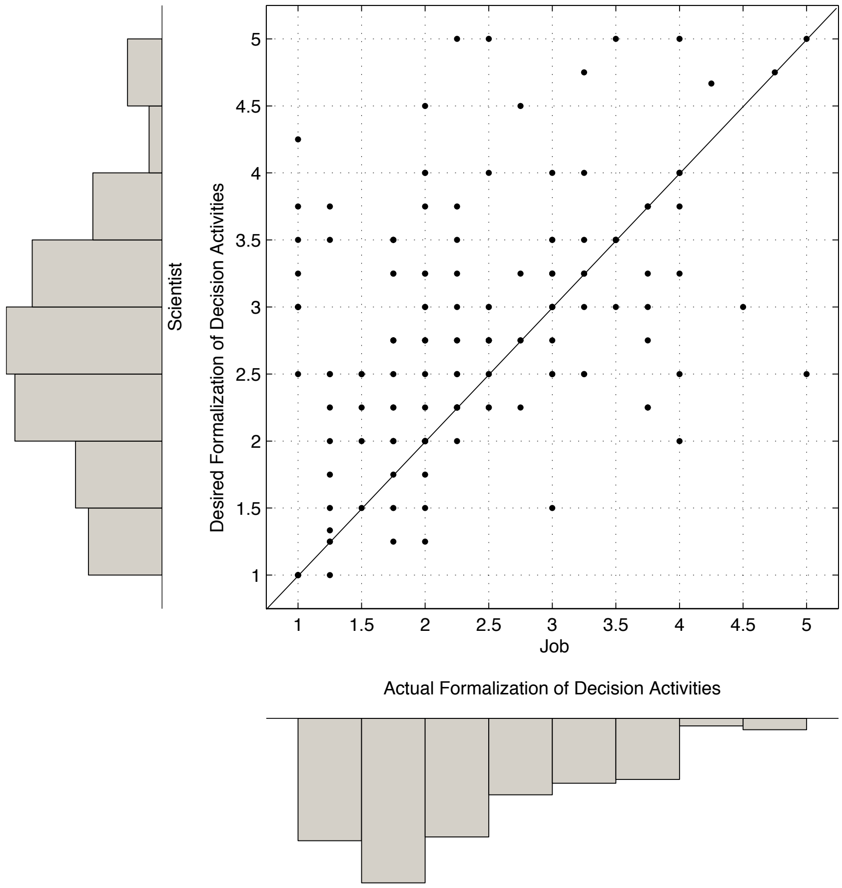

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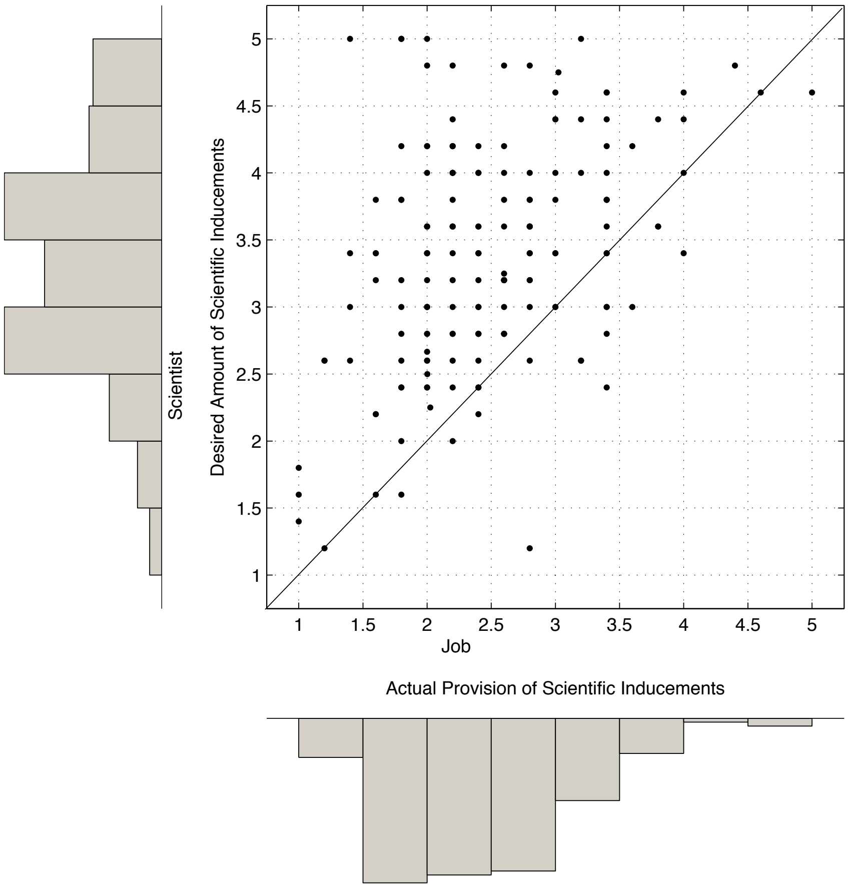
Figure 5.3c – Scientist-Job Fit: Scientific Inducements



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Figures from 5.4a to 5.4d depict distributions of scientist and organizational higher level values. Figure 5.4a indicates that scientist and organizational level importance of altruism —i.e., the importance of contributing to society through discovery and innovation— had a a very similar distribution, with a moderate negative asymmetry. The joint distribution highlighted that deviations from fit line can be positive —the importance of altruism is lower for scientist than the organization— and negative —the importance of altruism is higher for scientists than the organization— as well. Figure 5.4b concerns the distribution of scientists' and organization importance of economic achievements. The scientist level distribution had a moderate negative asymmetry, while organizational level scores were homogeneously distributed across the range of the scale. The exam of the joint distribution indicated the predominance of negative deviations —that are situations in which scientists consider economic inducements more important than their organizations— on positive ones. Figure 5.4c depicts the distribution of prestige importance. The univariate distribution at individual and organizational level were quite similar in this case, and followed a normal distribution. The scatter plot indicates the presence of negative deviations —the importance of prestige is greater for scientists than for the organization— and positive deviations as well. A striking feature of the distribution was that positive and negative deviations simultaneously occurred for a given level of organisational value, and this, in turn, suggested a certain heterogeneity of scientists in terms of prestige importance. Figure 5.4d concerns the distribution of security importance for scientists and the organization. The distribution at scientist level presented an accentuated negative asymmetry, while the organizational level distribution presented a normal shape. The joint distribution highlighted that negative deviations —a situation in which importance of security is greater for scientist than for the organization— predominate positive ones. Moreover negative deviations spanned across different levels of organizational scores.

Figure 5.4a – Scientist-Organization Fit: Altruism

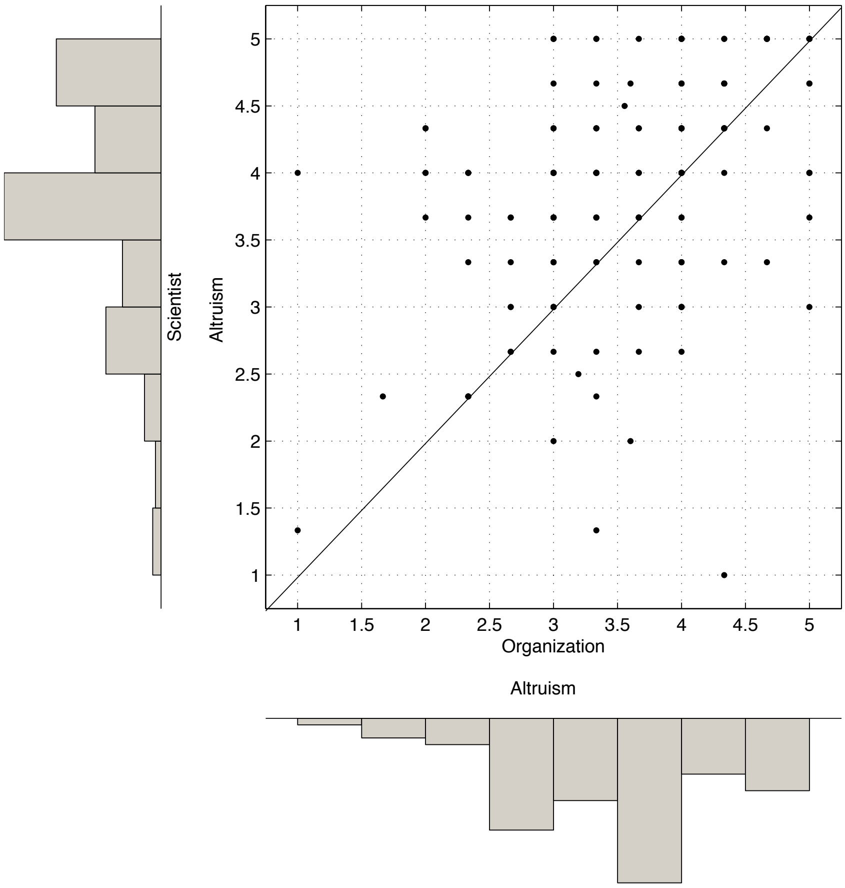

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Figure 5.4b – Scientist-Organization Fit: Economic Achievements

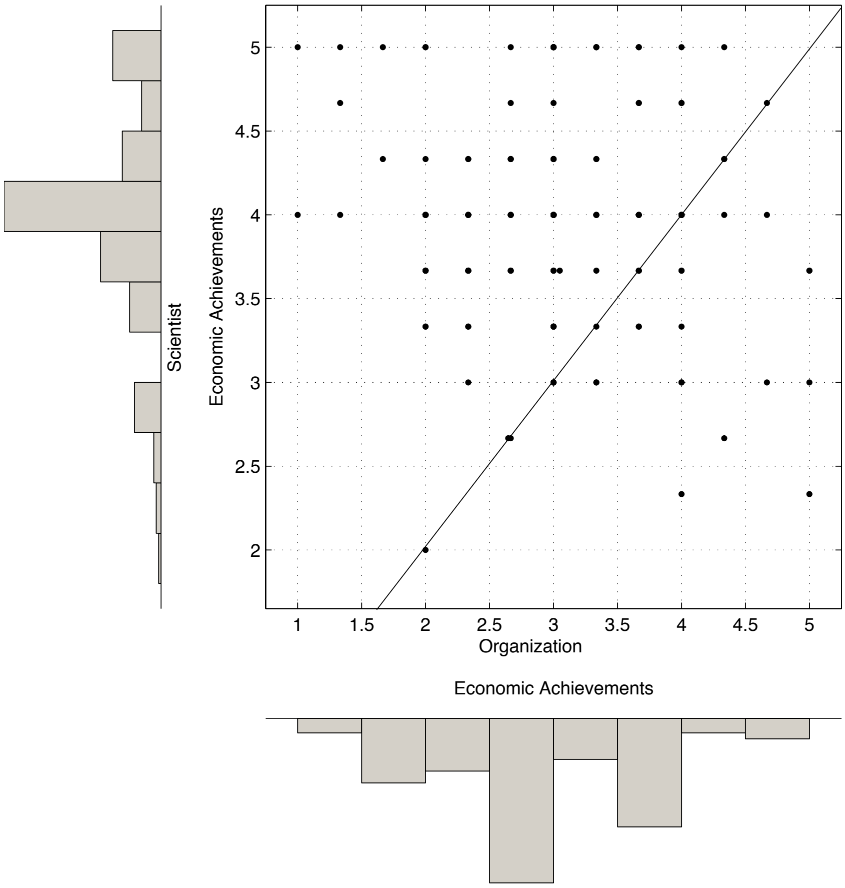

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Figure 5.4c – Scientist-Organization Fit: Prestige

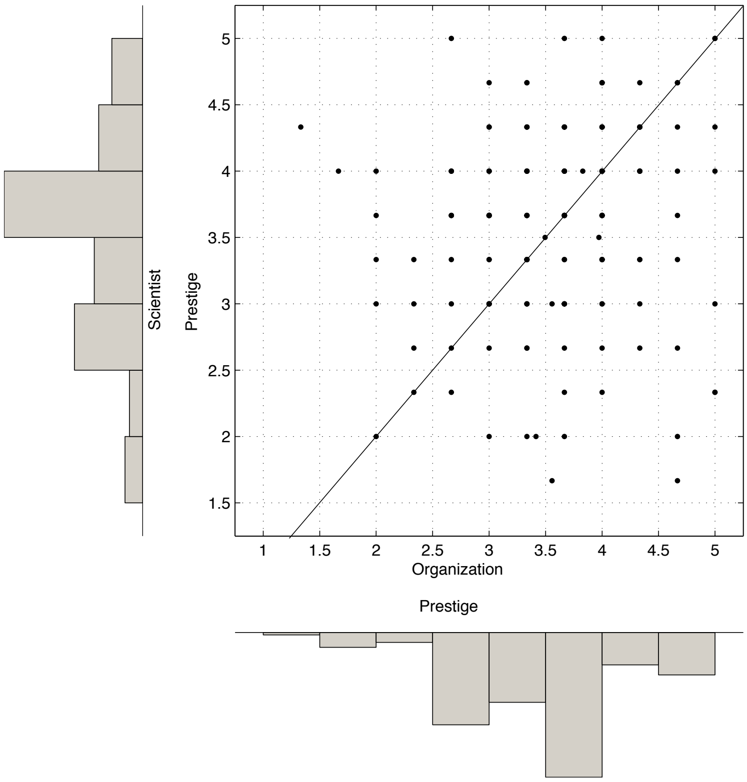

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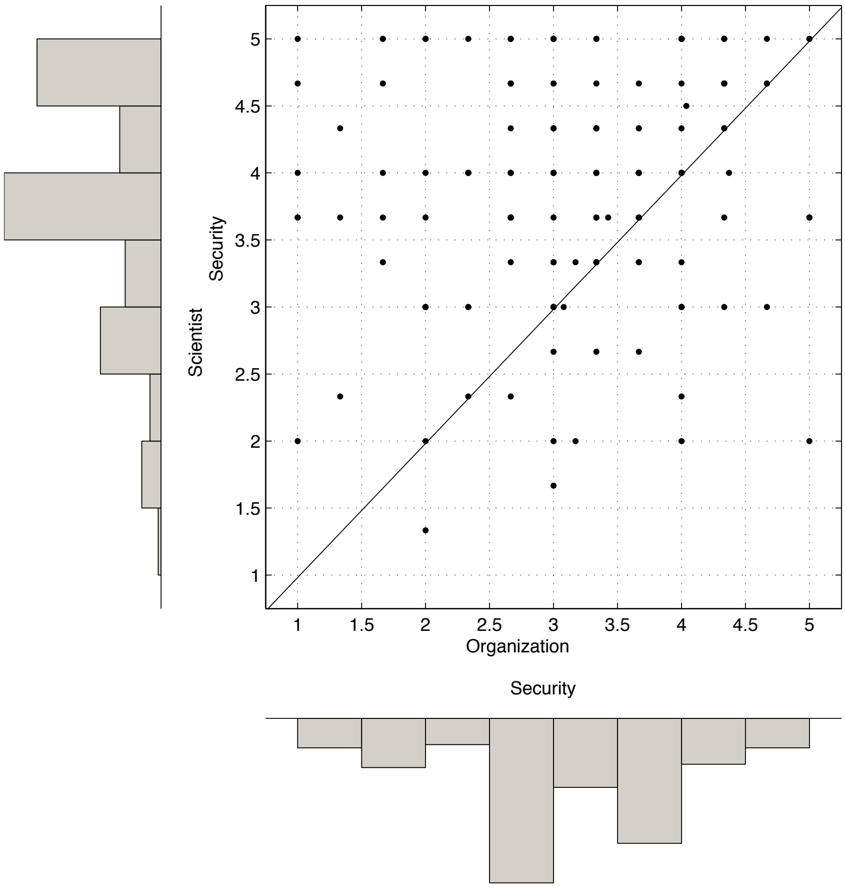
Figure 5.4d – Scientist-Organization Fit: Security



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5.2 - Scientist-Environment Fit: Implications for Performance and Knowledge Transfer

In this paragraph I present the empirical evidences concerning influences of fit on scientist level performance and knowledge transfer —see Figure 3.2—. Descriptive and bivariate statistics are first presented. Then results of multivariate analysis are reported.

Descriptive Statistics

Table 5.2 presents means, standard deviations and correlations for the measures used in the conceptual model. Prior to these analyses, scientist and environment components were scale-centered by subtracting the midpoint of the scale (Edwards, 1994). Reliability estimates for measures were generally high (average .82). A confirmatory factor analysis of the 95 items representing the 27 constructs listed in Table 5.2 indicate good fit, as evidenced by a comparative fit index (Bentler, 1990) of .91 and a root-mean-square error of approximation (Steiger, 1990) of .02. Taken together, this evidence indicated that the measures were suitable for my study.

The variable means and standard deviations indicated good dispersion and little evidence of floor or ceiling effects. The correlations among variable that refer to different kinds of fit were generally modest, with exceptions regarding correlations between SS fit and SJ fit. Dimensions within the same kind of fit tended to be positively correlated, with coefficients ranging from modest levels to around .60. Variables concerning social identities of scientists were positively correlated, as would be expected from prior research. The correlation of intra-workgroup and extra-workgroup knowledge transfer was positive but modest in terms of magnitude. Project contribution and scientific performance were positively correlated —the coefficient was above .63—. Analogously, both project contribution and scientific performance were positively correlated with contextual performance, but with a modest magnitude.

Table 5.2 – Descriptives Statistics and Full Correlations

		Mean	Std.Dev.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]
[1]	Workgroup Fit – E	3.48	0.71	1.00																									
[2]	Workgroup Fit – S	3.85	0.70	0.51	1.00																								
[3]	Supervisor Fit – E (Know. Acq. Tension)	3.03	0.72	0.51	0.28	1.00																							
[4]	Supervisor Fit – S (Know. Acq. Tension)	3.64	0.70	0.39	0.56	0.59	1.00																						
[5]	Supervisor Fit – E (Know. Enhanc. Tension)	3.69	0.79	0.14	-0.01	0.44	0.15	1.00																					
[6]	Supervisor Fit – S (Know. Enhanc. Tension)	3.78	0.77	0.25	0.20	0.40	0.41	0.65	1.00																				
[7]	Job Fit – E (Scientific Incent.)	2.48	0.70	0.33	0.21	0.53	0.30	0.27	0.24	1.00																			
[8]	Job Fit – S (Scientific Incent.)	3.41	0.82	0.27	0.66	0.27	0.58	0.01	0.27	0.40	1.00																		
[9]	Job Fit – E (Autonomy)	2.42	0.82	0.23	0.10	0.35	0.15	0.19	0.22	0.62	0.25	1.00																	
[10]	Job Fit – S (Autonomy)	3.16	0.81	0.24	0.36	0.23	0.35	0.08	0.26	0.39	0.58	0.60	1.00																
[11]	Job Fit – E (Formalization)	2.37	0.93	0.14	0.17	0.22	0.20	0.18	0.23	0.32	0.24	0.31	0.18	1.00															
[12]	Job Fit – S (Formalization)	2.79	0.91	0.25	0.27	0.37	0.34	0.17	0.27	0.34	0.38	0.25	0.31	0.46	1.00														
[13]	Organization Fit – E (Altruism)	3.90	0.81	0.24	0.28	0.29	0.42	0.13	0.24	0.19	0.32	0.12	0.20	0.14	0.19	1.00													
[14]	Organization Fit – S (Altruism)	3.61	0.82	0.19	0.04	0.18	0.16	0.07	0.15	0.16	0.16	0.17	0.16	0.17	0.07	0.41	1.00												
[15]	Organization Fit – E (Economic Achievements)	3.96	0.60	0.19	0.33	0.09	0.26	-0.02	0.14	0.08	0.32	-0.02	0.23	0.03	0.08	0.31	0.14	1.00											
[16]	Organization Fit – S (Economic Achievements)	3.04	0.84	0.06	-0.01	0.17	0.06	0.09	0.15	0.24	0.02	0.34	0.11	0.16	0.01	0.09	0.32	-0.14	1.00										
[17]	Organization Fit – E (Prestige)	3.58	0.72	0.25	0.46	0.21	0.36	0.08	0.23	0.23	0.37	0.15	0.23	0.12	0.18	0.35	0.19	0.44	0.00	1.00									
[18]	Organization Fit – S (Prestige)	3.56	0.73	0.15	0.13	0.29	0.25	0.14	0.25	0.18	0.19	0.20	0.21	0.18	0.19	0.16	0.36	0.11	0.34	0.11	1.00								
[19]	Organization Fit – E (Security)	3.87	0.84	0.22	0.16	0.25	0.21	0.15	0.12	0.19	0.07	0.10	0.11	0.04	0.03	0.30	0.34	0.34	0.06	0.40	0.22	1.00							
[20]	Organization Fit – S (Security)	3.17	0.94	0.06	0.01	0.04	-0.05	0.05	0.14	0.10	-0.06	0.23	0.10	-0.01	-0.07	0.00	0.30	-0.01	0.44	0.12	0.16	0.15	1.00						
[21]	Organizational Identification	3.58	0.74	0.20	0.15	0.20	0.26	0.14	0.30	0.17	0.22	0.22	0.24	0.06	0.12	0.27	0.26	0.38	0.17	0.35	0.18	0.30	0.25	1.00					
[22]	Workgroup Identification	4.11	0.74	0.16	0.06	0.18	0.12	0.24	0.33	0.12	0.04	0.18	0.09	0.19	0.05	0.15	0.10	0.20	-0.01	0.18	0.19	0.14	0.10	0.49	1.00				
[23]	Intra-Workgroup Knowledge Transfer	3.75	0.57	0.14	0.09	0.17	0.13	0.08	0.24	0.23	0.15	0.15	0.24	0.13	0.13	0.25	0.22	0.11	0.08	0.18	0.12	0.18	0.03	0.20	0.26	1.00			
[24]	Extra-Workgroup Knowledge Transfer	2.96	0.85	0.18	0.10	0.33	0.33	0.13	0.18	0.17	0.10	0.16	0.19	-0.02	0.17	0.25	0.10	-0.00	0.04	0.21	0.16	0.10	0.07	0.19	0.13	0.38	1.00		
[25]	Scientific Performance	3.76	0.60	0.11	0.22	0.15	0.13	0.05	0.11	0.21	0.17	0.09	0.09	0.06	0.05	0.26	0.13	0.12	0.14	0.15	0.07	0.07	0.19	0.15	0.18	0.22	0.16	1.00	
[26]	Project Contribution	3.65	0.64	0.08	0.06	0.11	0.11	0.04	0.12	0.12	0.10	0.12	0.14	0.10	0.09	0.25	0.23	0.11	0.06	0.17	0.02	-0.00	0.17	0.21	0.17	0.24	0.17	0.64	1.00
[27]	Contextual Performance	3.38	0.73	0.18	0.14	0.21	0.23	0.24	0.28	0.37	0.21	0.29	0.25	0.22	0.18	0.24	0.23	0.24	0.14	0.21	0.19	0.17	0.03	0.29	0.21	0.23	0.30	0.24	0.33

N=264

Full correlations are reported; Correlations that are greater than .12 in absolute magnitude are significant at $p < .05$; Correlations greater than .16 in absolute magnitude are significant at $p < .01$. “S” refer to scientist level component; “E” refers to environment level component.

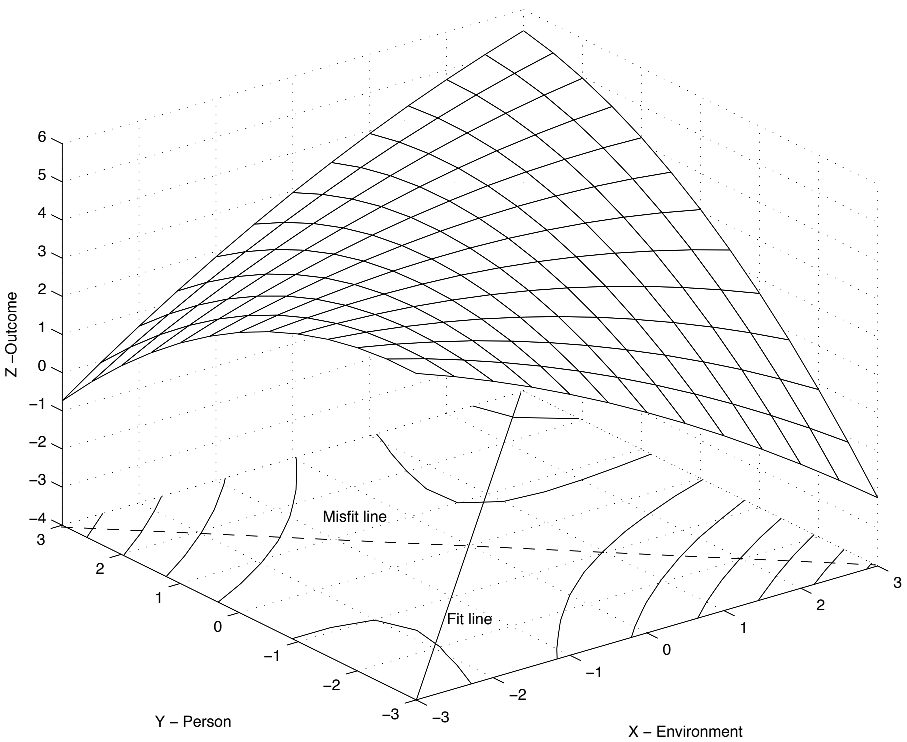
Test of Hypothesis Directly Relating Fit to Mediators and Outcomes

Results concerning my hypotheses relating fit conditions to the mediators and the mediators to outcomes are reported in Tables 5.3, 5.4 and 5.5. Table 5.3 contains estimates of paths relating scientist and environmental attributes to the mediating variables —e.g., the path relating SW fit to workgroup identification—. Tables 5.4 and 5.5 summarize results from response surface analyses indicating whether the relationships for individual and organization values reported in Table 5.3 satisfy the conditions for a fit effect. Finally, Table 5.6 contains paths that directly relate scientist and environment components to outcomes —e.g, the path from SW fit to contextual performance— and mediating variables to outcomes —e.g, the path from organizational identification to contextual performance—.

According to Edward and Parry's approach (Edwards & Parry, 1993), the coefficients achieved via polynomial regression —see Appendix B—were used to plot three-dimensional surfaces in which scientist and environmental components were perpendicular horizontal axes, and the dependent variable was the vertical axis. For each surface, contour lines are drawn on the X,Y plane to help clarify the shape of the surface. The stationary point and principal axes are also projected onto the X,Y plane, provided they lie within the range of the component measures. Component measures are depicted in scale-centered form, that is, centered at their scale midpoints, so as to simplify certain calculations and facilitates the interpretation of the coefficients on X and Y, which then represent the slope of the surface at the center of the X,Y plane (Aiken, West, & Reno, 1991). On the floor of the figure are two conceptual reference lines: (i) the fit line, along which individual and environmental components are equal, and (ii) the misfit line, along scientist and environmental components diverge. As Edwards and Cable noted (2009), response surface analyses are sensitive to influential observations. To detect such observations, I screened results for each regression using leverage, studentized residuals, and Cook's D statistic as criteria. Cases that exceeded the minimum cutoff on all three criteria (Bollen & Jackman, 1990) and were clearly discrepant on plots that combined the criteria were dropped.

As argued in the methodological section —see paragraph 4.6—, the conditions which surround a fit effect are stringent. Figure 5.5 depicts an idealized surface responses that mets all three conditions surrounding fit effect. However, it would be misleading to conclude that failure to support all three conditions rejects the hypothesized fit effect (Edwards, 2001; Edwards & Parry, 1993). The first condition, which requires downward curvature along the misfit line, is necessary to claim support for a value fit effect. The second condition ensures that the dependent variable is maximized when individual and organizational values are congruent, but failure to support this condition does not necessarily preclude a value fit effect. Finally, if the third condition is rejected, meaning the height of the surface varies along the fit line, but the first two conditions are met, then support can be inferred for a value fit effect with the caveat that the maximum value of the outcome depends on whether individual and organizational values are low or high.

Figure 5.5 – An Idealized Surface Response



These conditions are prioritized using Edward and Cables' approach (Edwards & Cable, 2009): if the first and second conditions were met, then support for a value fit effect was inferred (Edwards, 2007). If the first condition was met, but the second condition was not, I examined how the ridge deviated from the fit line by examining the slope and intercept of the first principal axis (Edwards & Parry, 1993). These tests determined whether a fit effect was obtained at particular levels of individual and organizational values. The third condition was tested to assess deviation from the idealized surface, but failure to support this condition was not considered grounds to reject a value fit hypothesis. Table 5.4 reports key features of the surface response model. Table 5.5 summarizes the test of conditions for each scientist- and environmental-component. Test of hypothesis are based on asymptotically derived standard errors based on 10.000 bootstrapped samples.

Table 5.3 – Effects Relating Scientits and Environmental Components to Mediators and Outcomes

Path	H	SW Fit	SS Fit		SJ Fit			SO Fit			
		Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activities	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Scientist-Workgroup Fit → Workgroup Identification	"1"	0.27 ••••									
Scientist-Workgroup Fit → Scientific Performance	"2a"	0.10									
Scientist-Workgroup Fit → Project Contribution	"2b"	0.13 •									
Scientist-Supervisor Fit → Scientific Performance	"3a"		0.23 •••	0.25 ••••							
Scientist-Supervisor Fit → Project Contribution	"3b"		0.25 •••	0.28 ••••							
Scientist-Supervisor Fit → Contextual Performance	"4"		0.28 ••••	0.30 ••••							
Scientist-Job Fit → Scientific Performance	"5a"				0.17 ••	0.17 ••	0.33 ••••				
Scientist-Job Fit → Project Contribution	"5b"				0.20 ••	0.19 ••	0.24 •••				
Scientist-Job Fit → Contextual Performance	"6"				0.35 ••••	0.28 ••••	0.41 ••••				
Scientist-Organization Fit → Organizational Identificati	"7"							0.48 ••••	0.49 ••••	0.40 ••••	0.49 ••••
Scientist-Organization Fit → Contextual Performance	"8"							0.33 ••••	0.34 ••••	0.29 ••••	0.22 ••••

N=264

the paths reported for Values are standardized coefficients estimated from block variables constructed from the five quadratic terms. Standard errors are asymptotically derived based on 10.000 bootstrapped samples. H = Hypothesis

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Table 5.4 – Key Features Describing Surfaces

Path	Fit content	Stationary Points and Principal Axis: Stationary Point		First Principal Axis		Second Principal Axis		Slopes Along Lines of Interest: Y= X		Y=−X		First Principal Axis		Second Principal Axis	
		X_0	Y_0	p_{10}	p_{11}	p_{20}	p_{21}	a_x	a_{x2}	a_x	a_{x2}	a_x	a_{x2}	a_x	a_{x2}
Scientist-Workgroup Fit → Workgroup Identification	Taste for Science	-0.13	0.55	0.52	-0.24	1.12	4.24	0.04	0.19	0.18	0.36	0.07	0.25	9.25	0.75
Scientist-Workgroup Fit → Scientific Performance	Taste for Science	2.04	1.87	3.95	-1.02	-0.12	0.98	0.34	-0.09	-0.03	0.30	-1.27	0.31	0.12	-0.08
Scientist-Workgroup Fit → Project Contribution	Taste for Science	-0.96	-1.13	-1.73	-0.63	0.40	1.60	0.09	0.05	0.06	0.26	0.36	0.19	1.33	0.06
Scientist-Supervisor Fit → Scientific Performance	Knowledge Enhancement Tension	0.00	0.28	0.28	4.13	0.28	-0.24	-0.09	0.11	0.03	-0.09	-0.00	2.11	-0.12	-0.11
	Knowledge Acquisition Tension	0.26	-0.20	-1.96	6.72	-0.16	-0.15	0.08	0.08	0.02	-0.02	-2.61	4.98	0.08	-0.08
Scientist-Supervisor Fit → Project Contribution	Knowledge Enhancement Tension	0.26	0.33	[a]	[a]	0.33	-0.00	-0.10	0.13	0.19	0.13	[a]	[a]	0.04	-0.08
	Knowledge Acquisition Tension	-0.53	0.03	1.25	2.31	-0.20	-0.43	-0.02	0.18	-0.24	-0.25	0.86	0.82	-0.05	-0.20
Scientist-Supervisor Fit → Contextual Performance	Knowledge Enhancement Tension	0.92	-0.16	14.60	-16.04	-0.22	0.06	0.33	-0.07	0.19	-0.00	-52.78	28.66	0.24	-0.15
	Knowledge Acquisition Tension	1.17	0.76	4.51	-3.20	0.40	0.31	0.24	-0.06	0.42	0.33	-6.38	2.73	0.47	-0.12
Scientist-Job Fit → Scientific Performance	Scientist's Decision Autonomy	8.49	11.50	18.63	-0.84	1.38	1.19	0.08	0.00	0.53	0.42	-6.18	0.36	3.04	-0.00
	Centralization of Decision Activities	-0.28	-1.83	-1.75	0.27	-2.89	-3.75	0.13	0.09	0.01	0.05	0.03	0.06	21.48	0.19
	Scientific Incentives	-2.10	-3.04	0.87	1.86	-4.17	-0.54	0.27	0.04	-0.17	-0.13	0.55	0.13	4.05	-0.10
Scientist-Job Fit → Project Contribution	Scientist's Decision Autonomy	-6.34	-4.38	-11.87	-1.18	0.99	0.85	0.10	0.02	0.52	0.47	7.21	0.57	1.59	0.01
	Centralization of Decision Activities	-3.58	-2.07	-7.60	-1.54	0.25	0.65	0.09	0.03	0.10	0.24	3.04	0.42	0.39	0.01
	Scientific Incentives	-0.42	-0.76	0.56	3.14	-0.90	-0.32	0.15	0.10	-0.10	-0.05	0.68	0.81	0.49	-0.06
Scientist-Job Fit → Contextual Performance	Scientist's Decision Autonomy	0.63	2.62	3.04	-0.67	1.68	1.49	0.33	-0.01	0.97	0.73	-0.70	0.55	4.54	-0.06
	Centralization of Decision Activities	-1.19	-0.40	-1.92	-1.28	0.53	0.78	0.22	0.14	0.20	0.29	0.91	0.38	1.01	0.11
	Scientific Incentives	2.31	0.51	18.72	-7.90	0.22	0.13	0.33	-0.01	0.34	0.08	-30.31	6.57	0.38	-0.07
Scientist-Organization Fit → Organizational Identification	Altruism	-0.63	-0.10	0.39	0.78	-0.92	-1.29	0.15	0.13	-0.25	-0.59	0.15	0.12	1.73	-0.80
	Economic Inducements	11.64	16.98	1.82	1.30	25.92	-0.77	0.74	-0.03	-0.49	-0.24	0.86	-0.04	-37.41	-0.20
	Prestige	-2.17	3.26	4.34	0.50	-1.07	-1.99	0.26	0.19	-0.32	-0.04	0.59	0.14	3.54	-0.18
	Security	-1.07	-1.97	0.41	2.22	-2.46	-0.45	0.29	0.05	-0.20	-0.29	0.69	0.32	1.73	-0.21
Scientist-Organization Fit → Contextual Performance	Altruism	-1.37	-1.23	0.36	1.16	-2.42	-0.86	0.15	0.06	-0.13	-0.37	0.19	0.07	3.55	-0.32
	Economic Inducements	3.28	0.86	1.67	-0.24	-12.55	4.09	0.97	-0.35	-0.48	-0.14	0.07	-0.01	-98.10	-4.17
	Prestige	4.22	0.01	17.73	-4.20	-0.99	0.24	0.35	0.02	-0.07	0.12	-13.80	1.64	-0.24	-0.02
	Security	-0.32	4.12	3.28	-2.64	4.24	0.38	0.26	-0.10	-0.14	-0.05	-0.11	-0.17	3.25	-0.06

N=264

a. Equation is undetermined.

Table 5.5- Test of Conditions for Value Congruence

Path	Fit content	Conditions on Surface Shape [1][a]	[2][b]	[3][c]	Congruence Effect
Scientist-Workgroup Fit → Workgroup Identification	Taste for Science	H_0 •	H_0 •••	H_0 •••	
Scientist-Workgroup Fit → Scientific Performance	Taste for Science	H_0 •	H_0 ••	H_0 •••	
Scientist-Workgroup Fit → Project Contribution	Taste for Science	H_0 •	✓	H_0 •	
Scientist-Supervisor Fit → Scientific Performance	Knowledge Enhancement Tension	✓	✓	H_0 •	✓
	Knowledge Acquisition Tension	✓	✓	H_0 •	✓
Scientist-Supervisor Fit → Project Contribution	Knowledge Enhancement Tension	H_0 •	H_0 ••••	H_0 •	
	Knowledge Acquisition Tension	✓	✓	H_0 ••	✓
Scientist-Supervisor Fit → Contextual Performance	Knowledge Enhancement Tension	✓	H_0 •••	H_0 •••	✓
	Knowledge Acquisition Tension	H_0 •	H_0 •	✓	
Scientist-Job Fit → Scientific Performance	Scientist's Decision Autonomy	H_0 ••	H_0 ••••	✓	
	Centralization of Decision Activities	✓	✓	✓	✓
	Scientific Incentives	✓	✓	H_0 ••	✓
Scientist-Job Fit → Project Contribution	Scientist's Decision Autonomy	H_0 ••	H_0 ••••	✓	
	Centralization of Decision Activities	H_0 •	H_0 ••	H_0 ••	
	Scientific Incentives	✓	✓	H_0 •	✓
Scientist-Job Fit → Contextual Performance	Scientist's Decision Autonomy	H_0 •••	H_0 ••••	✓ •••	
	Centralization of Decision Activities	H_0 ••	H_0 •	H_0 ••	
	Scientific Incentives	✓	✓	H_0 ••	✓
Scientist-Organization Fit → Organizational Identification	Altruism	✓	✓	H_0 ••••	✓
	Economic Achievements	✓	H_0 •••	H_0 ••••	
	Prestige	✓	H_0 ••	H_0 ••••	✓
	Security	✓	H_0 ••	H_0 •••	✓
Scientist-Organization Fit → Contextual Performance	Altruism	✓	✓	H_0 ••	✓
	Economic Achievements	✓	H_0 ••••	H_0 ••••	
	Prestige	✓	✓	H_0 •••	✓
	Security	✓	✓	✓	✓

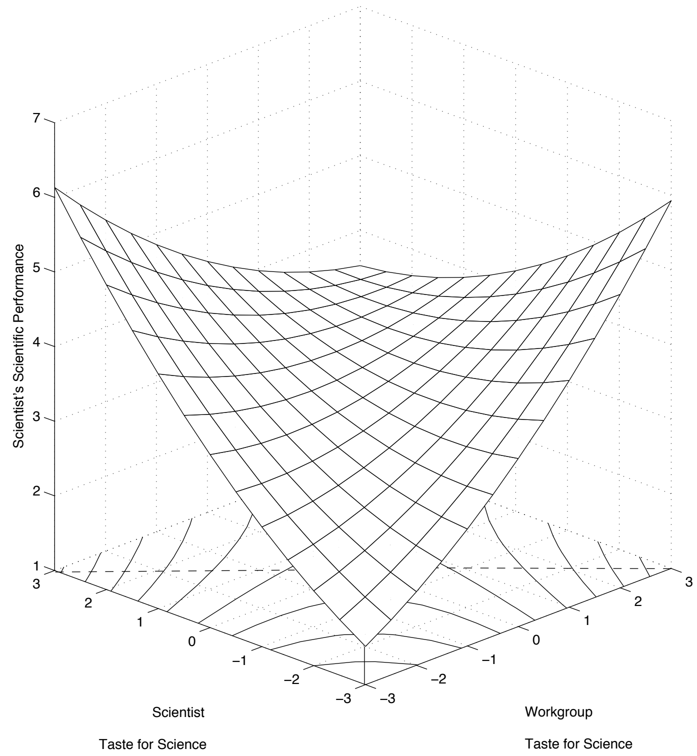
N=264

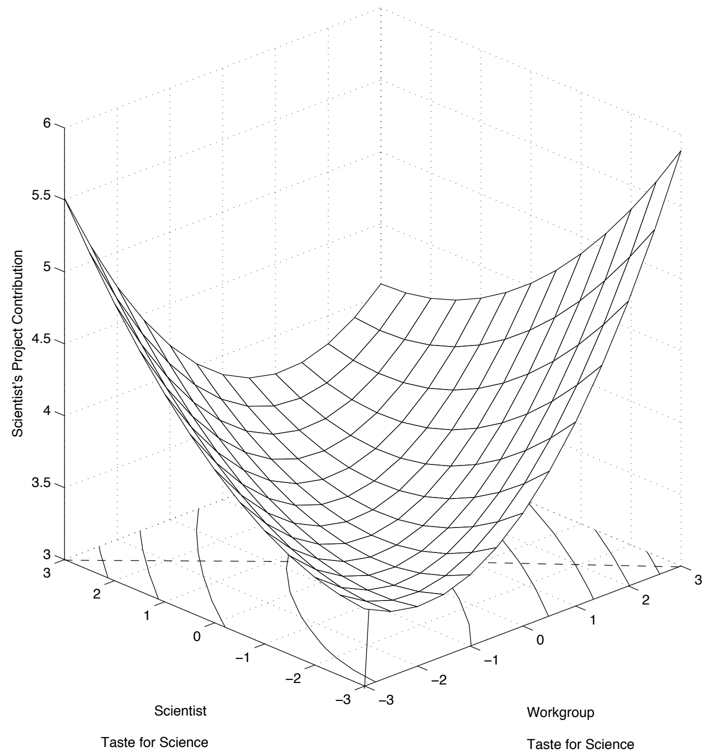
Table entries indicate which of the three conditions for a value congruence effect were met. Condition 1 stipulates that the surface is curved downward along the incongruence line, Condition 2 indicates that the ridge of the surface runs along the congruence line, and Condition 3 states that the surface is flat along the congruence line. H0 means that a condition was not met, in that the null hypothesis is rejected.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Recall that Hypothesis 1 predicted that value fit would be positively correlated with workgroup identification. As shown in Table 5.3, the path relating scientist and workgroup taste for science to workgroup identification was statistically significant (p-value <..001). According to my conceptual model this path also equals the total effect of scientists and environment attributes on workgroup identification. To determine whether the path from taste for science to workgroup identification signified a value fit effect, I examined whether the three conditions for fit were satisfied, as shown in Table 5.5. The first condition was not filled, meaning that the surface was not curved downward along the misfit line. The second condition was not met, indicating that the ridge of the surface deviated significantly from the fit line —the statistical test is concordant with the estimated parameters of the principal axis, reported in uppers section of Table 5.4. Analogously, the third condition was not met, suggesting that workgroup identification vary along the line of fit. All in all, these results did not give support for the hypothesized fit —see the far right column of Table 5.5—. Figure 5.6a depicts the surface response model that links taste for science at scientist- and workgroup level to scientist's identification with the workgroup. This surface has two local peaks positioned along the misfit line (Y=-X). Hypothesis 2 predicted the positive influence of SW fit — on task performance —e.g., scientific performance and project contribution—. Conversely, competing hypothesis 2' predicted a negative influence of SW fit on task performance. According to inferential tests, taste for science at individual-and workgroup level did not influence scientific performance of scientists. Conversely, taste for science exerted a statistically significant effect (p-value < .10) on scientist's project contribution. The evaluation of properties of the surface led to refuse all three conditions for fit effect. As shown in Figure 5.6c the surface was not curved downward along the misfit line —on the contrary two local peaks were localized along the misfit line—. The second condition was not met, indicating that the ridge of the surface deviated significantly from the fit line. The null hypothesis related to the third condition was also refused, indicating that height of the surface did vary along the fit line.

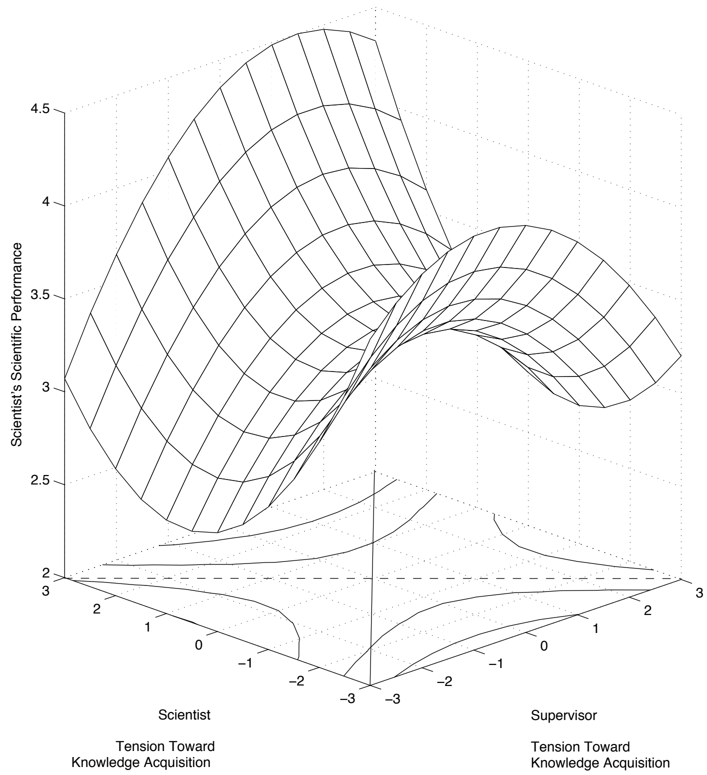
Figure 5.6 – Surface Response Relating SW Fit to Workgroup Identification and task Performance





Hypothesis 3 stated that SS would be positively correlated with task performance of scientists. As shown in Table 5.3, the path relating scientist and supervisor components was statistically significant (p-value <..001) (p-value < .001) for both fit contents —tension toward knowledge enhancement and tension toward knowledge acquisition—, as shown in the middle section of Table 5.3. Figures 5.7a and 5.7b illustrate how scientist- and supervisor tension toward acquisition and enhancement of knowledge related to scientist's scientific performance. The evaluation of surfaces indicated moderate support of a fit effect—see the upper section of Table 5.5—. The first condition was met, indicating that both surfaces were curved downward along the misfit line. The second condition was also met. The location of the ridge indicates that scientific performance is maximized by tension toward knowledge production when scientist and supervisor tensions are congruent as evidenced by the point at which the first principal axis (i.e., the solid line running diagonally across the floor of the surface) crosses the fit line. The third condition was not met because of the positive slope of the surface along the fit line. This positive slope means that, overall, scientific performance was higher when scientist and supervisor tension toward knowledge production were both high than when both were low. As shown in Table 5.5 I also averaged the coefficient estimates for the five quadratic terms across the two fit contents —see the far right column of Table 5.5—. The results of these analyses are summarized in the far right column of Table 3. Hypothesis 3b —referring to SS fit influence on scientist's project contribution— received strong support (p-value < .001 for fit on knowledge enhancement, while p-values < .0001 for fit on knowledge acquisition). However, the shape of the surface substantially varied across the content of fit. As can be seen in Figure 5.7c knowledge acquisition tension of scientist and supervisor jointly affect scientist's project contribution. Th evaluation of the surface highlighted that conditions for fit effect hold. The first condition was met, indicating the downward curvature of the surface along the misfit line. The second condition received partial support due to the shift and slight rotation of the ridge off the fit line —the slope on the c. The third condition was not fulfilled, in that the slope of the surface along the fit line was positive. Figure 5.7d depicts the surface relating scientist and supervisors tension toward knowledge enhancement to individual project contribution. Nor of the three conditions for a fit effect were satisfied.

Figure 5.7 – Surface Response Relating SS Fit to task Task Performance



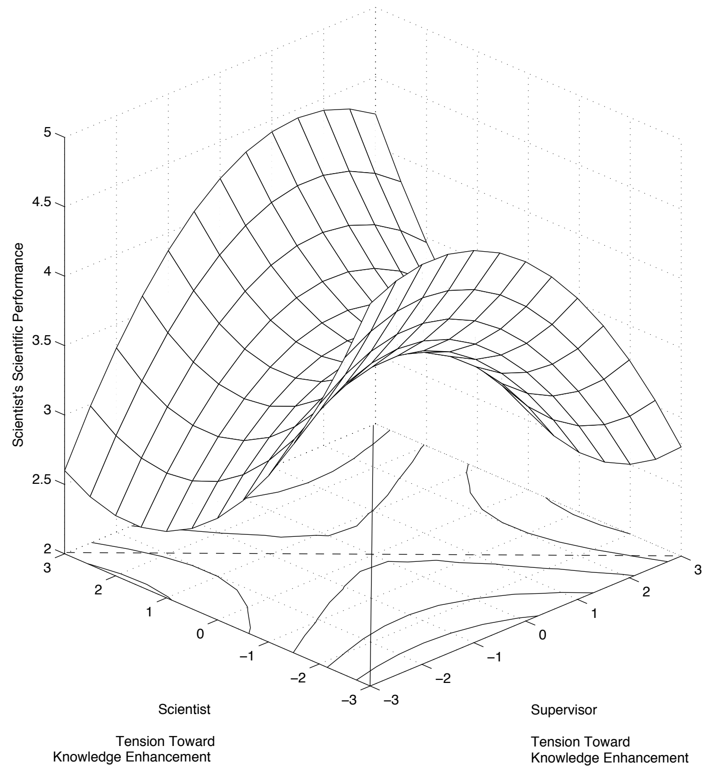
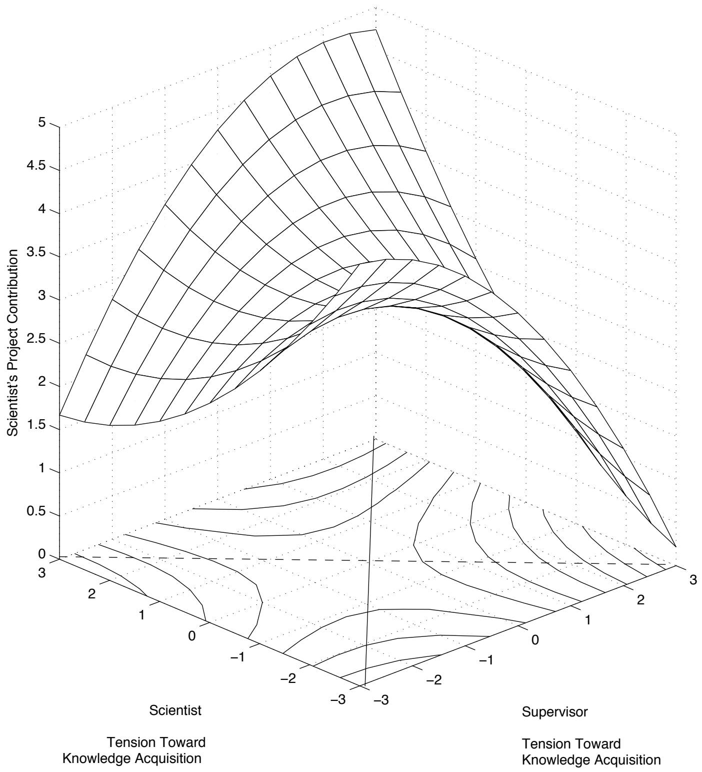
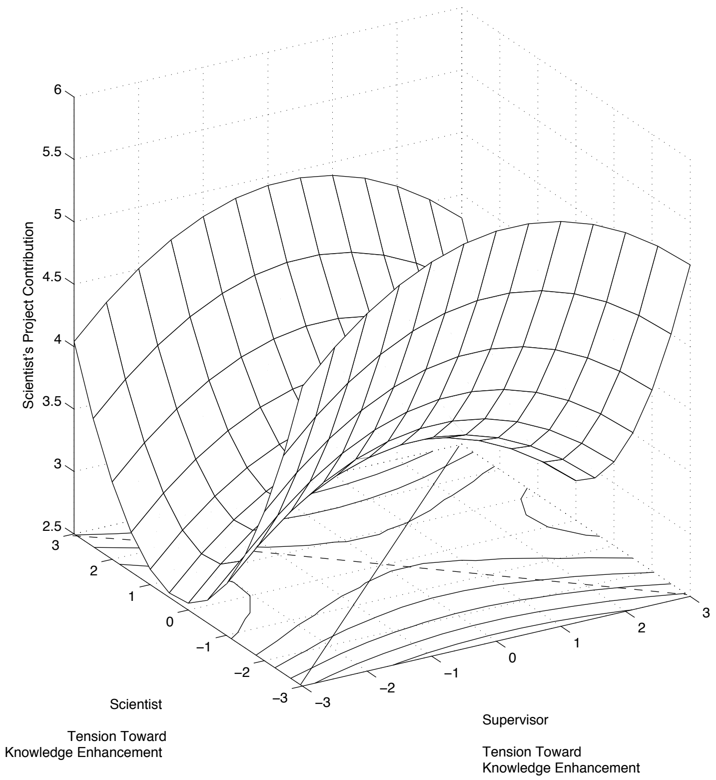


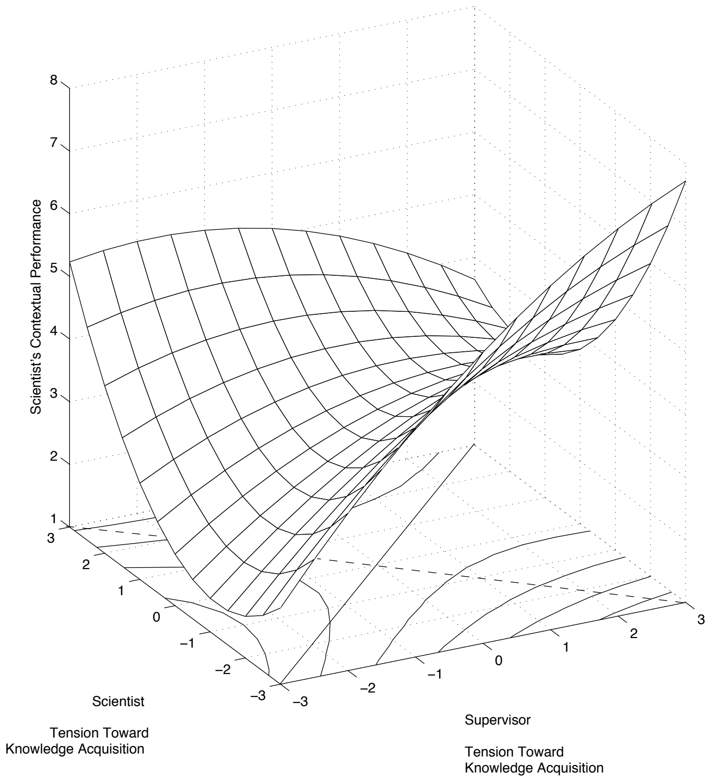
Figure 5.7 – Surface Response Relating SS Fit to task Task Performance

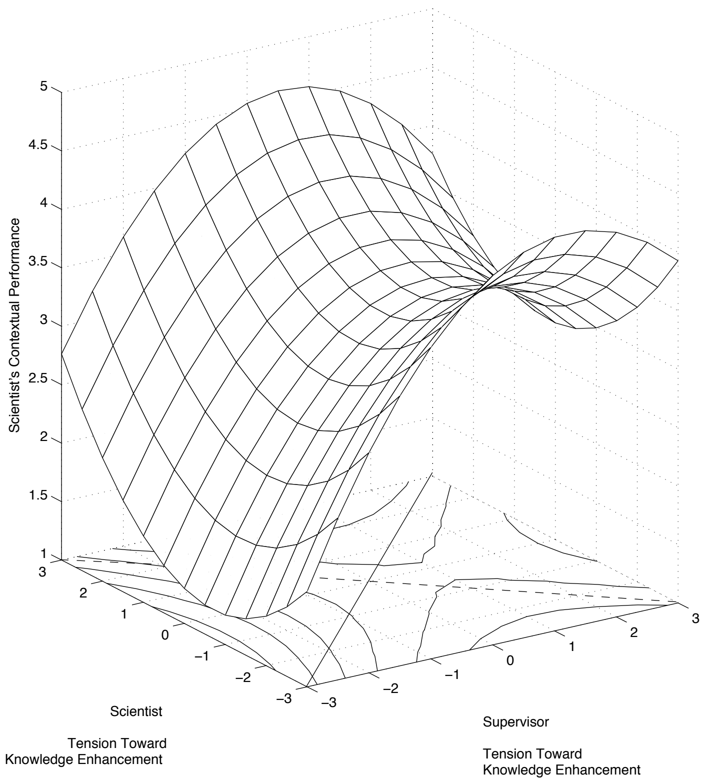




Hypothesis 4 stated that SS fit would be positively correlated with contextual performance of scientists. The middle section of Table 5.3 shows that scientist and supervisor claims for knowledge production were related to contextual performance —for both knowledge acquisition tension and knowledge enhancement tension—. Figure 5.7e depicts the relation among scientist and supervisor knowledge acquisition tension and contextual performance at the individual level. The evaluation of the surface indicates that fit effect did not operate in this case. The first condition did not hold, suggesting that surface was not downward curved off the fit line. At the same time, the second condition was not verified, suggesting that the ridge of the surface significantly deviated from the fit line —this was evident from the parameters of the first principal axes reported in Table 5.4—. Conversely, the third condition was filled in that the slope along the fit line was not significantly different from zero. Figure 5.7f depicts the surface that relates scientist and supervisor knowledge enhancement tension to contextual performance. The hypothesized fit effect received little support. The shape of the surface was inconsistent with both condition 2 and 3 as well. The ridge of the surface is markedly rotated respect to the fit line and the height of the surface substantially varied along the misfit line. Conversely, the first condition was filled, indicating that the expected contextual performance is lower when scientist and supervisor claim's for knowledge production diverge.

Figure 5.7 – Surface Response Relating SS Fit to task Contextual Performance

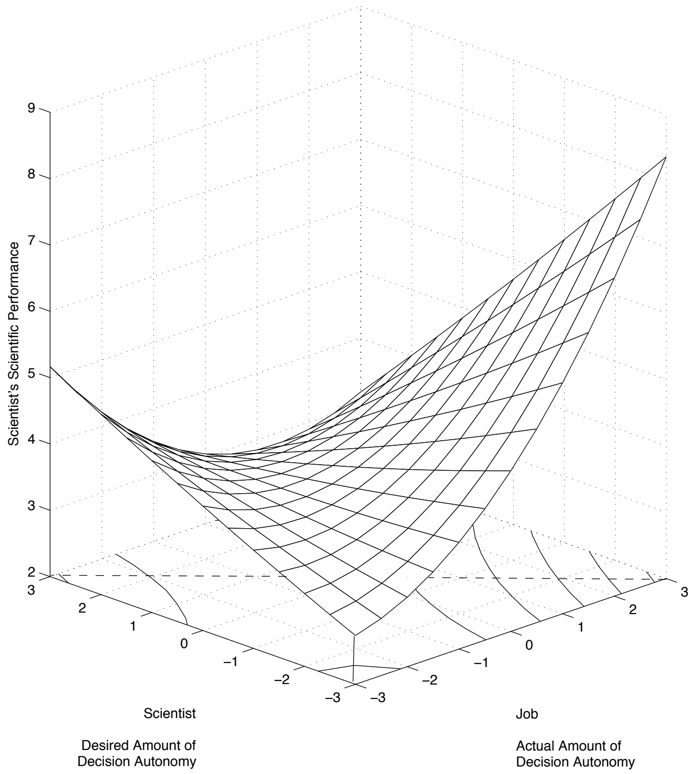


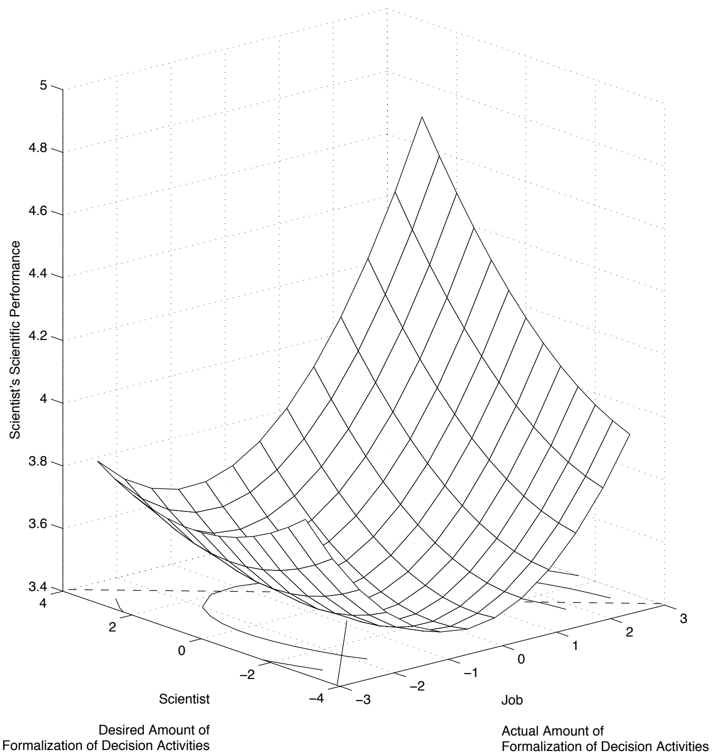


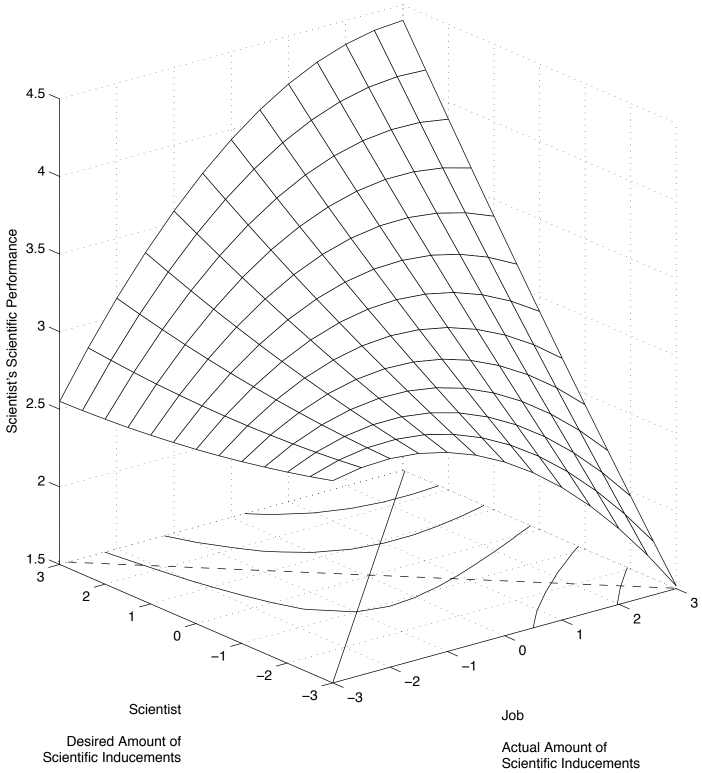
Hypothesis 5, stated that SJ fit would be positively correlated with task performance. As shown in the middle section of Table 5.3 the joint influence of scientist and job level features is statistically significant and robust across different content of fit —recall that individuals are compared to their job along actual Vs. desired decision autonomy, actual Vs. desired formalization of decision activities, actual Vs. desired scientific inducements—. Figure 5.8a relates scientist's claims for decision autonomy, autonomy provided by the job and scientist's scientific performance. Though the joint impact was statistically significant (p-value $< .005$), evidences did not support the existence of a fit effect. The surface is curved upward at low levels of scientist's claims for autonomy and high levels of autonomy provided by the job. The second condition was not met, suggesting that the ridge significantly deviated from the fit line. Conversely, the third condition was filled, as confirmed by slope of the surface along the misfit line. Figure 5.8b that relates scientist's claims for formalization of decision activities, formalization provided by the job and scientific performance. As shown in the middle section of Table 5.3 the join impact of scientist and job level decision formalization is statistically significant ($p < .005$). The evaluation of the surface offered moderate support of a fit effect. Scientific performance is maximized when scientist and job elements are both high, but the ridge of the slope increases along the fit line. Moreover the surface is curved downward only when scientist and job elements are both high, thus violating the second condition for fit. Figure 5.8c relates claims for scientific inducements provision, actual scientific inducements and scientific performance. The joint impact was statistically significant (p-value $< .001$), and consistent with the fit hypothesis. Evidences support the first condition, stating that the surface was curve downward off the fit line. The second condition was also met, indicating that the ridge of the surface did not deviate significantly from the ideal condition, where the principal axis runs along the fit line. Conversely, the third condition was not verified — as evident by the visual inspection the height of the surface varied alone the fit line, meaning that the joint impact of scientist and job level components vary according to the absolute levels of the components—. Figure 5.8d depicts the surface linking scientist's claims for decision autonomy, decision autonomy provided by the job and scientist's project contribution. The joint impact was statistically significant (p-value $< .05$), as shown in the lower section of Table 5.3. Figure 5.8e depicts the underlying surface, whose shape is inconstant with the hypothesized fit effect. The surface has two local peaks corresponding to high individual level - low environmental level and low individual level - high environmental level. Moreover the ridge of the surface is shifted and rotated respect to the principal axis. The height of the surfaces did not change significantly along the fit line, but this was irrelevant given that other conditions were not met. Figure 5.8f relates scientist's claim for formalizaton of decision activities, formalization characterizing the job and scientist's project contribution.

Though the joint impact was statistically significant (p-value < .05), the evaluation of the surface indicated that conditions for fit effect were not met —see the lower section of Table 5.7 —. The surface has a single peak at moderate levels of scientist and job formalization. The second condition was also violated —as evident in Figure 5.8f the ridge of the surface resulted in a shift and rotation from the fit line—. Finally, the third condition was violated, since the height of the surface markedly varied along the fit line. Figure 5.8g relates scientist's claim for scientific inducements and scientific inducements provided by the job. The joint impact of scientist and job level components was statistically significant (p-value < .01) and resulted in a fit effect. Test of conditions reported in the lower section of Table 5.4 indicated the surface has a downward curvature off the fit line —thus the first condition was achieved—, the ridge did not deviate in a significant way from the fit line —that is the second condition—. The third condition was not fill, indicating that the height of the surface was not constant along the fit line. However, this is not sufficient condition to reject the existence of a fit effect.

Figure 5.8 – Surface Response Relating SJ Fit to Task Performance






Scientist's Scientific Performance
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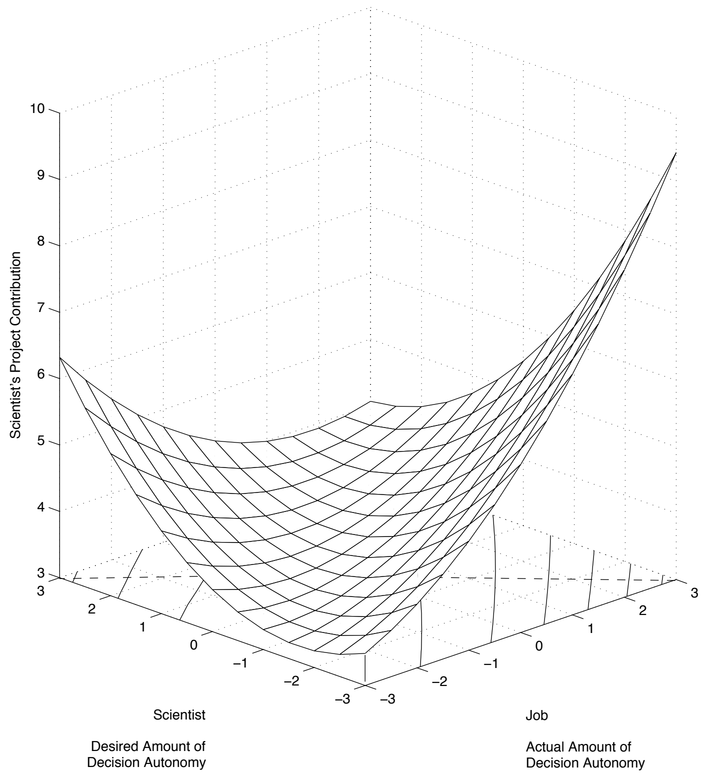
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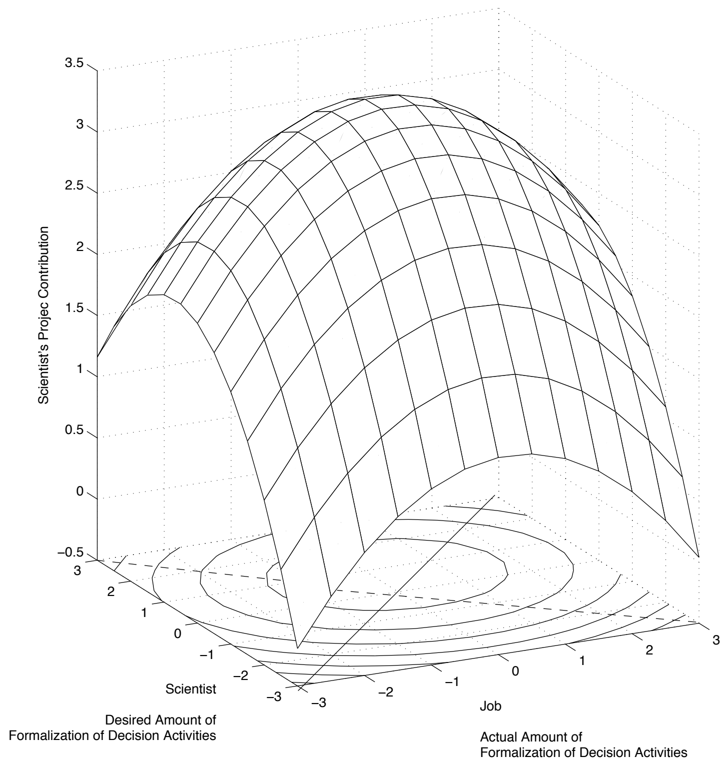
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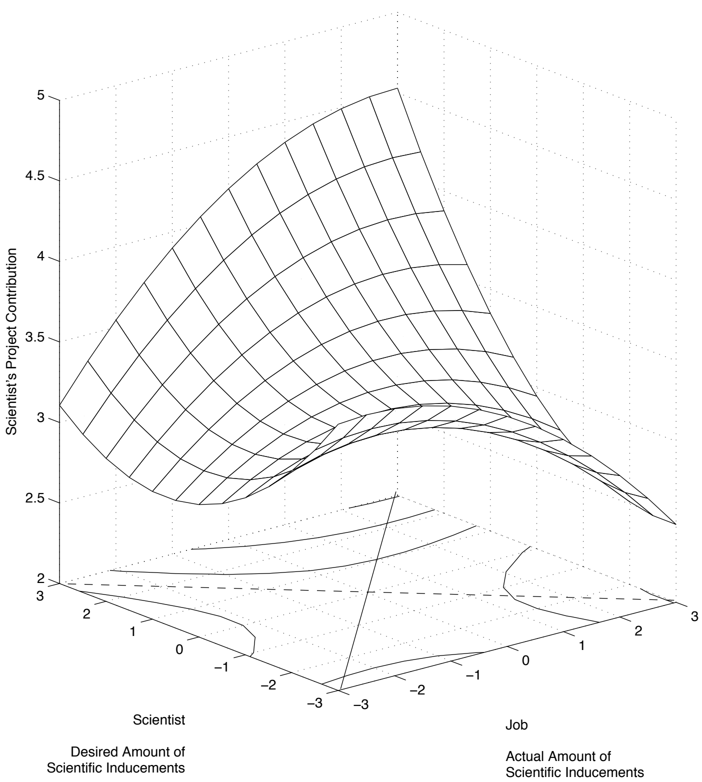
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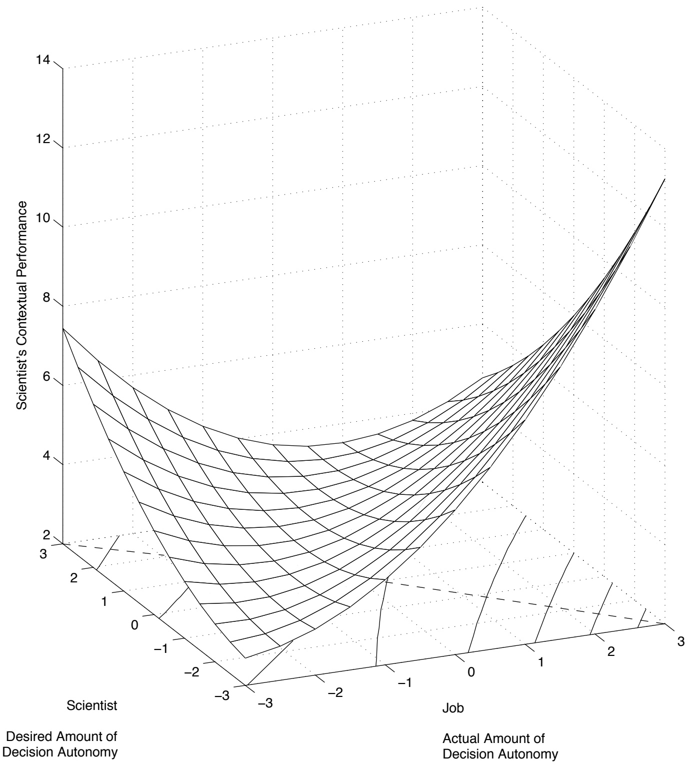
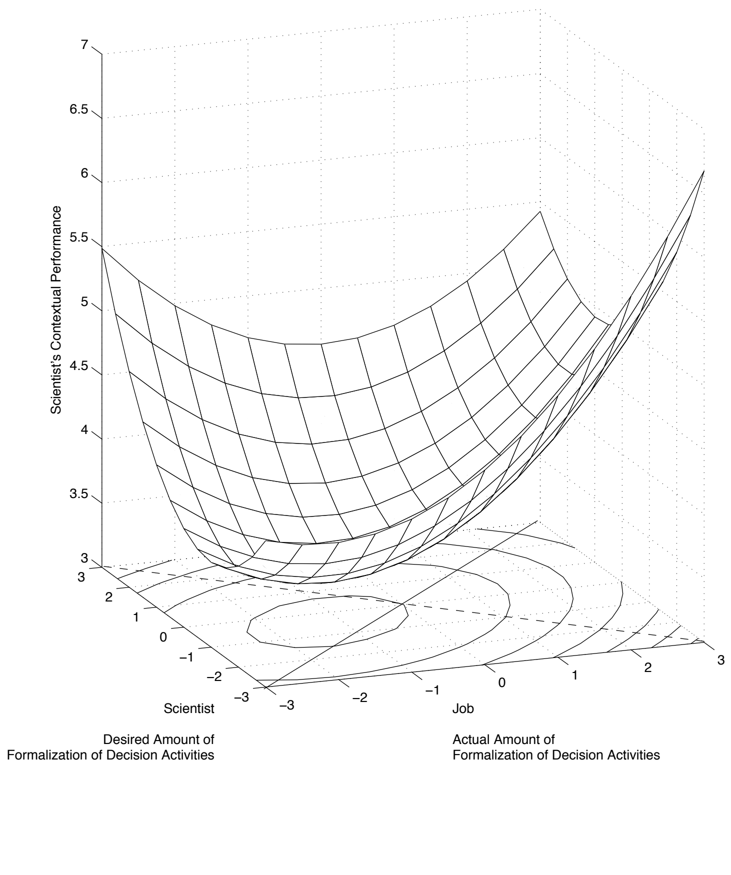
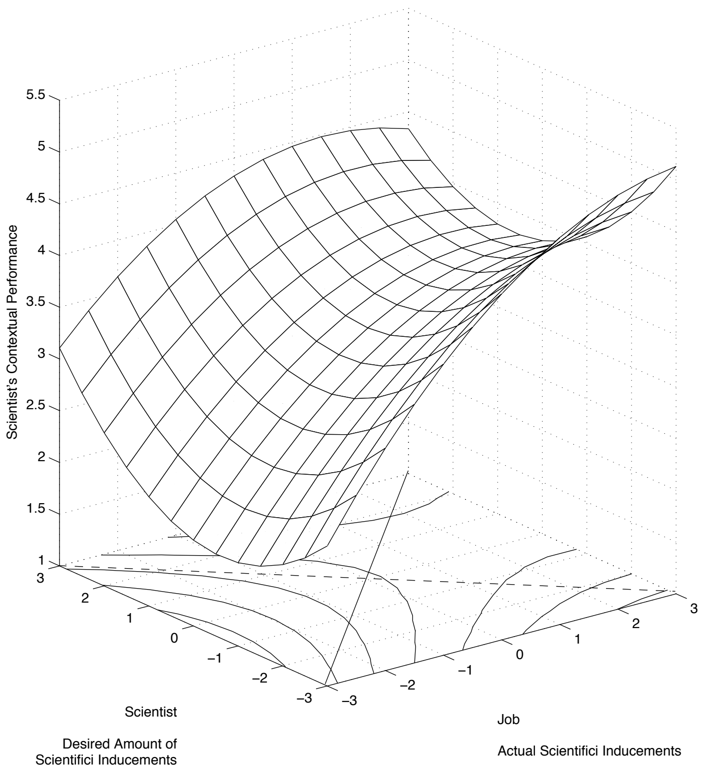
Scientific Inducements

Hypothesis 6 stated that SJ fit would positively influence the contextual performance of scientists. As shown in the lower section of Table 5.3 the joint impact of scientist and job level omponents was statistically significant across different fit contents (p-values are lower than .001). Figure 5.8g relates scientist's claim for decisional autonomy, decision autonomy granted by job and contextual performance. The evaluation of the surface indicated that the impact did not result in a fit effect. Two local peaks emerged off the fit line, thus violating the first condition of downward curvature. The second condition —referring to the principal axis— was also violated, as evident in estimated parameters —see Table 5.4—. The third condition was filled, meaning the expected contextual performance did not vary when the scientist and job level are congruent, independently to absolute levels of components. Figure 5.8h depicts the relation between scientist's claims for formalization of decision activities, formalization implied by job level features and contextual performance. The joint impact did not result in a fit effect. The surface has two local peaks corresponding to high individual level - low environmental level and low individual level - high environmental level. Moreover the ridge of the surface was shifted and rotated respect to the principal axis. Finally, the height of the surface did not change significantly along the fit line —but this was irrelevant given that other conditions were not met—. Figure 5.8i relates scientist's claim for scientific inducements, scientific inducements granted by the job and contextual performance. The hypothesized fit effect received moderate support. Contextual performance was maximized when scientific inducements provided by the job are high, and scientist's claim were very high or very low. On the other hand the expected performance was higher on the fit line when scientific inducements were low to moderate. The second condition was violated, as evident in parameters of the first principal axis —see the lower section of Table 5.4—.The third condition was not met, meaning the slope of the surface raises along the fit line.

Figure 5.8 – Surface Response Relating SJ Fit to Contextual Performance



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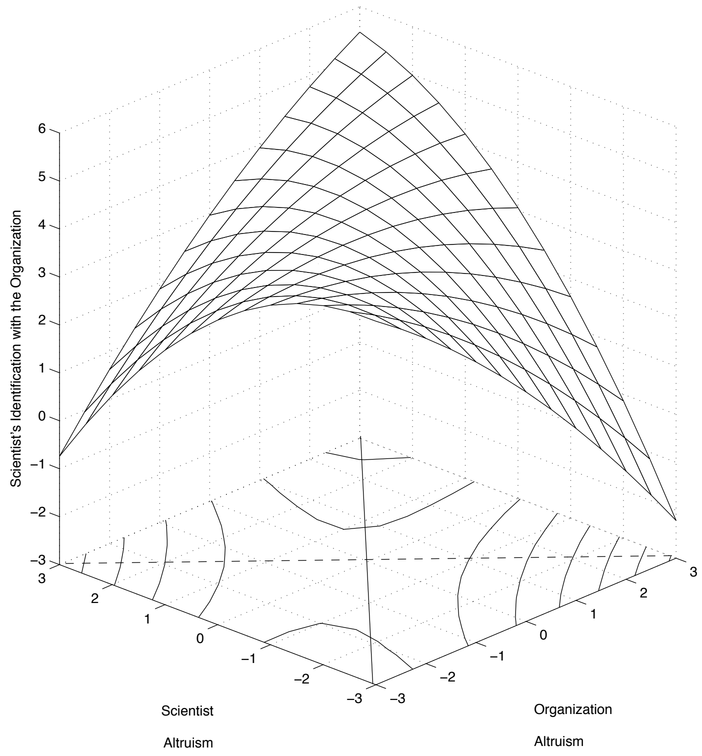
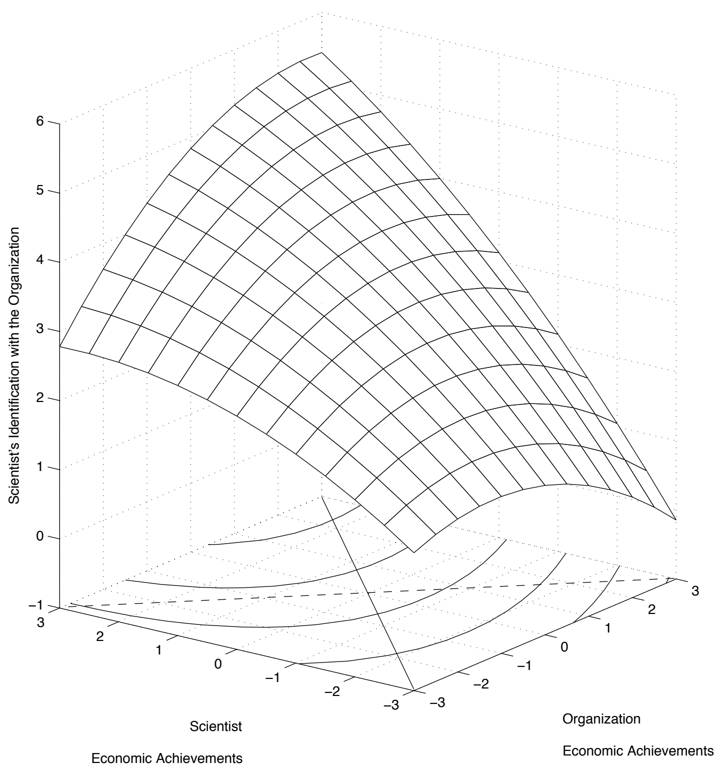
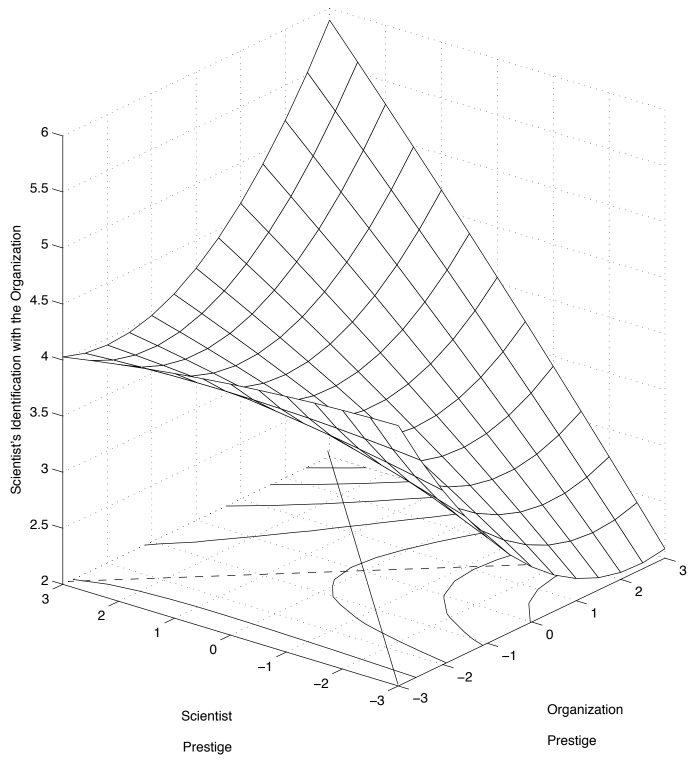
Hypothesis 7 stated that SO fit would positively influence organizational identification of scientists. As shown in the lower section of Table 5.4 the joint impact of scientist and organizational values on organizational identification is statistically significant (p-values are lower than .001) and robust across different fit contents—recall that individuals are compared to their organizations along altruism, economic achievements, prestige and security—. Figure 5.9a relates scientist and organization importance of altruism as a value, and organizational identification. The fit effect received support in this case. The surface is —symmetrically— curved downward off the fit line —condition 1—. Moreover, the ridge of the surface did not significantly deviate from the fit line, indicating the presence of a series of single peaks are associated to a given value of scientist or organization components. The third condition, regarding the height of the surface along the fit line, was not met —see the lower section of Table 5.4—. This was also evident by the slope of the surface along the principal axis an the fit line as well. According to my rule this violation did not lead to reject the presence of a fit effect relating altruism value to scientist's organizational identification. Figure 5.9b relates scientist and organization importance of economic achievements to organizational identification. The fit hypothesis received moderate support in this case. The first condition was filled, meaning the surface is curved downward off the fit line. The second and third condition were not. The principal axis significantly resulted in a shift and rotation respect to the fit line, as confirmed by the intercept and slope —see the lower section of Table 5.4—. Moreover, organizational identification was maximized only when scientist and organization economic achievements were both high. Figure5.9c illustrates the relation among scientist's importance of prestige, importance of prestige for the organization and organizational identification. The evaluation of the surface provided little empirical support for the existence of a fit effect. Organizational identification rapidly grows when scientist and organization components are high. The ridge of the surface was shifted and rotated respect to the fit line —as confirmed by the estimates of the first principal axis, report in the lower section of Table 5.4—. The third condition concerning the slope of the surface along the fit line was obviously rejected. Figure 5.9d relates security to organizational identification. The hypothesis that joint impact of scientist and organization operate through fit effect received moderate support. The first condition was met, indicating that the surface is downward curved off the fit line. The second condition was not supported in that the first principal axis experimented a marked rotation respect to the fit line. The third condition was not met, indicating the height of the surface significantly varied along the fit line.

Figure 5.9 – Surface Response Relating SO Fit to Organizational Identification






Scientist's Identification with the Organization
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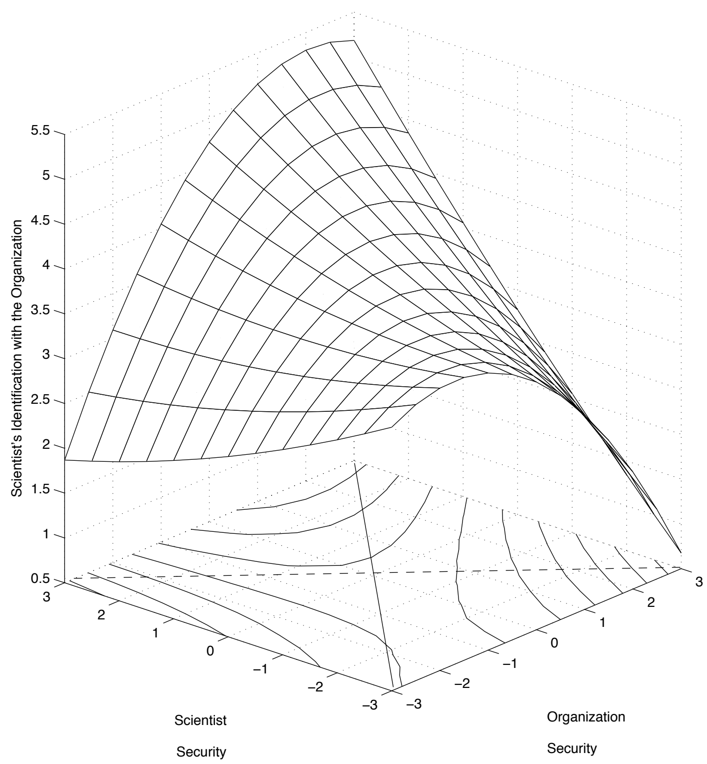
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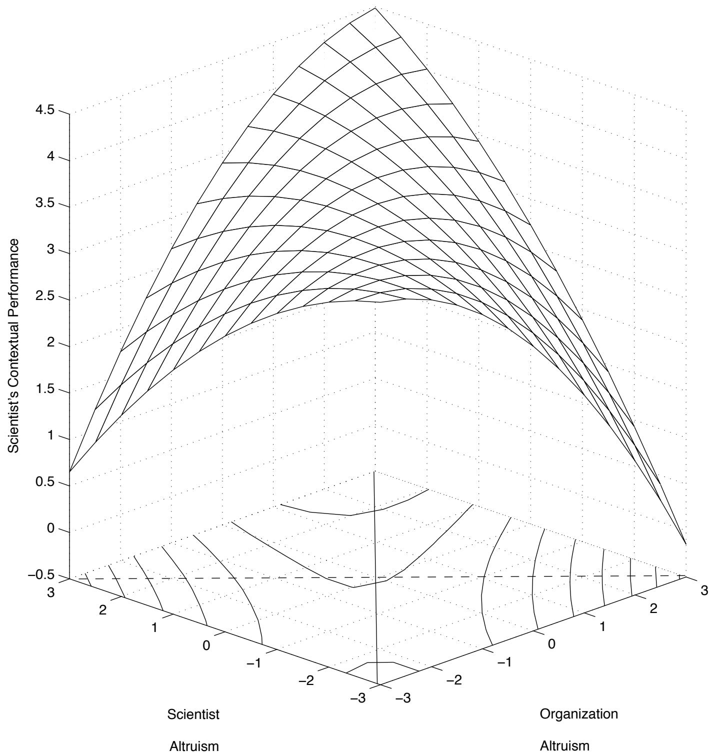
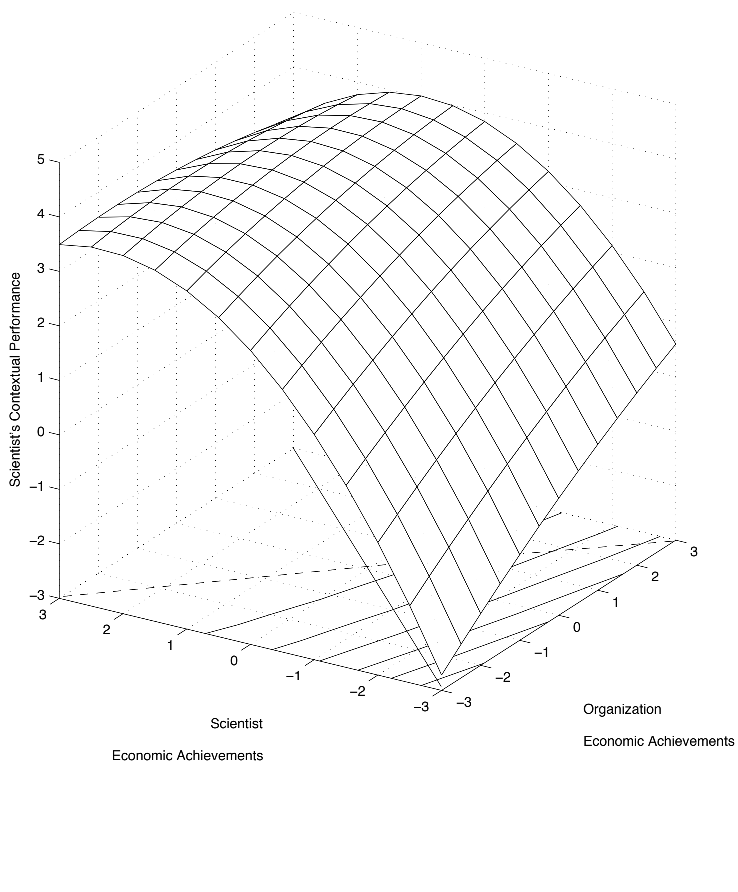
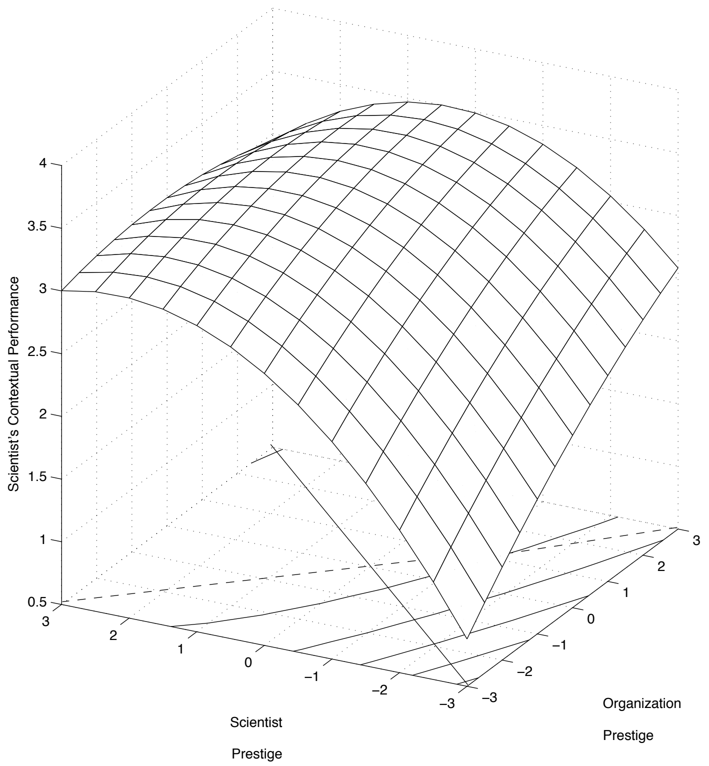
Hypothesis 8 stated that SO fit would positively influence contextual performance of scientists. As shown in the lower section of Table 5.4 the joint impact of scientist and organizational values is statistically significant (p-values are lower than .001). Figure 5.9e links altruism as a value to organizational identification. The evaluation of the surface confirmed the hypothesized fit effect. The curvature of the surface is consistent with condition 1, as confirmed by the fact that organizational identification presents a single peak for each value of scientist/environment component. The second condition —concerning the ridge of the surface— was filled indicating that the principal axis did not significantly deviate from the first principal axis. The third condition was not met, indicating a variation in the height of the surface along the fit line —as remarked this was not a necessary condition to refuse the fit hypothesis—. The relation among economic achievements importance and contextual performance is depicted in Figure 5.9f. The fit effect was rejected in this case. Contextual performance is maximized when scientists consider economic achievements important, disregarding the absolute level of the organization component. Figure 5.9g deals with the relation among prestige as a value and contextual performance. The fit effect in this case received moderate support. The first condition was satisfied —however p-value was near to critical threshold of .10—, indicating a downward curvature of the surface off the fit line. The second condition was also filled —also in this case p-value was near to critical threshold of .10—, suggesting that the first principal axis significantly deviated from the fit line. Finally, Figure 5.9h relates security to contextual performance. The hypothesized fit effect received strong support —see the lower section of Table 5.4—. All three conditions were satisfied. Given the level of scientist/organization component, organizational identification reach a peak along the fit line. Furthermore, the ridge of the surface did not significantly deviate from the fit line. The third condition was also met, indicating that the height of the height of the surface did not vary significantly along the fit line —the slope of the surface along the fit line reinforced the result of the inferential test—.

Figure 5.9 – Surface Response Relating SO Fit to Contextual Performance






Scientist's Contextual Performance
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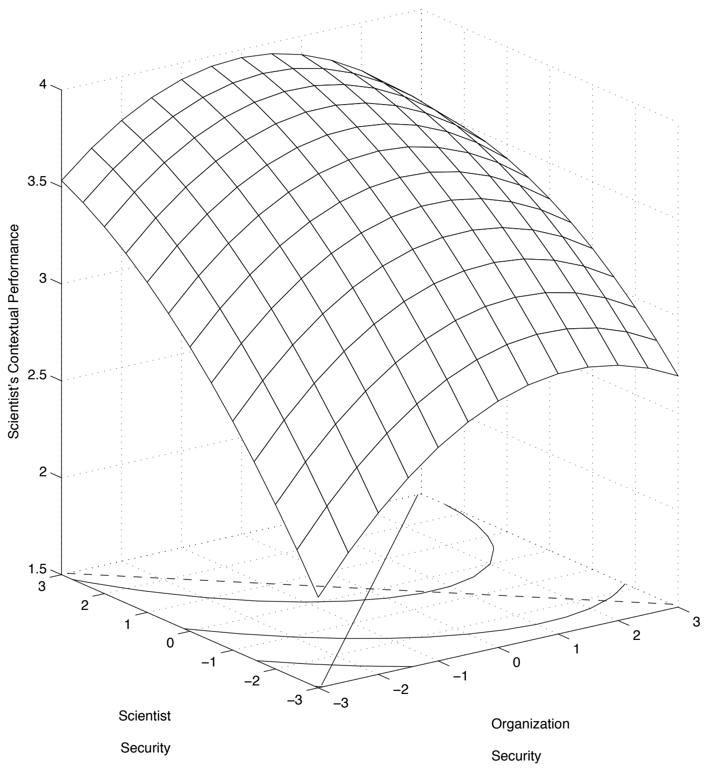
Scientist's Contextual Performance
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Security

Test of Hypothesis Indirectly Relating Fit to Mediators and Outcomes

Results for hypotheses indirectly relating fit to outcomes and the mediators to outcomes are reported in Table 5.6. Hypothesis 9 predicted that workgroup identification would be negatively correlated with scientist's contextual performance. As shown in the upper section of Table 5.6, the path from workgroup identification was positive and statistically significant (p-value < .01). Taking into account the paths relating SW fit to contextual performance transfer yields the direct, indirect and total effects reported in the lower section of Table 5.6. Results indicated that SW fit transfer was positively related to contextual performance, even when the indirect effects relating was considered. Hypotheses 10 stated that organizational identification would be positively correlated with contextual performance. As shown in the lower section of Table 5.6, this hypothesis received strong empirical support (p-value < .0001)Hypotheses 11 predicted that workgroup identification would be positively related to intra-workgroup knowledge transfer. As shown in the upper section of Table 5.6, the path from workgroup identification to intra-workgroup knowledge transfer was positive and statistically significant (p-value < .001). Moreover, estimates indicated that workgroup identification transmitted around the 25% percent of the effect of SW fit on intra-group knowledge transfer.. Hypothesis 12 predicted that organizational identification would be positively correlated with extra-workgroup knowledge transfer. This hypothesis received moderate empirical support (p-values < .05), as shown in the lower section of Table 5.6. Hypothesis 13 stated that workgroup identification would be negatively correlated with extra-workgroup knowledge transfer. This hypothesis did not found empirical support, as shown in the upper section of Table 5.6. Finally, Hypothesis 14 stated that organizational identification would be positively correlated with extra-workgroup knowledge transfer. This hypothesis was supported (p-value < .05) as shown in the middle section of Table 5.6.

Table 5.6 – Effects Relating Mediators to Outcomes

Path	H	Path Coefficient	SW Fit	SS Fit		SJ Fit			SO Fit			
			Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activities	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Workgroup Identity → Contextual Performance	"9"	0.17 ••										
Scientist-Workgroup Fit → Contextual Performance												
Direct Effect			0.23 •••									
Indirect Effect (via Workgroup Identification)			0.02									
Total Effect			0.25 •••									
Proportion of the effect that is mediated (%)			9.16									
Workgroup Identity → Intra-Workgroup Knowledge Transfer	"11"	0.21 •••										
Scientist-Workgroup Fit → Intra-Workgroup Knowledge Transfer												
Direct Effect			0.13 •									
Indirect Effect (via Workgroup Identification)			0.04 •									
Total Effect			0.18 ••									
Proportion of the effect that is mediated (%)			23.86									
Workgroup Identity → Extra-Workgroup Knowledge Transfer	"13"	0.11										
Scientist-Workgroup Fit → Extra-Workgroup Knowledge Transfer												
Direct Effect			0.23 •••									
Indirect Effect (via Organizational Identification)			0.01									
Total Effect			0.24 •••									
Proportion of the effect that is mediated (%)			4.12									

N=264

For predictors represented as single variables standardized regression coefficients whre used as path coefficients. For scientist and environment components the reported paths are standardized coefficients estimated from block variables that involve the five quadratic terms (see text). The indirect and total effects that involved products of path coefficients were tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrapped samples. H=Hypothesis.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Table 5.6 – Cont'd

Path	H	Path Coeffi-cient	SW Fit	SS Fit		SJ Fit			SO Fit			
			Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activities	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Contextual Performance → Extra-Workgroup Knowledge Transfer	"14"	0.20 ••										
Scientist-Supervisor Fit → Extra-Workgroup Knowledge Transfer												
Direct Effect				0.20 •••	0.42 ••••							
Indirect Effect (via Contextual Performance)				0.06 •	-0.04							
Total Effect				0.26 ••	0.38 ••••							
Proportion of the effect that is mediated (%)				22.09	-10.26							
Scientist-Job Fit → Extra-Workgroup Knowledge Transfer												
Direct Effect						0.13	0.22 •••	0.27 ••••				
Indirect Effect (via Contextual Performance)						0.06 ••	0.01	0.05 •				
Total Effect						0.19 ••	0.22 •••	0.32 ••••				
Proportion of the effect that is mediated (%)						30.11	3.59	15.36				

N=264

For predictors represented as single variables standardized regression coefficients whre used as path coefficients. For scientist and environment components the reported paths are standardized coefficients estimated from block variables that involve the five quadratic terms (see text). The indirect and total effects that involved products of path coefficients were tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrapped samples. H=Hypothesis.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Table 5.6 – Cont'd

Path	H	Path Coeffi-cient	SW Fit	SS Fit		SJ Fit			SO Fit			
			Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activities	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Organizational Identification → Contextual Performance	"10"	0.27 ••••										
Scientist-Organization Fit → Contextual Performance												
Direct Effect									0.25 •••	0.27 ••••	0.22 •••	0.13 •
Indirect Effect (via Organizational Identification)									0.07 ••	0.07	0.07 ••	0.08 •••
Total Effect									0.33 ••••	0.34 ••••	0.29 ••••	0.22 ••••
Proportion of the effect that is mediated (%)									22.32	19.41	24.04	38.25
Organizational Identification → Extra-Workgroup Knowledge Transfer	"12"	0.19 ••										
Scientist-Organization Fit → Extra-Workgroup Knowledge Transfer												
Direct Effect									0.34 ••••	0.08	0.25 •••	0.14 •
Indirect Effect (via Organizational Identification)									0.05 •	0.04	0.06 •	0.05 •
Total Effect									0.39 ••••	0.12	0.30 ••••	0.19 ••
Proportion of the effect that is mediated (%)									11.92	36.36	18.33	26.60

N=264

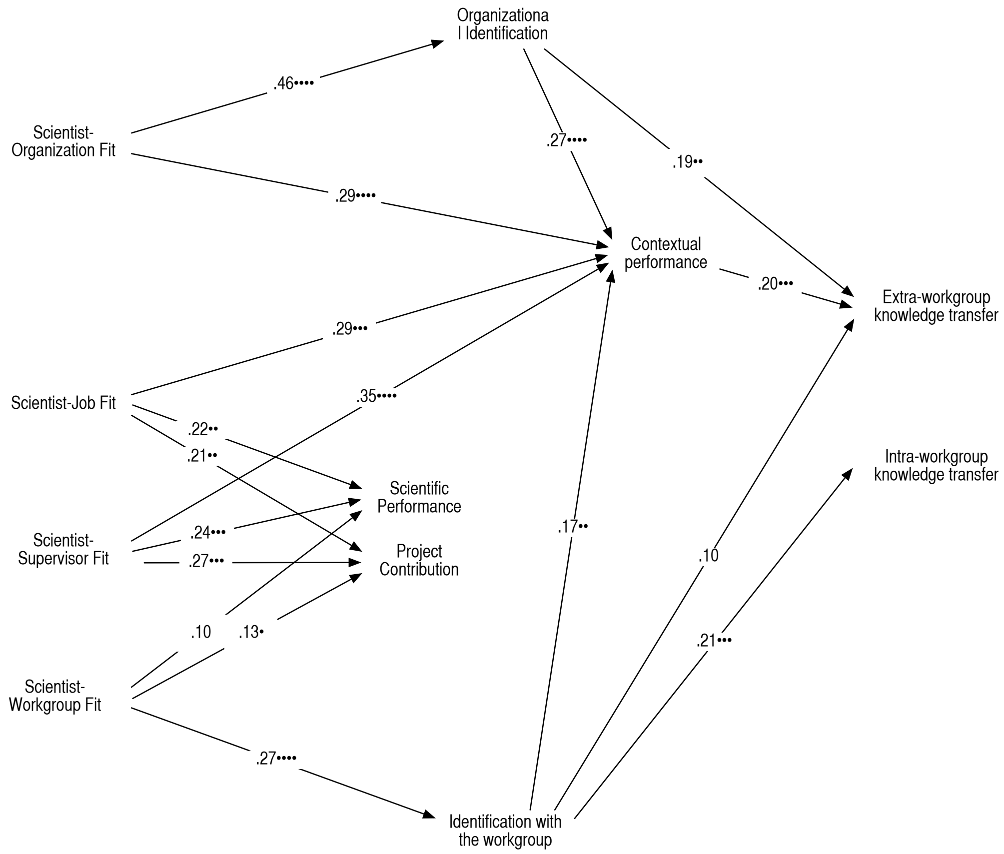
For predictors represented as single variables standardized regression coefficients whre used as path coefficients. For scientist and environment components the reported paths are standardized coefficients estimated from block variables that involve the five quadratic terms (see text). The indirect and total effects that involved products of path coefficients were tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrapped samples. H=Hypothesis.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Integration of Results

I now step back from the individual hypothesis tests to integrate results in terms of the conceptual model. To this end, I assembled the paths to summarize the degree of support for each of the relationships in the model. This summary is captured by the model depicted in Figure 5.10. For mediating variables—that is, workgroup identification, organizational identification and contextual performance—standardized regression coefficients for the variables were used as path coefficients (Pedhazur, 1982). To illustrate how scientist and organizational components related to mediators and outcome I reported the standardized coefficient on the five quadratic terms included in polynomial regression. My conceptual model did not predict different effects for different facets of fit —e.g., SJ fit considers various aspects of fit, such as decision autonomy, formalization of decision activities and provision of scientific inducements—. Therefore, I averaged the coefficient estimates for the five quadratic terms across the different facets of fit, testing each hypothesis once for each facet. Following previous contributes (Edwards & Cable, 2009; Kristof-Brown & Stevens, 2001) I controlled Type I error, using sequential Bonferroni procedure (Seaman, Levin, & Ser-lin, 1991). The probability levels of tests of each hypothesis were listed in ascending order, and the first —i.e., smallest— probability was multiplied by the total number of tests —e.g., three for SJ fit—. If that probability remained less than .05, the next probability level was multiplied by the number of remaining tests —e.g., two for SJ fit—. This procedure continued until all three probability levels were corrected, and only the corrected probability levels that remained below .05 were considered statistically significant.

Figure 5.10 – Summary of Results for the Proposed Conceptual Model



5.3 - Institutional Pluralism and Boundary Span Stressors

In this paragraph I present the empirical evidences concerning influences of fit on scientist level performance and knowledge transfer activities —see Figure 3.3—. Descriptive and bivariate statistics are first presented. Then results of multivariate analysis are reported.

Descriptive Statistics

Table 5.7 presents means, standard deviations and correlations for the measures used in the conceptual model. Prior to these analyses, the measures of scientist and environment components were scale-centered by subtracting the midpoint of the scale (Edwards, 1994). Reliability estimates were generally high (average .85). The variable referring to desirability of a dual ladder career was log-transformed, so as to attenuate the problem of non-normal distribution. Reliability estimates were generally high (average .85). A confirmatory factor analysis of the 86 items representing the 24 constructs listed in Table 5.7 indicate good fit, as evidenced by a comparative fit index (Bentler, 1990) of .94 and a root-mean-square error of approximation (Steiger, 1990) of .03. Taken together, this evidence indicates that the measures were suitable for our study.

The variable means and standard deviations indicated good dispersion and little evidence of floor or ceiling effects. As previously noted, correlations among variables that refer to different kinds of fit were generally modest, with exceptions regarding correlations between SS fit with variables concerning SJ fit. Dimensions within the same kind of fit tended to be positively correlated, with coefficients ranging from modest levels to around .60. Role clarity and role conflict were positively correlated, as would be expected from prior research. Furthermore, role ambiguity and role conflict were positively correlated with both turn over intent —as reported in the previous literature— and orientation toward a dual ladder career —on this point there is no empirical research—. Finally, the correlation between turn over intent and desirability of a dual ladder career was positive.

Table 5.7 – Descriptives Statistics and Full Correlations

	Mean	Std.Dev.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]
[1] Workgroup Fit – E	3.49	0.72																							
[2] Workgroup Fit – S	3.86	0.69	0.51																						
[3] Supervisor Fit – E (Know. Acq. Tension)	3.06	0.73	0.56	0.33																					
[4] Supervisor Fit – S (Know. Acq. Tension)	3.64	0.70	0.39	0.56	0.62																				
[5] Supervisor Fit – E (Know. Enhanc. Tension)	3.72	0.78	0.19	0.04	0.44	0.20																			
[6] Supervisor Fit – S (Know. Enhanc. Tension)	3.79	0.78	0.26	0.21	0.43	0.42	0.69																		
[7] Job Fit – E (Scientific Incent.)	2.50	0.73	0.34	0.23	0.55	0.31	0.29	0.24																	
[8] Job Fit – S (Scientific Incent.)	3.40	0.82	0.24	0.65	0.30	0.58	0.05	0.27	0.41																
[9] Job Fit – E (Autonomy)	2.45	0.83	0.28	0.15	0.37	0.19	0.20	0.24	0.63	0.28															
[10] Job Fit – S (Autonomy)	3.17	0.81	0.25	0.37	0.26	0.35	0.12	0.27	0.37	0.56	0.61														
[11] Job Fit – E (Formalization)	2.39	0.95	0.17	0.19	0.26	0.21	0.21	0.23	0.37	0.25	0.34	0.18													
[12] Job Fit – S (Formalization)	2.81	0.90	0.27	0.29	0.43	0.35	0.22	0.26	0.38	0.38	0.29	0.30	0.48												
[13] Organization Fit – E (Altruism)	3.61	0.84	0.17	0.02	0.19	0.15	0.08	0.14	0.20	0.16	0.18	0.15	0.19	0.09											
[14] Organization Fit – S (Altruism)	3.90	0.81	0.22	0.27	0.31	0.40	0.15	0.22	0.22	0.32	0.14	0.19	0.16	0.19	0.42										
[15] Organization Fit – E (Economic Achievements)	3.06	0.83	0.10	0.02	0.15	0.06	0.06	0.14	0.24	0.03	0.32	0.11	0.16	0.02	0.35	0.11									
[16] Organization Fit – S (Economic Achievements)	3.95	0.59	0.18	0.31	0.13	0.24	0.03	0.14	0.07	0.27	0.00	0.22	0.02	0.08	0.13	0.29	-0.09								
[17] Organization Fit – E (Prestige)	3.55	0.73	0.13	0.10	0.29	0.22	0.15	0.22	0.18	0.18	0.20	0.18	0.17	0.17	0.36	0.15	0.38	0.10							
[18] Organization Fit – S (Prestige)	3.59	0.72	0.24	0.45	0.23	0.34	0.10	0.21	0.27	0.36	0.17	0.22	0.14	0.19	0.20	0.35	0.04	0.43	0.11						
[19] Organization Fit – E (Security)	3.18	0.94	0.07	0.01	0.04	-0.05	0.04	0.14	0.10	-0.07	0.22	0.10	-0.01	-0.07	0.30	-0.00	0.45	0.01	0.17	0.12					
[20] Organization Fit – S (Security)	3.89	0.85	0.25	0.19	0.27	0.22	0.17	0.14	0.20	0.08	0.13	0.13	0.07	0.05	0.32	0.30	0.06	0.36	0.20	0.39	0.15				
[21] Role Ambiguity	2.58	0.74	-0.14	0.05	-0.31	-0.03	-0.30	-0.32	-0.29	0.02	-0.20	-0.07	-0.09	-0.08	-0.20	-0.29	-0.16	-0.19	-0.19	-0.07	-0.14	-0.24			
[22] Role Conflict	2.39	0.73	0.05	0.14	0.02	0.10	-0.09	-0.13	0.12	0.12	-0.01	0.17	-0.02	0.12	-0.13	-0.12	-0.14	0.02	-0.13	0.10	0.02	-0.06	0.31		
[23] Turn Over Intention	3.09	0.43	-0.07	-0.00	-0.26	-0.07	-0.24	-0.16	-0.35	-0.01	-0.26	-0.13	-0.30	-0.16	-0.07	-0.17	-0.13	-0.12	-0.06	-0.17	-0.11	-0.14	0.31	0.09	
[24] Dual Ladder Orientation	1.01	0.59	-0.02	-0.18	-0.13	-0.14	0.03	-0.02	-0.19	-0.26	-0.06	0.03	-0.17	-0.21	-0.05	-0.24	0.03	-0.05	-0.06	-0.15	0.09	-0.07	0.17	0.22	0.24

N=264

Full correlations are reported; Correlations that are greater than .12 in absolute magnitude are significant at p<.05; Correlations greater than .16 in absolute magnitude are significant at p<.01
Reliability estimates (coefficient alpha) are reported along the diagonal.
[a] This variable is log-transformed

Test of Hypothesis Relating Fit Variables to Role Ambiguity and Role Conflict

Results concerning my hypotheses relating fit conditions to role ambiguity and role conflict are reported in Tables 5.8, 5.9 and 5.10. Table 5.8 contains estimates of paths relating scientist and environmental attributes to role ambiguity and role conflict—e.g., the path relating SW fit to workgroup identification—. Tables 5.9 and 5.10 summarize results from response surface analyses indicating whether the relationships for individual and organization values reported in Table 5.3 satisfy the conditions for a fit effect.

As in the previous section of the work —where I tested the effect of fit performance, and knowledge transfer—, the coefficients achieved through the set of polynomial regressions were used to plot three-dimensional surfaces in which scientist and environmental features were perpendicular horizontal axes, and the dependent variable was the vertical axis. For each surface, contour lines are drawn on the X,Y plane to help clarify the shape of the surface. The stationary point and principal axes are also projected onto the X,Y plane, provided they lie within the range of the component measures. Component measures are depicted in scale-centered form, that is, centered at their scale midpoints, so as to simplify certain calculations and facilitates the interpretation of the coefficients on X and Y, which then represent the slope of the surface at the center of the X,Y plane (Aiken & West, 1991). Again, on the floor of the figure there are two conceptual reference lines: (a) the fit line, along which individual and organizational values are equal, and (b) the misfit line, along which individual and organizational values differ.

Also in this case, the conditions for a fit effect are prioritized using Edward and Cables' approach (Edwards & Cable, 2009): if the first and second conditions were met, then support for a value fit effect was inferred (Edwards, 2007). If the first condition was met, but the second condition was not, I examined how the ridge deviated from the fit line by examining the slope and intercept of the first principal axis (Edwards & Parry, 1993). These tests determined whether a fit effect was obtained at particular levels of individual and organizational values. The third condition was tested to assess deviation from the idealized surface, but failure to support this condition was not considered grounds to reject a value fit hypothesis.

Table 5.8 – Effects Relating Scientits and Environmental Components to Mediators and Outcomes

Path	H	SW Fit	SS Fit		SJ Fit			SO Fit			
		Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activi-ties	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Scientist-Workgroup Fit → Role Ambiguity	"1a"	0.228 •••									
Scientist-Workgroup Fit → Role Conflict	"1b"	0.142 •									
Scientist-Supervisor Fit → Role Ambiguity	"2a"		0.36 ••••	0.38 •••							
Scientist-Supervisor Fit → Role Conflict	"2b"		0.22 •••	0.22 •••							
Scientist-Job Fit → Role Ambiguity	"3a"				0.30 ••••	0.24 •••	0.35 ••••				
Scientist-Job Fit → Role Conflict	"3b"				0.28 ••••	0.30 ••••	0.29 ••••				
Scientist-Organization Fit → Role Ambiguity	"4a"							0.27 ••••	0.37 ••••	0.23 •••	0.35 ••••
Scientist-Organization Fit → Role Conflict	"4b"							0.16 ••	0.17 ••	0.21 •••	0.27 ••••

N=264

the paths reported for Values are standardized coefficients estimated from block variables constructed from the five quadratic terms. Standard errors are asymptotically derived based on 10.000 bootstrapped samples. H = Hypothesis

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Table 5.9 – Key Features Describing Surfaces

Path	Fit content	Stationary Points and Principal Axis: Stationary Point		First Principal Axis		Second Principal Axis		Slopes Along Lines of Interest: Y= X		Y=−X		First Principal Axis		Second Principal Axis	
		X_0	Y_0	p_{10}	p_{11}	p_{20}	p_{21}	a_x	a_{x2}	a_x	a_{x2}	a_x	a_{x2}	a_x	a_{x2}
Scientist-Workgroup Fit → Role Ambiguity	Taste for Science	-0.55	0.63	0.14	-0.89	1.25	1.12	-0.02	-0.10	-0.54	-0.46	-0.12	-0.11	-0.74	-0.41
Scientist-Workgroup Fit → Role Conflict	Taste for Science	-1.28	-0.02	-1.26	-0.96	1.31	1.04	-0.05	-0.04	0.32	0.25	0.62	0.24	2.49	-0.04
Scientist-Supervisor Fit → Role Ambiguity	Knowledge Enhancement Tension	5.03	8.12	-0.11	1.64	11.19	-0.61	0.38	-0.06	-0.04	-0.65	0.51	-0.05	-10.34	-0.47
	Knowledge Acquisition Tension	-4.49	-3.62	-1.01	0.58	-11.33	-1.72	0.25	0.02	0.45	-0.28	0.26	0.03	37.72	-0.59
Scientist-Supervisor Fit → Role Conflict	Knowledge Enhancement Tension	-1.27	-3.27	-0.29	2.34	-3.81	-0.43	0.16	-0.06	0.04	-0.54	0.22	0.09	2.43	-0.37
	Knowledge Acquisition Tension	0.25	1.12	0.16	3.80	1.19	-0.26	-0.27	-0.00	0.12	-0.35	-0.70	1.39	-0.44	-0.29
Scientist-Job Fit → Role Ambiguity	Scientist's Decision Autonomy	0.62	4.73	4.94	-0.34	2.93	2.91	0.33	0.15	0.90	0.57	-0.49	0.39	16.21	0.07
	Centralization of Decision Activities	-0.66	-0.48	0.95	2.15	-0.79	-0.47	0.10	0.11	-0.21	-0.23	0.60	0.45	0.47	-0.17
	Scientific Inducements	70.02	-34.39	-178.12	2.05	-0.28	-0.49	0.22	0.20	0.39	0.02	-80.03	0.57	0.59	-0.00
Scientist-Job Fit → Role Conflict	Scientist's Decision Autonomy	-3.91	2.29	9.57	1.86	0.18	-0.54	0.03	0.22	0.28	0.06	4.18	0.53	0.04	0.03
	Centralization of Decision Activities	-0.04	1.11	1.39	6.77	1.11	-0.15	-0.21	-0.01	0.06	-0.14	0.26	3.12	-0.32	-0.14
	Scientific Inducements	-0.42	0.69	2.95	5.35	0.62	-0.19	-0.38	0.10	-0.08	-0.15	3.96	4.69	-0.36	-0.19
Scientist-Organization Fit → Role Ambiguity	Altruism	-1.19	1.57	2.00	0.36	-1.72	-2.77	0.19	0.05	-0.24	-0.07	0.12	0.05	8.82	-0.48
	Economic Achievements	1.22	3.62	0.28	2.73	4.06	-0.37	0.53	-0.15	-0.29	-0.29	1.15	-0.47	-2.73	-0.18
	Prestige	0.47	-0.41	-1.57	2.46	-0.22	-0.41	0.12	0.06	0.19	-0.21	-0.39	0.42	0.32	-0.16
	Security	-0.72	0.95	1.26	0.43	-0.71	-2.31	0.23	0.14	-0.35	-0.19	0.17	0.12	2.46	-0.79
Scientist-Organization Fit → Role Conflict	Altruism	-1.19	1.57	2.00	0.36	-1.72	-2.77	0.19	0.05	-0.24	-0.07	0.12	0.05	8.82	-0.48
	Economic Achievements	0.85	0.47	1.61	-1.34	-0.17	0.75	0.33	-0.24	0.07	-0.09	0.22	-0.13	0.05	-0.19
	Prestige	0.68	0.04	-0.35	0.58	1.22	-1.72	-0.11	0.06	0.13	-0.33	-0.08	0.06	-3.74	-0.71
	Security	-0.12	0.95	1.04	0.79	0.81	-1.26	-0.18	0.27	-0.18	-0.13	0.05	0.23	-2.05	-0.17

N=264

a. Equation is undetermined.

Table 5.5- Test of Conditions for Value Congruence

Path	Fit content	Conditions on Surface Shape [1][a]	[2][b]	[3][c]	Congruence Effect
Scientist-Workgroup Fit → Role Ambiguity	Taste for Science	H_0 •	H_0 ••••	✓	
Scientist-Workgroup Fit → Role Conflict	Taste for Science	H_0 •	H_0 •	✓	
Scientist-Supervisor Fit → Role Ambiguity	Knowledge Enhancement Tension	✓	✓	H_0 ••••	✓
	Knowledge Acquisition Tension	✓	✓	H_0 ••	✓
Scientist-Supervisor Fit → Role Conflict	Knowledge Enhancement Tension	H_0 ••	H_0 ••••	✓	
	Knowledge Acquisition Tension	✓	H_0 ••••	H_0 ••	
Scientist-Job Fit → Role Ambiguity	Scientist's Decision Autonomy	H_0 ••	H_0 ••••	H_0 ••	
	Centralization of Decision Activities	✓	✓	✓	✓
	Scientific Incentives	✓	✓	H_0 ••	✓
Scientist-Job Fit → Role Conflict	Scientist's Decision Autonomy	✓	H_0 ••••	H_0 ••	
	Centralization of Decision Activities	✓	H_0 ••••	H_0 ••	
	Scientific Incentives	✓	H_0 ••••	H_0 ••••	
Scientist-Organization Fit → Role Ambiguity	Altruism	H_0 •	✓	H_0 ••	
	Economic Achievements	H_0 ••	H_0 •	H_0 ••	
	Prestige	✓	✓	✓	✓
	Security	✓	H_0 ••••	H_0 ••••	
Scientist-Organization Fit → Role Conflict	Altruism	H_0 •	H_0 ••••	H_0 ••••	✓
	Economic Achievements	H_0 •	H_0 ••••	H_0 ••••	✓
	Prestige	✓	✓	H_0 ••	
	Security	✓	✓	H_0 •	

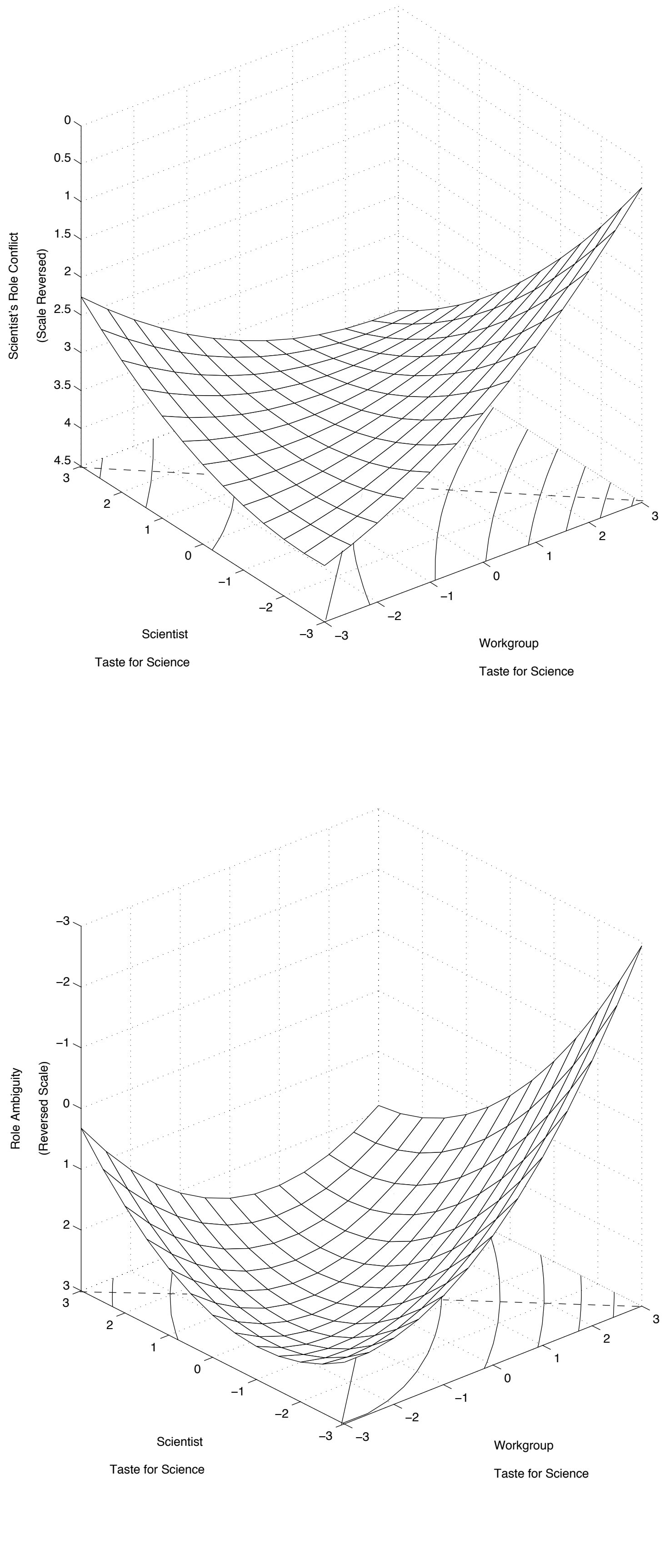
N=264

Table entries indicate which of the three conditions for a value congruence effect were met. Condition 1 stipulates that the surface is curved downward along the incongruence line, Condition 2 indicates that the ridge of the surface runs along the congruence line, and Condition 3 states that the surface is flat along the congruence line. H0 means that a condition was not met, in that the null hypothesis is rejected.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

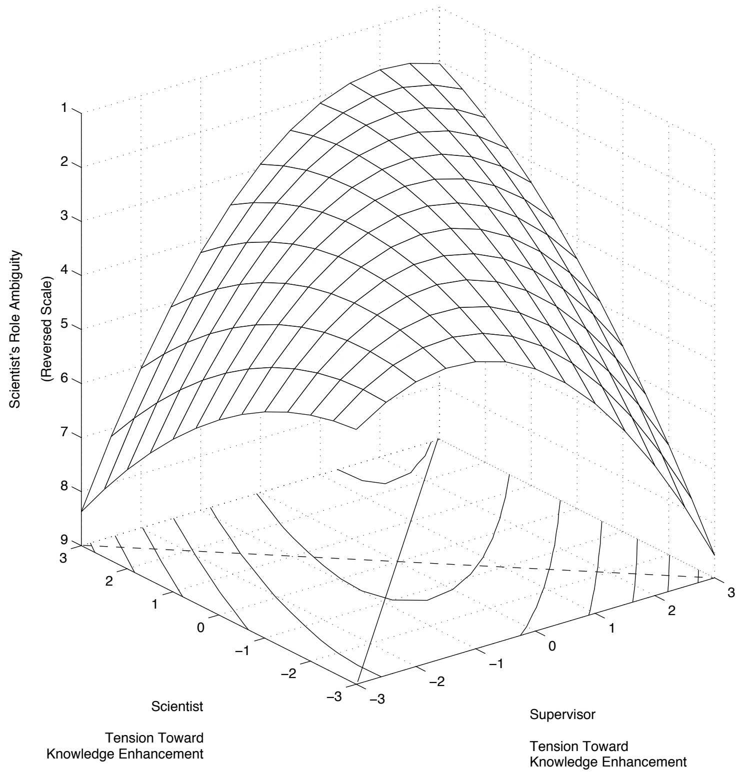
Hypothesis 1a and 1b stated that scientist-workgroup fit would be positively correlated —respectively— with role ambiguity and role conflict. Table B5 —see "Appendix C"—, contains standardized regression coefficients for the two polynomial regressions —one having role ambiguity as dependent variable and the other having role conflict has dependent variable—, as well as the variance explained by models. Results indicated that scientist and workgroup's taste for science explained a significant amount of variation of role ambiguity (R-sq = .13) and role conflict as well (R-sq = .11). Estimates concerning the block variable — reported in the upper section of Table 5.8— confirmed that once aggregated scientist and workgroup taste for science exerted a statistically significant influence on the dependent variable (p-value < .01 when role ambiguity is regressed; p-value < .10 when role conflict is regressed). Equations explaining role ambiguity and role conflict had corresponding surface plot. Figures 5.11a illustrates how scientist and workgroup taste for science related to scientist's role ambiguity. The evaluation of the surface indicated no support for a fit effect —as shown in the upper section of Table 5.10. The first condition was not met, indicating that surface was curved downward along the misfit line. Analogously, it was not possible to fill the second condition. The ridge of the surface significantly deviated from the fit line —this is evident in the presence of two local peaks located at the opposite corners of the XY plan—. The third condition was met, indicating that the height of the surface did not significantly vary alone the fit line. Figure 5.11b related scientist and workgroup taste for science to role conflict. Empirical evidence did not support a fit effect. The visual inspection indicated that the surface was quite similar to the previous one relating taste for science to role ambiguity —this was confirmed by the test of conditions reported in the upper section of Table 5.10. Hypothesis 3b —referring to SS fit influence on scientist's project contribution— received strong support (p-value < .001 for fit on knowledge enhancement, while p-values < .0001 for fit on knowledge acquisition).

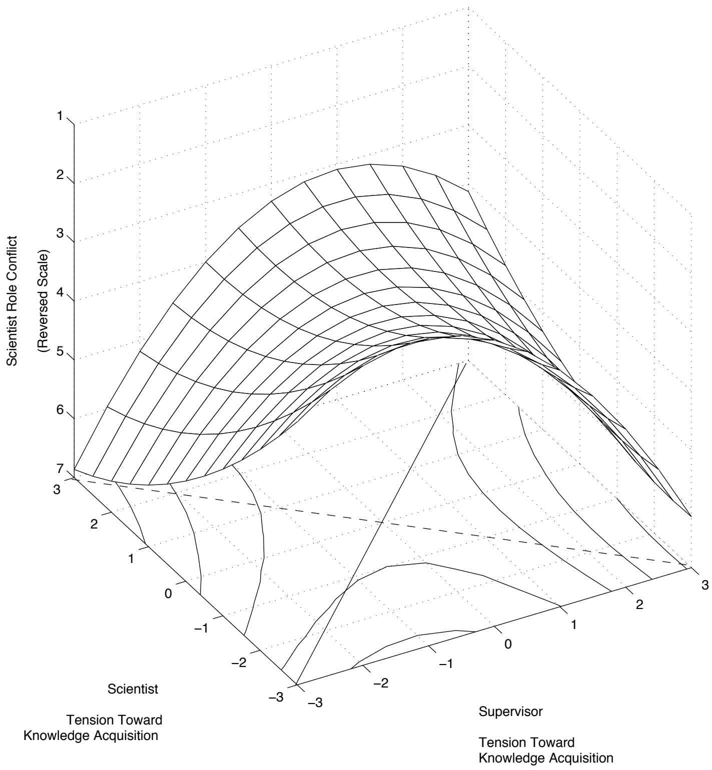
Figure 5.11 – Surface Response Relating SW Fit to Role Ambiguity and Role Conflict

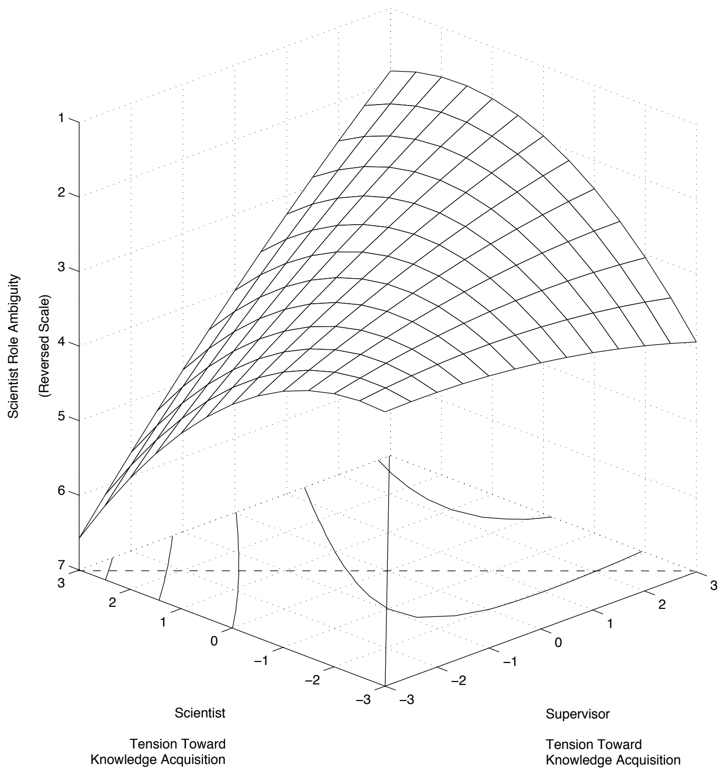


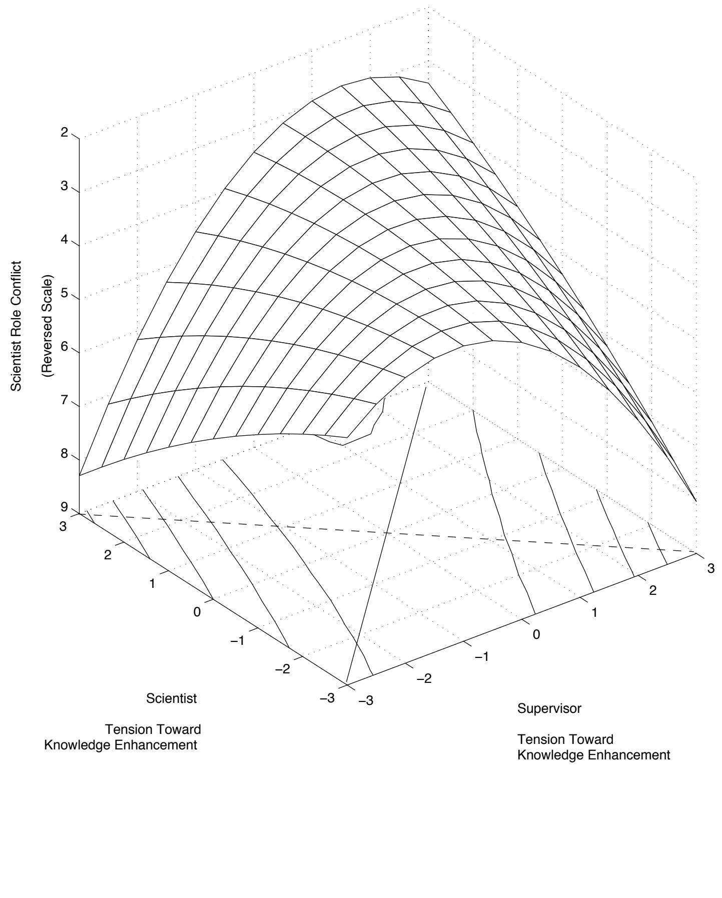
Hypothesis 2a and 2b stated that SS fit would be negatively correlated —respectively— with role ambiguity and role conflict. Table B6 —see "Appendix C"—, contains standardized regression coefficients for the set of polynomial regressions explaining role ambiguity and role conflict, based on scientist and supervisor tension toward knowledge enhancement and knowledge acquisition. The quadratic terms introduced in the regression resulted in significant models (R-sq ranging from .12 to .23). As shown in the upper section of Table 5.8, scientist and supervisor tension toward knowledge enhancement significantly affected role ambiguity (p-value < .001) and role conflict (p-value < .01). Analogously, scientist and supervisor tension toward knowledge acquisition significantly affected role conflict (p-value < .01) and role conflict (p-value < .01). Furthermore, coefficients associated to the block variables were statistically significant (p-value < .001 when knowledge enhancement was considered; p-value < .01 when knowledge acquisition was considered). Figures 5.12a and 5.12b illustrate how scientist- and supervisor tension toward enhancement of knowledge related to scientist's role ambiguity. The evaluation of the surface depicted in Figure 5.12a supported the hypothesized fit effect—see the upper section of Table 5.10—. The first condition was met, indicating that the surface was curved downward along the misfit line. The second condition was also met, in that the location of the ridge indicates that role ambiguity was minimized when scientist and supervisor tension toward knowledge enhancement were congruent —as evidenced by the point at which the first principal axis crosses the fit line—. The third condition was not met because of the positive slope of the surface along the fit line. This positive slope means that, overall, role ambiguity was lower when scientist and supervisor tension toward knowledge production were both high than when both were low. Analogously, Figure 5.12b underscored that scientist and supervisor tension toward knowledge acquisition affected role ambiguity according to fit effect. Test of conditions —reported in the middle section of Table 5.10— indicated that both first and recondition were met. Conversely, the third condition was not filled, due to the slope of the surface that raised running the fit line. The evaluation of the surface highlighted that conditions for fit effect hold. The first condition was met, indicating the downward curvature of the surface along the misfit line. The second condition received partial support due to the shift and slight rotation of the ridge off the fit line. The third condition was not fulfilled, in that the slope of the surface along the fit line was positive. Figure 5.7d depicts the surface relating scientist and supervisors tension toward knowledge enhancement to individual project contribution. Nor of the three conditions for a fit effect were satisfied. Hypothesis 2b stated that SS fit would be negatively correlated with role conflict. The polynomial regression based on the five quadratic firms explained a significant amount of the variation in role conflicts —as shown on the far right columns of Table B6—. Furthermore the block variable —achieved as weighted linear combination of the quadratic terms and their slopes— exerted a statistical significant effect, for both enhancement of knowledge (p-value $< .01$) and acquisition of knowledge (p-value $< .01$). Surfaces that related scientist and supervisors components to role conflict are depict in Figure 5.12c and 5.12d. Test of conditions on their parameters led to refuse the fit hypothesis. For knowledge enhancement both the first and the second condition were violated —as shown in the middle section of Table 5.10—. The visual inspection supported results of inferential tests. The surface depicted in Figure 5.12c was not curved downward when scientist tension for knowledge enhancement departed from the fit line, but supervisor tension for knowledge enhancement was high. At the same time the first principal axis significantly deviated from the fit line. The third condition was satisfied, but it was not sufficient to support the existence of a fit effect. The surface relating knowledge acquisition to role conflict did not match the requirement for a fit effect. As shown in that middle section of Table 5.10, just the first condition was met. The visual inspection of Figure 5.12d clearly highlighted that the first principal axis was shifted respect the fit line. On top of this, the height of the surface markedly varied along the first principal axis.

Figure 5.12 – Surface Response Relating SS Fit to Role Ambiguity and Role Conflict



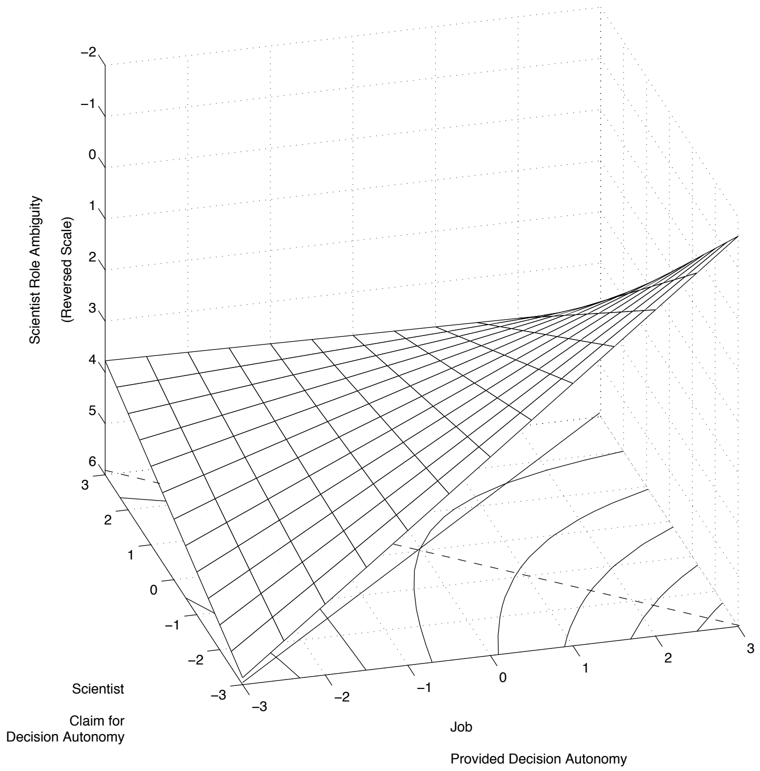


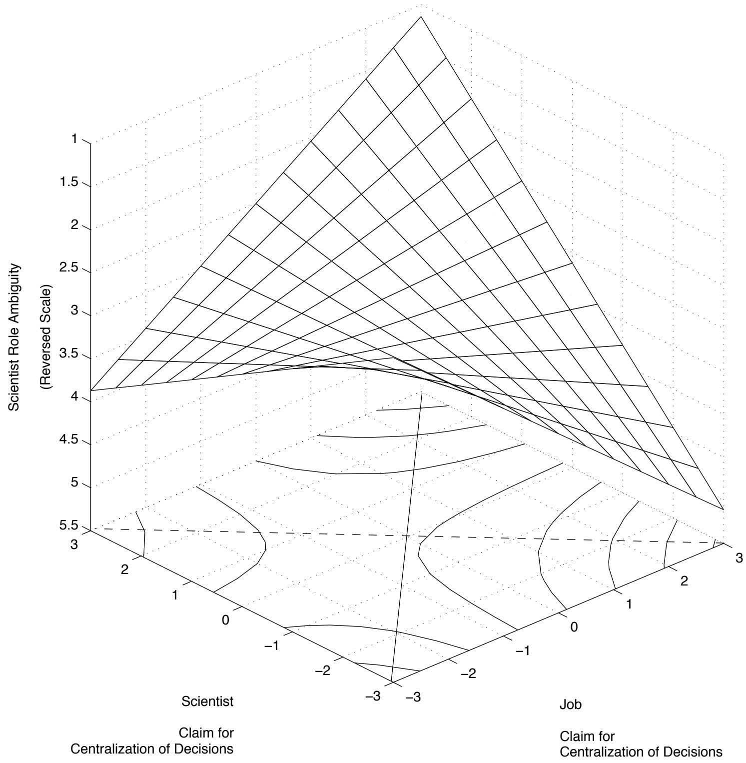

Scientist Role Ambiguity
(Reversed Scale)
1
2
3
4
5
6
7
3
2
1
0
−1
−2
−3
−3
−2
−1
0
1
2
3
Scientist
Tension Toward
Knowledge Acquisition
Supervisor
Tension Toward
Knowledge Acquisition

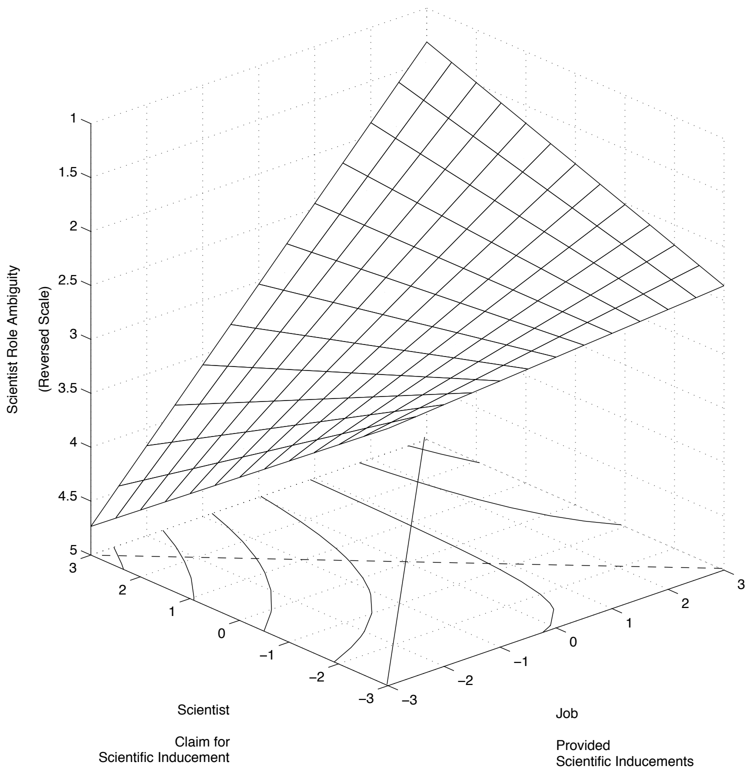

Scientist Role Conflict
(Reversed Scale)
2
3
4
5
6
7
8
9
3
2
1
0
−1
−2
−3
−3
−2
−1
0
1
2
3
Scientist
Tension Toward
Knowledge Enhancement
Supervisor
Tension Toward
Knowledge Enhancement

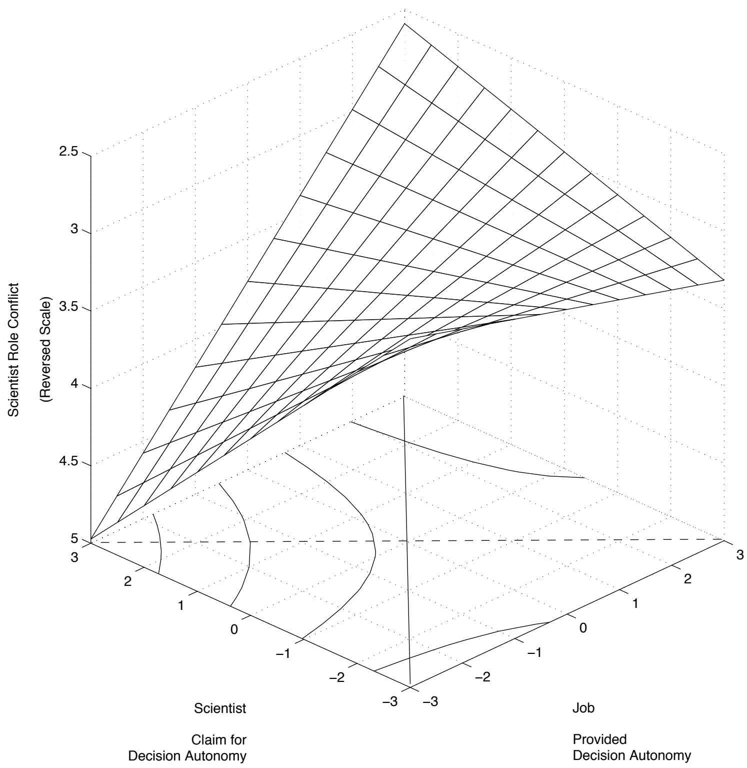
Hypothesis 3a and 3b stated that SJ fit would be negatively correlated —respectively— with role ambiguity and role conflict. Table B7 —see "Appendix B"—, contains standardized regression coefficients for the set of polynomial regressions explaining role ambiguity and role conflict, based on scientist's organizing templates and job level features. The quadratic terms introduced in the regression resulted in significant models (R-sq ranging from .14 to .20).The pattern which emerged from empirical estimates was quite fragmented. Scientist's organizing templates and job features had a significant impact on role ambiguity —as shown in the middle section of Table 5.8 p-value < .001 when decision autonomy serves as fit content, p-value < .01 for formalization of decision activities, while p-value < .001 for scientific inducements—. However the joint impact of scientist and job components resulted in a fit effect exclusively when scientific inducements were considered as a basis for fit. Figure 5.13a related scientist claim for decision autonomy and decision autonomy provided by the job to role ambiguity. Inferential tests led to reject all three conditions for fit effect. The ridge of the surfaces increases while running the fit line, but role ambiguity is minimized when scientist claim for decisional autonomy is low and decisional autonomy provided by the job is high. Figure 5.13b concerned the relation among scientist claim for formalization of decision activities, formalization of decision activities provided by the job and role ambiguity. The evaluation of surfaces indicated strong support of a fit effect—see the middle section of Table 5.10 —. The first condition was met, indicating that the surface was curved downward along the misfit line. The second condition was also met. The location of the ridge indicated that role ambiguity was minimized when scientist claims were congruent with formalization of decision activities implied by job level features —i.e., the firs line did not significantly deviated from the fit line—. Analogously, the third condition was met, suggesting that slope of the surface along the fit line was not significantly different from zero. Figure 5.13c related scientist's claims for scientific inducements, job provisions and role ambiguity. Inferential tests on the parameters of the surface provided moderate support for the fit effect. The first condition was met —but p-value for the related statistic was near to the critical threshold of .10—. The second condition received partial support due to the shift and slight rotation of the ridge off the fit line. The third condition was not fulfilled, in that the slope of the surface along the fit line was positive. Based on hypothesis 3b SS fit would be negatively correlated with role conflict. The pattern that merged form empirical estimates did not support the existence of a fit effect. Figure 5.13d related scientist claim for autonomy in decision activities, actual autonomy provided by the job and role conflict. The shape of the surface was inconsistent with a fit effect —as shown in the lower section of Table 5.10—. If the first condition was satisfied, the ridge of the surface resulted in a marked rotation respect to the fit. Analogously, the third condition was not satisfied due to the variation of the height of the surface at the fit line. Figure 5.13b concerned the relation between scientist claim for formalization of decision activities, actual formalization implied by job features and role conflict. As for the previous surface, just the first condition was met, suggesting the presence of a downward curvature off the fit line —see the lower section of Table 5.10—. Figure 5.13c, referred to scientific inducements desired by scientists, scientific inducements provided by the job and their joint impact on role conflict. Test of conditions indicated that the first condition was the only filled.

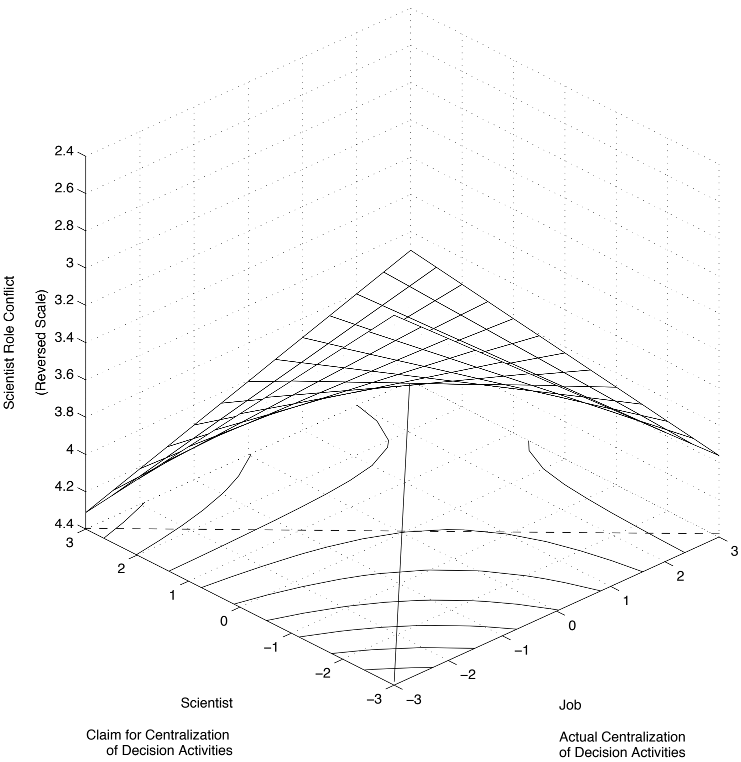
Figure 5.13 – Surface Response Relating SJ Fit to Role Ambiguity and Role Conflict



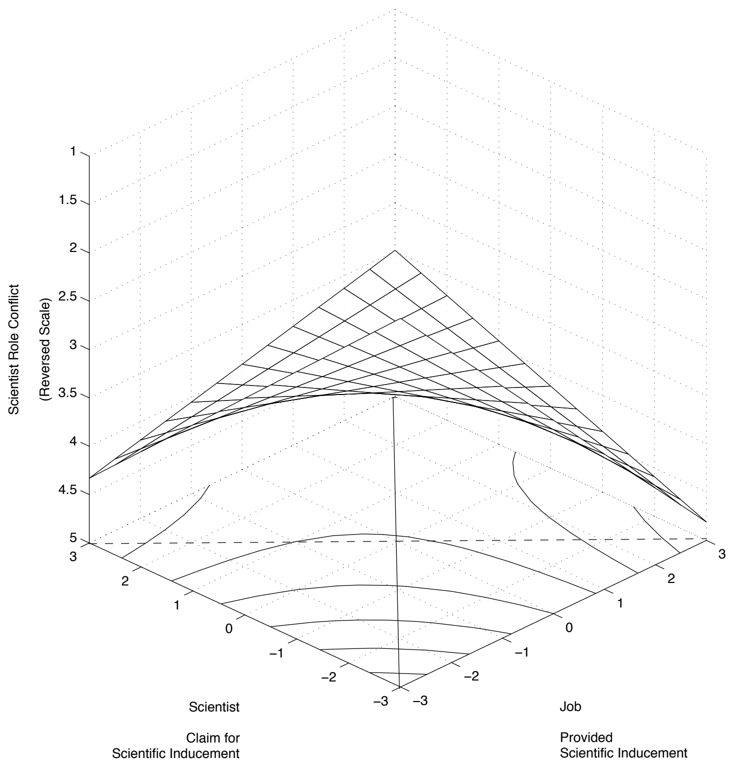



Scientist Role Ambiguity
(Reversed Scale)
1
1.5
2
2.5
3
3.5
4
4.5
5
3
2
1
0
−1
−2
−3
−3
−2
−1
0
1
2
3
Scientist
Claim for
Scientific Inducement
Job
Provided
Scientific Inducements


Scientist Role Conflict
(Reversed Scale)
2.5
3
3.5
4
4.5
5
3
2
1
0
−1
−2
−3
−3
−2
−1
0
1
2
3
Scientist
Claim for
Decision Autonomy
Job
Provided
Decision Autonomy



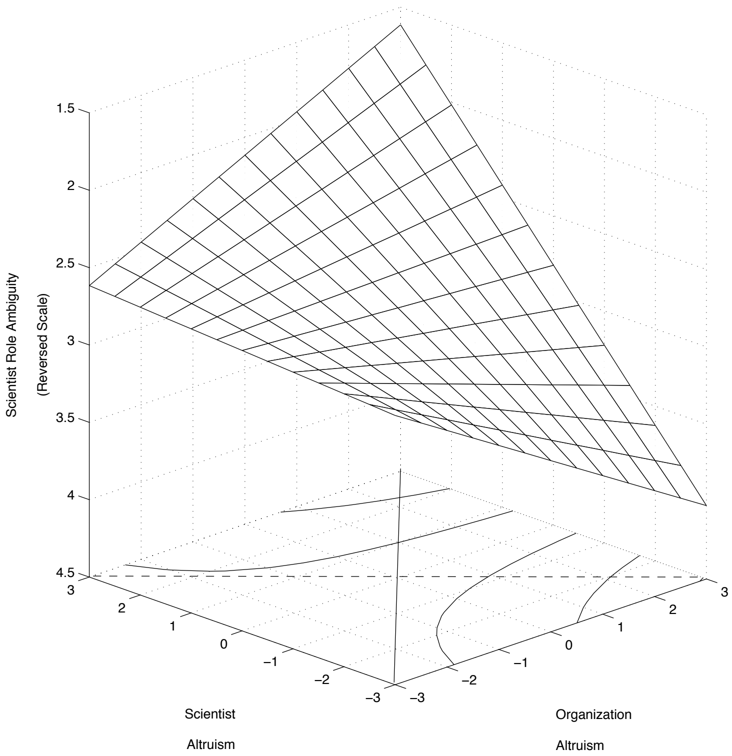
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
Scientist Role Conflict
(Reversed Scale)
3
2
1
0
−1
−2
−3
Scientist
Claim for Centralization
of Decision Activities
−3
−2
−1
0
1
2
3
Job
Actual Centralization
of Decision Activities

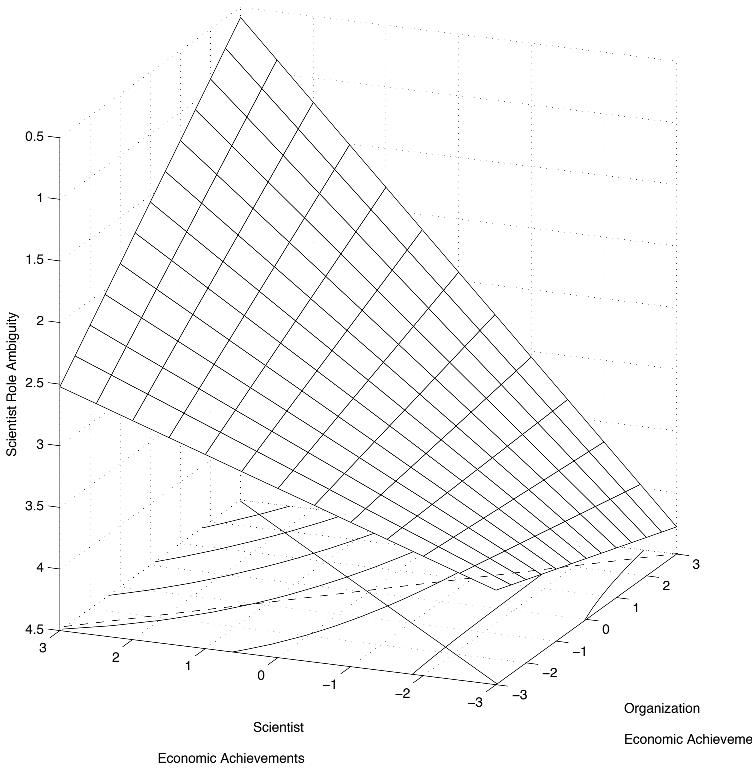


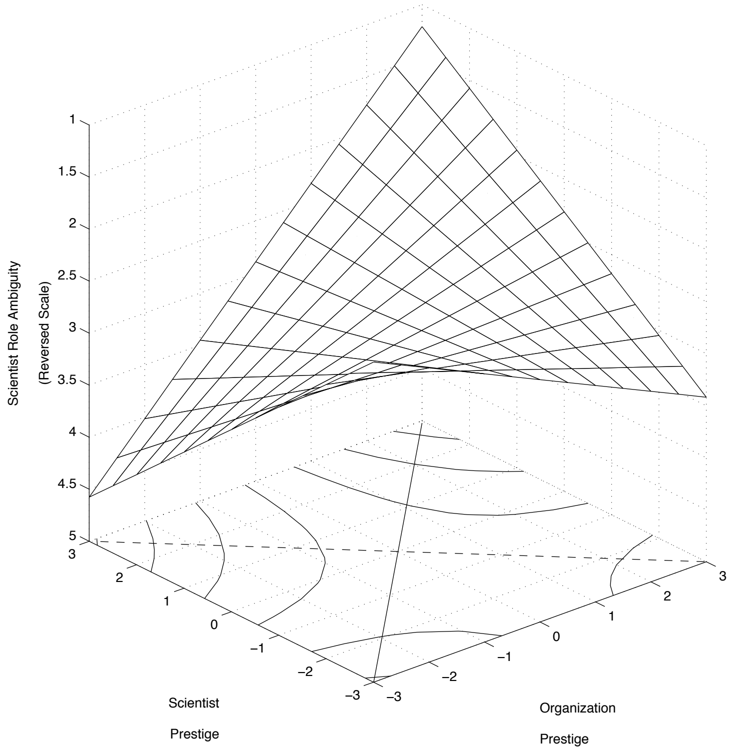
1
1.5
2
2.5
3
3.5
4
4.5
5
Scientist Role Conflict
(Reversed Scale)
3
2
1
0
−1
−2
−3
Scientist
Claim for
Scientific Inducement
−3
−2
−1
0
1
2
3
Job
Provided
Scientific Inducement

Hypothesis 4a and 4b stated that So fit would be negatively correlated —respectively— with role ambiguity and role conflict. Table B8 —see "Appendix C"—, contains standardized regression coefficients for the set of polynomial regressions explaining role ambiguity and role conflict, based on scientist and organizational values. The quadratic terms introduced in the regression resulted in significant models (R-sq ranging from .10 to .21). In spite of the significance of the joint impact of scientist and organizational values —see the lower section of Table 5.8— the hypothesized fit effect received moderate support. Recall hypothesis 4a, concerning the relation among values and role ambiguity. The evaluation of the surfaces related to different values, indicated that the conditions for fit did not hold for altruism, prestige and security —see that lower section of Table 5.10—. Conversely, the fit effect was supported when "prestige" served as a basis for fit. The first condition was met, indicating that surface was curved downward along the misfit line. The second condition was also met. The location of the ridge indicates that role ambiguity is minimized when scientist and organizational importance of "prestige" are congruent, as evidenced by the estimated parameters of the first principal axis —see the lower section of Table 5.9—. The third condition was also met because slope of the surface along the fit line did not significantly differ from zero —see the lower section of Table 5.9—. Hypothesis 4b related values to role conflict. As shown in Table 5.8 scientist and organizational values jointly affected role conflict, as evidenced by the test on the block variables. In spite of this, conditions for fit effect were satisfied only when prestige or security served as basis for fit —as shown in the lower section of Table 5.10—. Outcomes of statistical tests were support by the visual inspection of the surfaces depicted in Figure 5.14g and 5.14h. Conversely conditions for fit were not filled when altruism and economic achievements have been taken into account. Related surfaces, depicted in Figure 5.14g and 5.14h indicated in fact that role conflict was minimized off the fit line —this indicates the violation of the first condition—.

Figure 5.14 – Surface Response Relating SO Fit to Role Ambiguity and Role Conflict






Scientist Role Ambiguity
(Reversed Scale)
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1.5
2
2.5
3
3.5
4
4.5
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3
2
1
0
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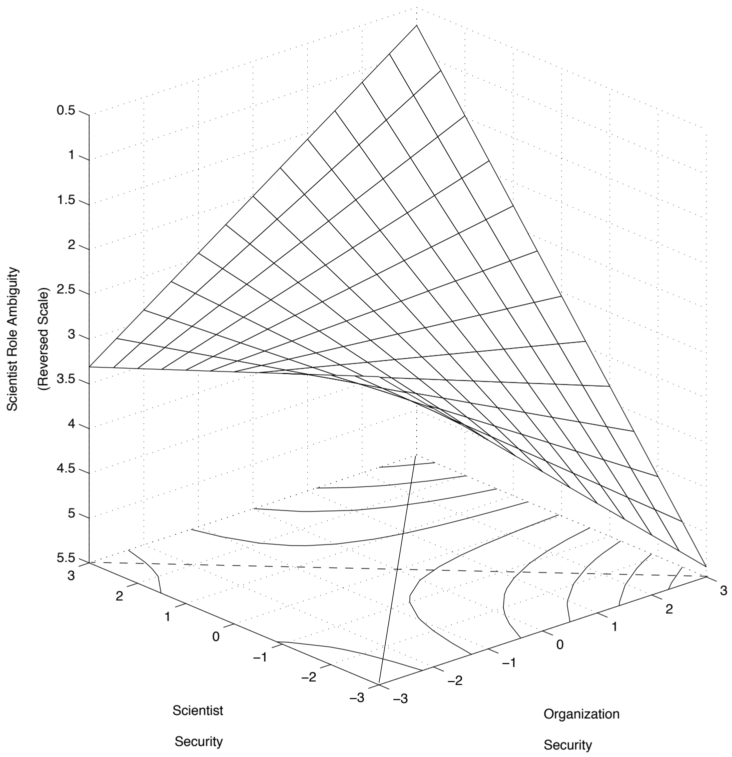
−3
−2
−1
0
1
2
3
Scientist
Prestige
Organization
Prestige


Scientist Role Ambiguity
(Reversed Scale)
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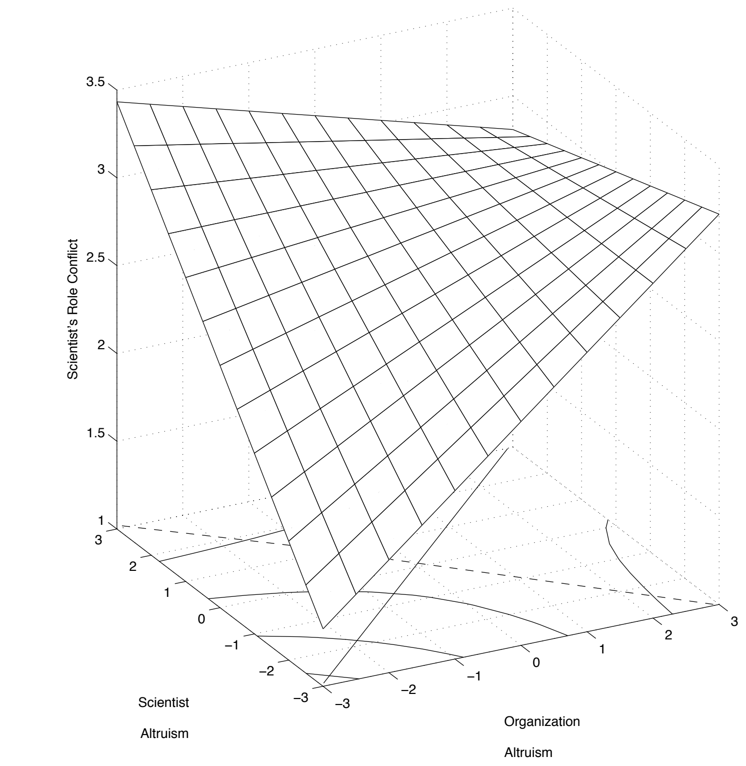
1.5
2
2.5
3
3.5
4
4.5
5
5.5
3
2
1
0
−1
−2
−3
−3
−2
−1
0
1
2
3
Scientist
Security
Organization
Security


3.5
3
2.5
2
1.5
1
Scientist's Role Conflict
3
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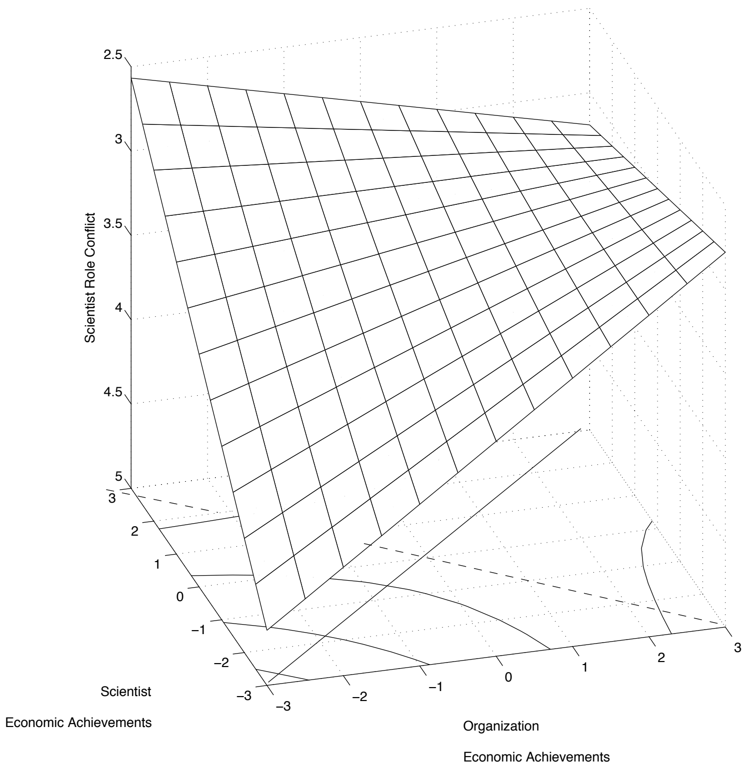
0
−1
−2
−3
Scientist
Altruism
−3
−2
−1
0
1
2
3
Organization
Altruism


2.5
3
3.5
4
4.5
5
Scientist Role Conflict
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2
1
0
−1
−2
−3
Scientist
Economic Achievements
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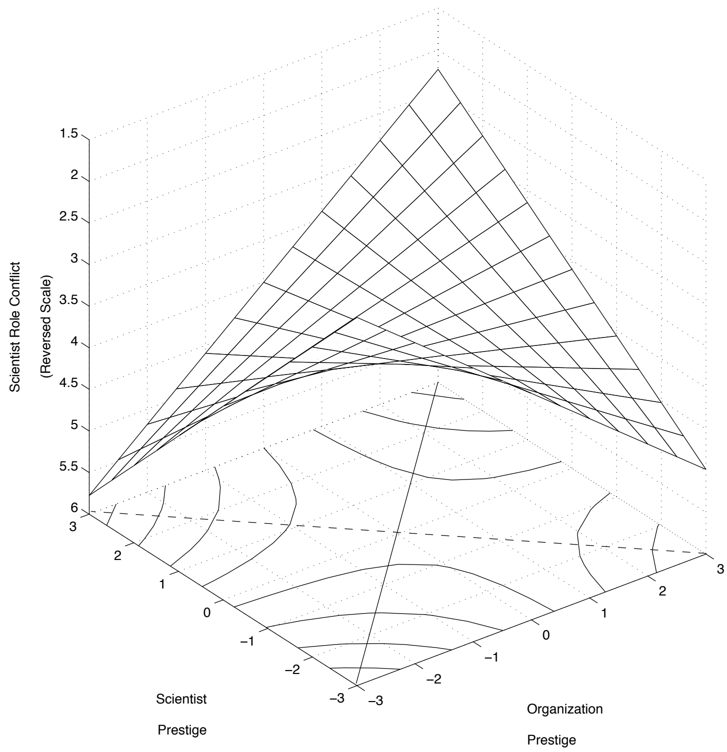
1
2
3
Organization
Economic Achievements


Scientist Role Conflict
(Reversed Scale)
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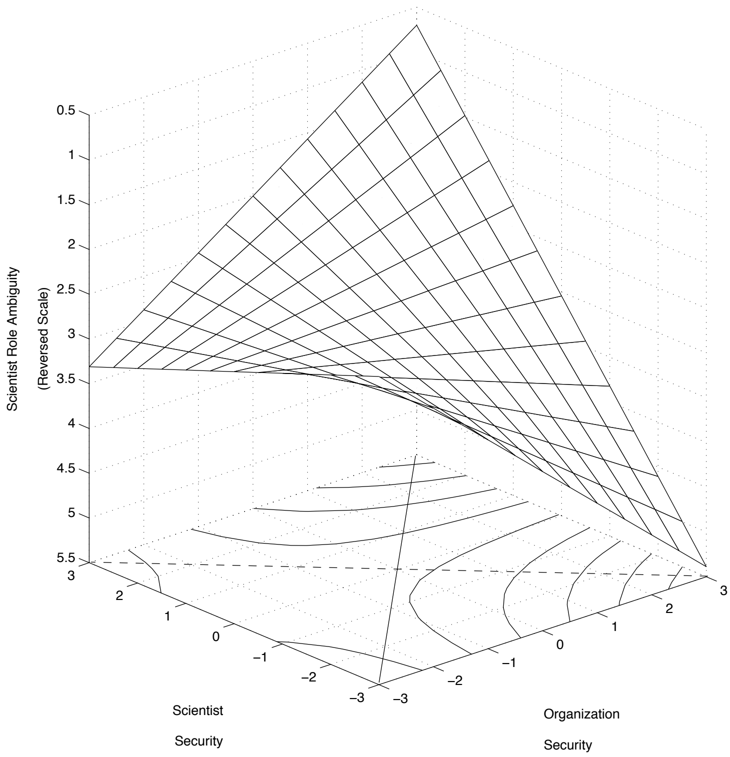
2
2.5
3
3.5
4
4.5
5
5.5
6
3
2
1
0
−1
−2
−3
Scientist
Prestige
−3
−2
−1
0
1
2
3
Organization
Prestige


Scientist Role Ambiguity
(Reversed Scale)
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
3
2
1
0
−1
−2
−3
Scientist
Security
−3
−2
−1
0
1
2
3
Organization
Security

Test of Hypothesis Indirectly Relating Fit to Turn Over Intent and Dual Ladder

Results for hypotheses indirectly relating fit to outcomes and the mediators to outcomes are reported in Table 5.11. Hypothesis 5 predicted that role ambiguity would be positively correlated with scientist's orientation toward a dual ladder career. Hypotheses 6 predicted that role conflict would be positively correlated with orientation toward a dual ladder career. This hypothesis received strong support as shown in the middle section of Table 5.11. Hypotheses 7 predicted that role ambiguity would be positively related to turnover intent. As shown in the upper section of Table 5.11, the coefficient related to this was positive and statistically significant (p-value $< .001$). Taking into account the paths relating fit variables to turn over intent yields the direct, indirect and total effects reported in the Table 5.11. Hypothesis 8 stated that role conflict would be positively correlated with turn over intent. This hypothesis did not found empirical support, as shown in the upper section of Table 5.11.

Table 5.11 – Effects Relating Mediators to Outcomes

Path	H	Path Coefficient	SW Fit	SS Fit		SJ Fit			SO Fit			
			Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activities	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Role Ambiguity → Turnover Intent	"5"	0.37 ••••										
Scientist-Workgroup Fit → Turnover Intent												
Direct Effect			0.14 •									
Indirect Effect (Role Ambiguity)			0.06 •									
Total Effect			0.20 ••									
Proportion of the effect that is mediated (%)			29.90									
Scientist-Supervisor Fit → Turnover Intent												
Direct Effect				0.16 ••	0.18 ••							
Indirect Effect (Role Ambiguity)				0.11 •••	0.12 ••							
Total Effect				0.27 ••••	0.30 ••••							
Proportion of the effect that is mediated (%)				41.42	40.07							
Scientist-Job Fit → Turnover Intent												
Direct Effect						0.18 ••	0.23 •••	0.23 •••				
Indirect Effect (Role Ambiguity)						0.03	0.02	0.04				
Total Effect						0.21 •••	0.25 •••	0.27 ••••				
Proportion of the effect that is mediated (%)						13.04	9.06	14.39				
Scientist-Organization Fit → Turnover Intent												
Direct Effect									0.18 ••	0.22 •••	0.18 ••	0.19 ••
Indirect Effect (Role Ambiguity)									0.08 •	0.09 •	0.03 •	0.09 •
Total Effect									0.25 •••	0.31 ••••	0.22 •••	0.27 ••••
Proportion of the effect that is mediated (%)									30.28	29.81	15.35	31.48

N=264

For predictors represented as single variables standardized regression coefficients whre used as path coefficients. For scientist and environment components the reported paths are standardized coefficients estimated from block variables that involve the five quadratic terms (see text). The indirect and total effects that involved products of path coefficients were tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrapped samples. H=Hypothesis.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Table 5.11 – Cont'd

Path	H	Path Coefficient	SW Fit	SS Fit		SJ Fit			SO Fit			
			Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activities	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Role Ambiguity → Dual Ladder Career	"6"	0.21 •••										
Scientist-Workgroup Fit → Dual Ladder Career												
Direct Effect			0.19 ••									
Indirect Effect (Role Ambiguity)			-0.00									
Total Effect			0.18 ••									
Proportion of the effect that is mediated (%)			-0.54									
Scientist-Supervisor Fit → Dual Ladder Career												
Direct Effect				0.13 •	0.17 ••							
Indirect Effect (Role Ambiguity)				0.01	-0.01							
Total Effect				0.14 •	0.16 ••							
Proportion of the effect that is mediated (%)				9.15	-4.97							
Scientist-Job Fit → Dual Ladder Career												
Direct Effect						0.27 ••••	0.33 ••••	0.31				
Indirect Effect (Role Ambiguity)						0.08 ••	0.03	0.08 ••				
Total Effect						0.35 ••••	0.36 ••••	0.39 ••••				
Proportion of the effect that is mediated (%)						23.28	8.10	21.54				
Scientist-Organization Fit → Dual Ladder Career												
Direct Effect									0.13	0.04	0.18 ••	0.12
Indirect Effect (Role Ambiguity)									0.04	0.03	0.03	0.03
Total Effect									0.16 ••	0.08	0.22 •••	0.15 •
Proportion of the effect that is mediated (%)									23.17	44.16	15.21	20.27

N=264

For predictors represented as single variables standardized regression coefficients whre used as path coefficients. For scientist and environment components the reported paths are standardized coefficients estimated from block variables that involve the five quadratic terms (see text). The indirect and total effects that involved products of path coefficients were tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrapped samples. H=Hypothesis.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Table 5.11 – Cont'd

Path	H	Path Coefficient	SW Fit: Taste for Science	SS Fit: Knowledge Enhancement	SS Fit: Knowledge Acquisition	SJ Fit: Decision Autonomy	SJ Fit: Decision Activities	SJ Fit: Scientific Incentives	SO Fit: Altruism	SO Fit: Economic Inducements	SO Fit: Prestige	SO Fit: Security
Role Ambiguity → Turn Over Intent	"7"	0.086										
Scientist-Workgroup Fit → Turn Over Intent												
Direct Effect			0.20 ••									
Indirect Effect (via Role Conflict)			0.00									
Total Effect			0.20 ••									
Proportion of the effect that is mediated (%)			0.00									
Scientist-Supervisor Fit → Turn Over Intent												
Direct Effect				0.25 •••	0.30 ••••							
Indirect Effect (via Role Conflict)				0.02	0.01							
Total Effect				0.27 ••••	0.30 ••••							
Proportion of the effect that is mediated (%)				5.97	2.32							
Scientist-Job Fit → Turn Over Intent												
Direct Effect						0.20 •••	0.29 ••••	0.29 ••••				
Indirect Effect (via Role Conflict)						0.01	-0.03	-0.02				
Total Effect						0.21 •••	0.25 •••	0.27 ••••				
Proportion of the effect that is mediated (%)						4.83	-12.99	-7.75				
Scientist-Organization Fit → Turn Over Intent												
Direct Effect									0.25 •••	0.30 ••••	0.22 •••	0.27 ••••
Indirect Effect (via Role Conflict)									0.01	0.01	-0.00	0.00
Total Effect									0.25 •••	0.31 ••••	0.22 •••	0.27 ••••
Proportion of the effect that is mediated (%)									2.39	3.21	-1.40	1.11

N=264

For predictors represented as single variables standardized regression coefficients whre used as path coefficients. For scientist and environment components the reported paths are standardized coefficients estimated from block variables that involve the five quadratic terms (see text). The indirect and total effects that involved products of path coefficients were tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrapped samples. H=Hypothesis.

•$p<0.1$, ••$p<0.05$, •••$p<0.01$, ••••$p<0.001$

Table 5.11 – Cont'd

Path	H	Path Coeffi-cient	SW Fit	SS Fit		SJ Fit			SO Fit			
			Taste for Science	Knowledge Enhancement	Knowledge Acquisition	Decision Autonomy	Decision Activities	Scientific Incentives	Altruism	Economic Inducements	Prestige	Security
Role Ambiguity → Turn Over Intent	"7"	0.086										
Scientist-Workgroup Fit → Turn Over Intent												
Direct Effect			0.20 ••									
Indirect Effect (via Role Conflict)			0.00									
Total Effect			0.20 ••									
Proportion of the effect that is mediated (%)			0.00									
Scientist-Supervisor Fit → Turn Over Intent												
Direct Effect				0.25 •••	0.30 ••••							
Indirect Effect (via Role Conflict)				0.02	0.01							
Total Effect				0.27 ••••	0.30 ••••							
Proportion of the effect that is mediated (%)				5.97	2.32							
Scientist-Job Fit → Turn Over Intent												
Direct Effect						0.20 •••	0.29 ••••	0.29 ••••				
Indirect Effect (via Role Conflict)						0.01	-0.03	-0.02				
Total Effect						0.21 •••	0.25 •••	0.27 ••••				
Proportion of the effect that is mediated (%)						4.83	-12.99	-7.75				
Scientist-Organization Fit → Turn Over Intent												
Direct Effect									0.25 •••	0.30 ••••	0.22 •••	0.27 ••••
Indirect Effect (via Role Conflict)									0.01	0.01	-0.00	0.00
Total Effect									0.25 •••	0.31 ••••	0.22 •••	0.27 ••••
Proportion of the effect that is mediated (%)									2.39	3.21	-1.40	1.11

N=264

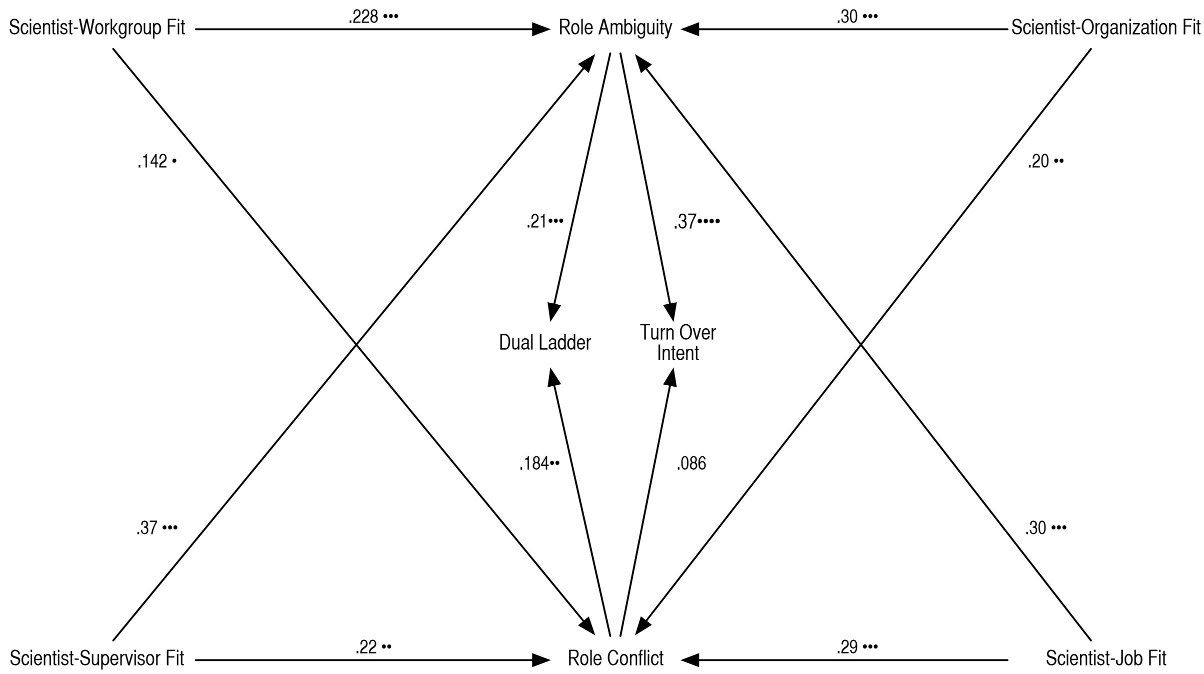
For predictors represented as single variables standardized regression coefficients whre used as path coefficients. For scientist and environment components the reported paths are standardized coefficients estimated from block variables that involve the five quadratic terms (see text). The indirect and total effects that involved products of path coefficients were tested using bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrapped samples. H=Hypothesis.

•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

Integration of Results

I now step back from the individual hypothesis tests to integrate results in terms of the conceptual model. To this end, I assembled the paths to summarize the degree of support for each of the relationships in the model. This summary is captured by the model depicted in Figure 5.15. For mediating variables—i.e., role ambiguity and role conflict—standardized regression coefficients for the variables were used as path coefficients (Pedhazur, 1982). To illustrate how scientist and organizational components related to mediators and outcome I reported the standardized coefficient on the five quadratic terms. My conceptual model did not predict different effects for different fit facets —e.g., SJ fit considers various aspects of fit, such as decision autonomy, formalization of decision activities and provision of scientific inducements—. Therefore, I averaged the coefficient estimates for the five quadratic terms across the different facets of fit, testing each hypothesis once for each facet of fit. To control Type I error, sequential Bonferroni procedure (Seaman, Levin, & Ser-lin, 1991) was used, as suggested by Kristof-Brown et al. (Kristof-Brown & Stevens, 2001) and Edwards and Cable (Edwards & Cable, 2009). The probability levels of tests of each hypothesis were listed in ascending order, and the first —i.e., smallest— probability was multiplied by the total number of tests —e.g., three for SJ fit—. If that probability remained less than .05, the next probability level was multiplied by the number of remaining tests —e.g., two for SJ fit—. This procedure continued until all three probability levels were corrected, and only the corrected probability levels that remained below .05 were considered statistically significant.

Figure 5.15 – Summary of Results for the Proposed Conceptual Model



5.4 - Configurations of Scientist-Environment Fit

In this paragraph I present the empirical evidences concerning configurations —i.e., patterns— of fit conditions relating scientists to different domains of the environment —see Figure 3.4—. I accomplished this goal by forming clusters of scientists that are homogeneous along the four kinds of fit investigated in the study—scientist-workgroup fit, scientist-supervisor fit, scientist-job fit, scientist-organization fit—. The paragraph is organized as follows. First, I present procedures of cluster formation. Then clusters are profiled using scores of scientist-environment fit. Finally, clusters are contrasted along a series of variables —e.g., identification, role ambiguity, role conflict, knowledge transfer, performance— in order to show criterion validity of the designated cluster solution.

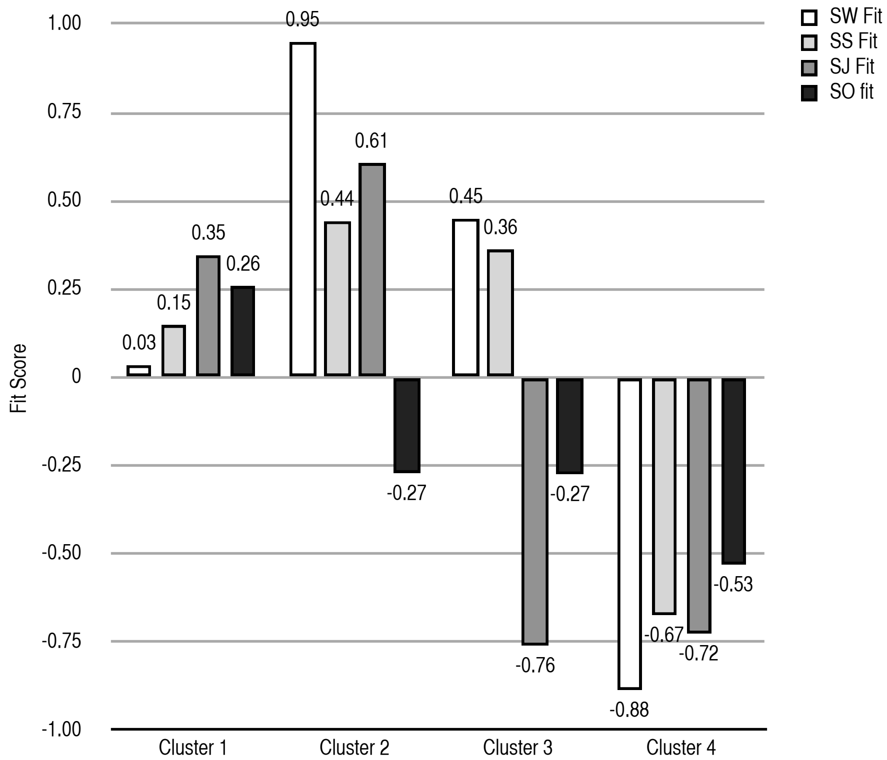
Cluster Formation

Groups of scientists showing homogenous patterns of fit have been identified using individual scores on SW, SS, SJ and SO as clustering variables. In order to form "fit scores" scientist components were subtracted from environmental components for each relevant dimension of the environment. When fit involved more contents —e.g., SJ touching decision autonomy, formalization of decision activities, and scientific inducements— scores were averaged. Before conducting clustering procedures two data transformations were applied. First, difference scores were standardized before similarities between units were determined. The basic rational to use standardized scores in place of absolute values is that similarity measures are quite sensitive to differing scales of magnitudes among the variables (Hair, Black, Babin, Anderson, & Tatham, 2006). In general variables with larger dispersion have more impact on the final similarity value. Second, outliers in the sample were dropped, so as to avoid distortion in the actual structure of clusters and preserve representativeness of cluster structure in the population of origin. Combining graphical approaches and analytic measures as Mahalanobis D-square 22 outliers were identified and eliminated, thus reducing the number of observations from 264 to 242. Inter-units similarity —i.e., the similarity among scientists— was assessed using Euclidean distance measure, that best represents the concept of objects proximity. Once determined distances, units were grouped drawing on agglomerative hierarchical clustering, according to which each unit starts out as its own cluster, and results at an earlier stage are always nested within the results at a later stage creating a sort tree graph. The final number of cluster retained may reflect idiosyncrasies to the algorithm of clusterization. For this reason I used an array of hierarchical algorithms, such as complete linkage, average linkage, centroid method and Ward's method. The visual inspection of tree graphs for each algorithm, together with the application of formal stopping rules, indicated that Ward's method provided the more neat solution. In particular Calinsky-Harabatz pseudo-F suggested to form 4 clusters of observations. As robustness check, I cross-tabulated cluster solutions provided by different algorithms. The concordance of Ward's method with alternative algorithms was satisfying, as indicated by Cronbach's alpha ranging from .52 —achieved as comparison of Ward's Method with Centroid Method— to .82 —achieved as comparison of Ward's Method with Average-Linkage Method—. An additional robustness check was conducted by separately examining the distribution of units across clusters for each company. The statistical test suggested that conditional distributions did not significantly differ.

Profile Analysis of Cluster

The cluster solution was profiled in two ways. First, clusters were contrasted in terms of clustering variates. Second, variables not included in the clustering procedures were used to explain scientist's assignment to a cluster. This stage was necessary to reinforce the validity of cluster solution —failing to show substantial variation between clusters indicate other cluster solutions should be examined— and to give theoretical sense to statistical output. Figure 5.x1 depicts the differences between clusters in terms of clustering variables. For each variable I tested the hypothesis that the expected value conditional to cluster did not differ respect to the expected value of the variable in the remaining cluster —taking into account the “i” variable for the “j” cluster, I compared E(xi | Cluster=“j”) respect to E(xi | Cluster ≠ “j”)—.

Figure 5.16 – Profile Analysis of Standardized Clustering Variables



N(Cluster 1)=111. N(Cluster 2)=48. N(Cluster 3)=37. N(Cluster 4)=46.

For each cluster fit difference scores are compared to the average difference scores of remaining clusters. Inferential tests are based on one-tailed t-test. Fit difference scores are normal standardized values.
• p<0.10, •• p<0.05, ••• p<0.01, •••• p<0.001

Figure 5.16 depicts results from profile analysis. For “Cluster 1” —composed of 111 scientists— fit scores were positive for three on four kinds of fit. Moreover, fit scores significantly differed from overall averages —i.e., the average computed in the remaining clusters-. SW fit score indicated that the average scientist in this cluster did not experiment neither fit nor misfit respect to other scientists in the workgroup. Conversely the average scientist fitted respect to his or her supervisor —SS fit—, job features —SJ fit— and his or her organization in a broader sense —SO fit—. For “Cluster 2” —composed of 48 scientists— fit scores were positive for SW fit, SS fit and SJ fit as well, but not for SO fit. Furthermore, scores significantly differed from the average value registered in the remaining clusters (p-values ranging from .10 to .0001). All in all evidences suggested that values of the average scientist did not fit with values inspiring their organization. For “Cluster 3” —made of 37 scientists— fit scores significantly differed from average values registered in the remaining clusters. The average scientist in this cluster experienced a misfit situation for two on four kinds of fit. As for “Cluster 2” values of average scientist in this cluster did collide with organizational values. But in this case misfit extended to the characteristics of the job —that are organizing templates and scientific inducement aiming at regulating scientist’s work—. For “Cluster 4” —composed of 46 scientists— fit scores were significantly different respect to average values registered in the remaining clusters. The average scientist in this cluster experimented a misfit condition on all four kinds of fit.

Table 5.12 – Test of Differences on Clustering Variables

Variable	Inferential test						
	Anova		Kruskal-Waliis	Manova			
	F	R-sq	Chi-sq	Wilk's Lambda	Pillai's Trace	Lawley-Hotelling Trace	Roy's Largest Root
Identification							
	44.75 ••••	0.49	64.34 ••••				
	47.14 ••••	0.51	58.81 ••••				
	67.44 ••••	0.59	85.35 ••••				
	17.69 ••••	0.28	43.19 ••••				
[1] + [2] + [3] + [4]				0.11 ••••	1.47 ••••	3.82 ••••	2.52 ••••

N=242

a. Scientists actually in a dual-ladder position are excluded. The resulting number of observation is:

Having profiled clusters, a further test was carried out to assess internal validity. As firs step, clusters were contrasted along fit scores using a series of ANOVA models —see the left section of Table 5.12—. As second step, differences on fit scores were simultaneously evaluated within a MANOVA model —see the right section of Table 5.12—. Results indicated that between cluster variation accounted for a significant portion of variation in fit scores —i.e., clustering variables—. Variance explained by models ranged from .27 —for SO fit— to .59 —for SJ fit—. As shown in Table 5.12 non parametric version of tests —that are robust to violations of distribution assumptions implied in parametric tests— provided concordant results. The simultaneous test on fit scores confirmed that between cluster variations jointly accounted for the variance of fit scores —i.e., clustering variables—. Put in perspective, these results supported the internal validity of a clusters solution based on 4 groups. Additional support for this solution came from the size of four clusters. Although observations were not equally distributed across clusters—the firs cluster contains more observations than others—, the sample size of the smallest cluster —based on 37 observations— ensured a satisfying statistical power.

All in all inferential tests indicated that cluster significantly differed in terms of fit difference scores. However a crucial stage of cluster analysis is to show units' differences that underly the classification. For this reason, variables outside the set of clustering variables were used to predict scientist's assignment to a cluster. This goal was accomplished drawing on a multinomial logit model, where "Cluster 1" served as baseline category. The equation I estimated was the following:

$$Pr(Cluster=Cluster_i \mid X = Xi) =$$

$$= b0 + b1\ Age + b2\ Org.\ Tenure + b3\ Company + b4\ Phd + b5\ Learning\ Orientation +$$

$$+ b6\ Performance\ Orientation - Avoid + b7\ Performance\ Orientation - Prove +$$

$$+ b8\ Sent\ interdependencies + b9\ Received\ Interdependencies + e$$

The equation contains individual level controls such as age, organizational tenure and education —a dummy variable identified scientists who received a Ph.D.—. Other individual level differences were also taken into account. In particular "state goal orientation"—composed of two related constructs that are learning orientation and performance orientation— was included as a predictor. This enabled me to derive the influence of pure —and stable— individual level differences on interactions scientists and environmental features. Finally task level controls were introduced in the right hand side of the equation, so as to highlight the influence of "pure" organizational aspects on cluster formation. I conceptualized task level differences as sent interdependencies —i.e., the degree to which other's work depends to the completion of scientist's tasks—, and received interdependencies —i.e., the degree to which scientist's work depends to the completion of other's task—.

Table 5.13 – Analysis of Scientists Attributes Predicting ClusterAffiliation

Dependent Variable	Cluster Affiliation		
	2	3	4
Age	0.99	0.94	0.94 ••••
	0.04	0.06	0.01
Org. Tenure	1.03 ••	1.12 •••	1.04 ••••
	0.01	0.05	0.00
Company	0.48 •••	0.20 •••	0.15 ••••
	0.11	0.14	0.03
Phd	0.30 •••	0.89	0.94
	0.13	1.24	0.19
Learning Orientation	1.17	1.52 ••••	1.51 ••••
	0.23	0.12	0.35
Performance Orientation – Avoid	0.74	1.18	1.12
	0.17	0.17	0.17
Performance Orientation – Prove	2.43 ••••	1.21 •••	1.27
	0.18	0.09	0.68
Sent interdependencies	1.71 ••	0.92	0.72 ••••
	0.37	0.32	0.04
Received Interdependencies	0.93	0.58	0.70 ••••
	0.19	0.29	0.03

N=242
R-sq = .23

Relative risk ratios are reported. Standard errors in second row. Cluster 1 is the baseline category.

• p<0.10, •• p<0.05, ••• p<0.01, •••• p<0.001

Multinomial logit estimates are reported in Table 5.13. Results indicated that *ceteris paribus*, scientist's assignment to "Cluster 2" was positively related to: (i) organizational tenure (p-value < .05); (ii) performance-prove orientation (p-value < .001), that is the individual focus on the attainment of favorable judgments of competence—; (iii) sent interdependencies (p-value < .05), referring to the degree to which other's work depends to the completion of scientist's tasks. Conversely, scientists who received a Ph.D. were less likely to be included in "Cluster 2" (p-value < .01). *Ceteris paribus*, scientist's assignment to "Cluster 3" was positively related to: (i) organizational tenure (p-value < .01); (ii) performance-prove orientation (p-value < .01), that is the individual focus on the attainment of favorable judgments of competence; (iii) learning orientation (p-value < .001), that concerns the focus on the development of competence—. Scientists in the pharmaceutical company had a lower probability to block in "Cluster 3". Finally scientists likelihood to be included in "Cluster 4" was positively related to: (i) organizational tenure (p-value < .001); (ii) learning orientation (p-value < .001). Conversely the assignment to "Cluster 4" was negatively correlated with: (i) age (p-value <

001); (ii) sent interdependencies (p-value < .001); (iii) received interdependencies (p-value < .001).

Criterion Validity of Cluster Solution

The criterion validity of designed cluster solution was assessed by contrasting clusters along an array of variables, concerning identification, knowledge transfer, performance, conflict, turnover intention, and desirability of a dual ladder career —Figure 5.17 offers a representation of this framework—. Results of differences of mean tests are reported in Table 5.14. For individual variables —e.g., organizational identification— between clusters variation was assessed using ANOVA and Kruskal-Wallis equality-of-populations rank test. For groups of related variables —e.g., workgroup identification, organizational identification, and professional identification— between clusters variation was assessed using MANOVA.

Figure 5.17 – Framework of Criterion Validity Assessment

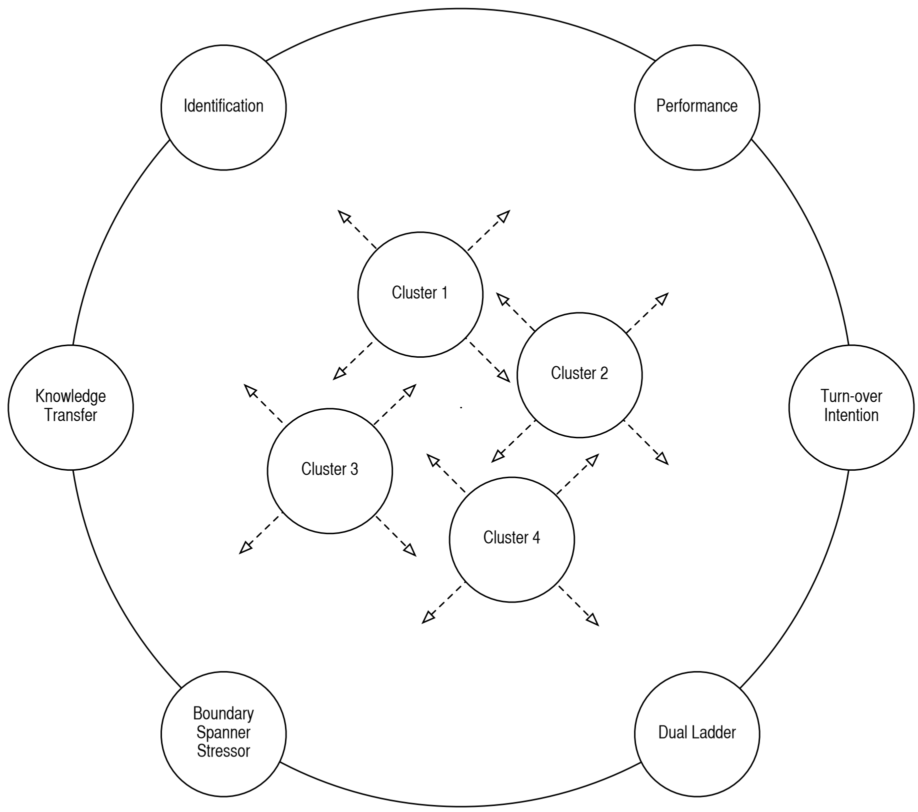


Table 5.14 – Criterion Validity of Cluster Solution: Test of Differences

Variable	Inferential test						
	Anova		Kruskal-Waliis	Manova			
	F	R-sq	Chi-sq	Wilk's Lambda	Pillai's Trace	Lawley-Hotelling Trace	Roy's Largest Root
Identification							
Workgroup Identification [1]	0.86	0.02	2.17				
Organizational Identification [2]	0.35	0.01	0.47				
Professional Identification [3]	0.17	0.00	0.96				
[1] + [2] + [3]				0.96	0.04	0.04	0.03
Knowledge Transfer							
Intra-Workgroup	1.06	0.02	1.82				
Extra-Workgroup	0.44	0.01	1.02				
[4]+ [5]				0.97	0.03	0.03	0.02
Performance							
Scientific Performance [6]	0.47	0.01	0.86				
Project Contribution [7]	1.62	0.03	4.34				
Contextual Performance [8]	3.33 ••	0.07	9.02				
[6] + [7] + [8]				0.90 •	0.11 •	0.11 •	0.08••
Conflict							
Role Ambiguity [9]	5.69 •••	0.11	13.63 •••				
Role Conflict [10]	2.89 ••	0.06	8.73 ••				
[9] + [10]				0.86 •••	0.14 •••	0.16 ••••	0.14•••
Turn Over Intention	3.71 ••	0.07	10.69 ••				
Attractiveness of Dual Ladder Career	1.29	0.04	4.12				

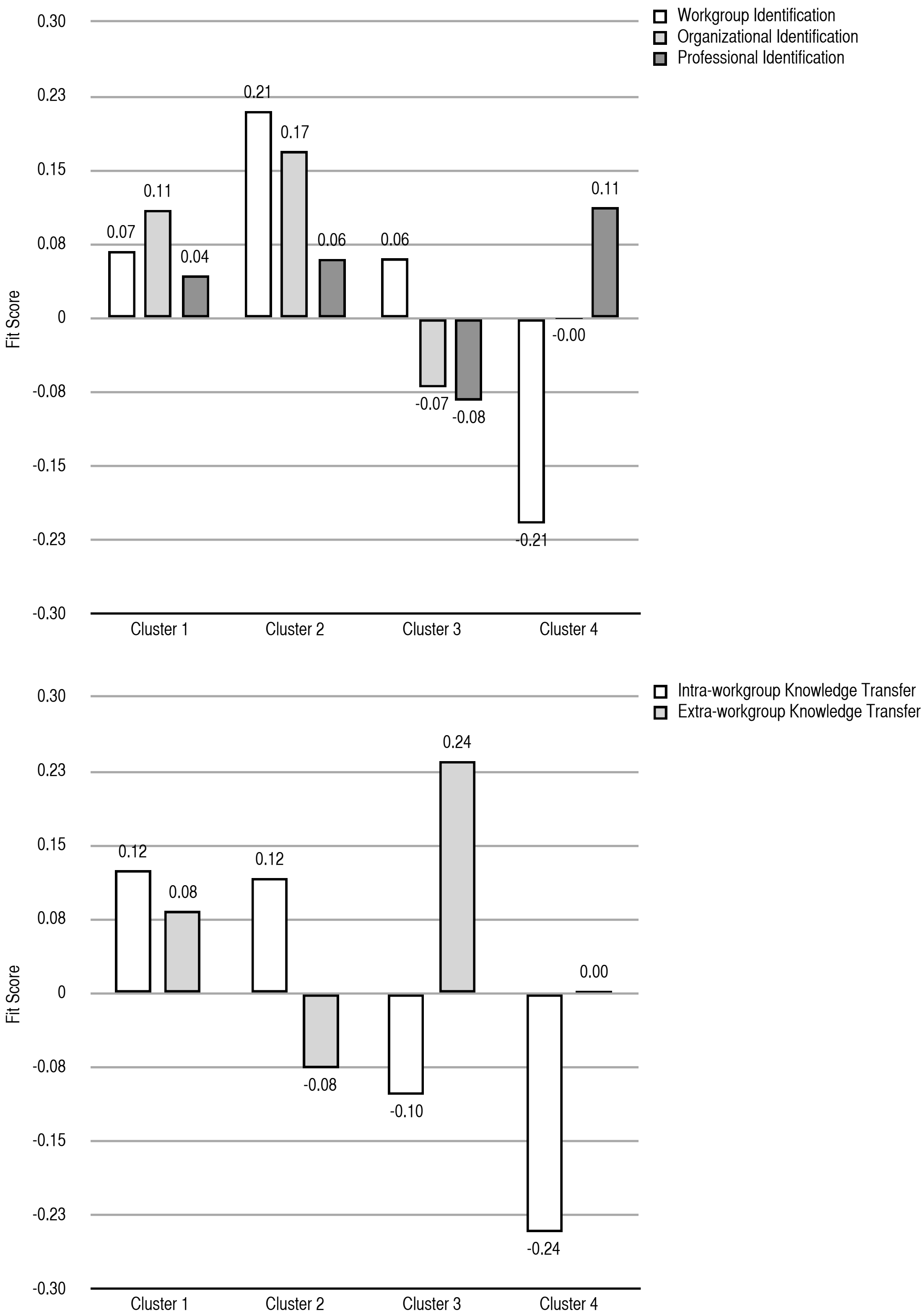
N=242

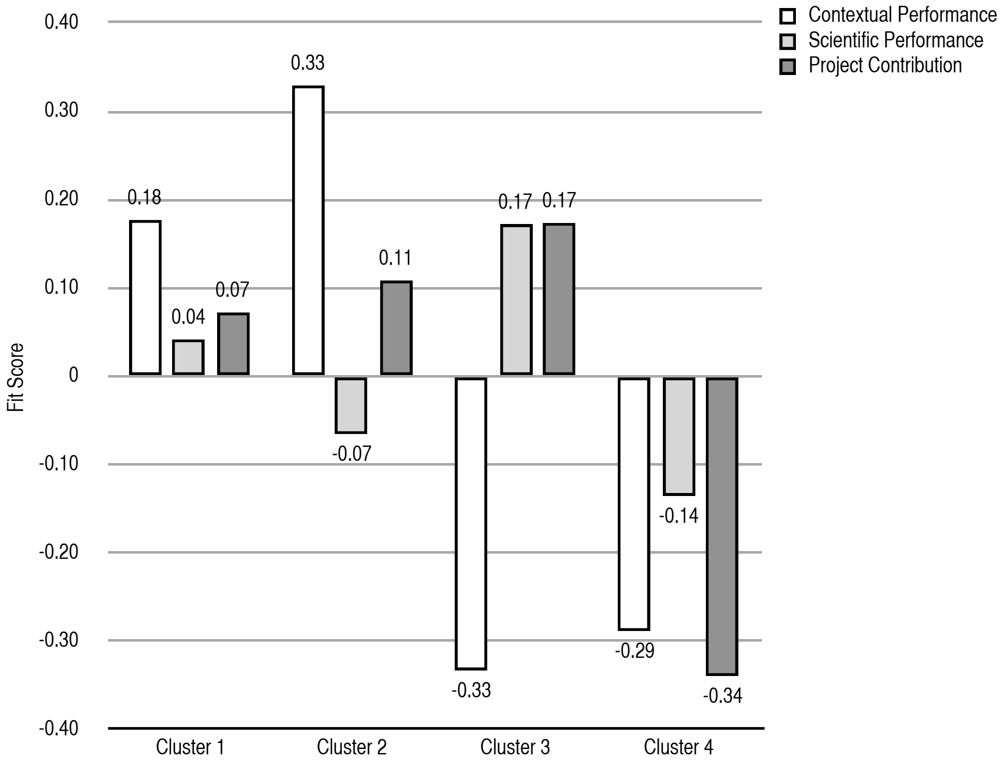
a. Scientists actually in a dual-ladder position are excluded. The resulting number of observation is 148.

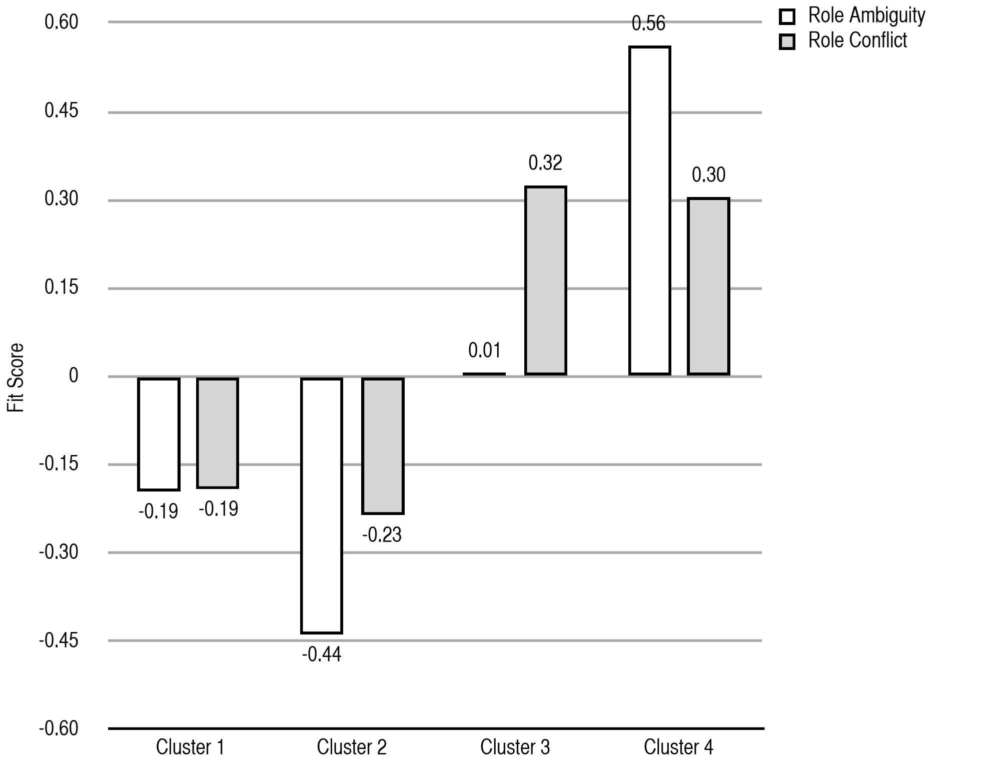
• p<0.10, •• p<0.05, ••• p<0.01, •••• p<0.001

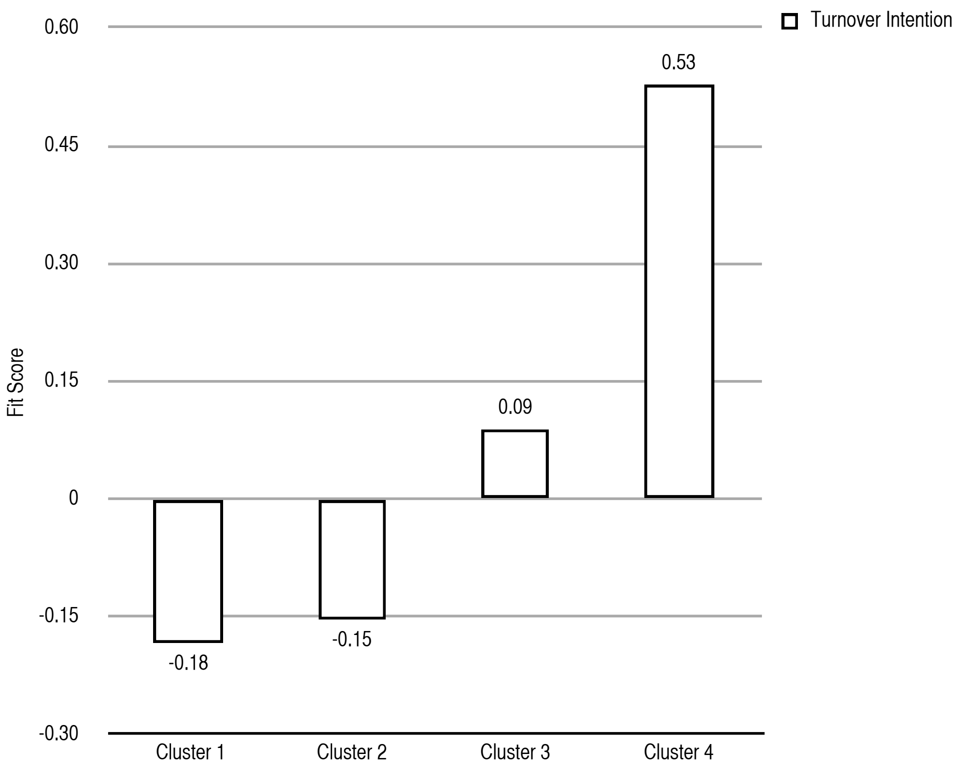
Figure 5.18a-5.18f depict cluster differences on the array of variables. As far as identification variables are concerned results indicated that there were not significant differences between clusters. Furthermore, MANOVA results indicated that individual level patterns of workgroup-, organizational-, and professional-identification did not systematically differed across groups. As shown in the middle section of Table 5.14, no differences were found regarding intra-workgroup and extra-workgroup knowledge transfer. Between cluster variation of performance variables —scientific performance, project contribution, contextual performance—received moderate support . Between cluster variation of contextual performance was statically significant (p-value < .05), but variations of in-role performance —scientific performance and project contribution— was not. In spite of this, MANOVA results indicated that clusters were systematically associated to patterns of contextual and in-role performance —as shown in the middle section of Table 5.14—. As far as role ambiguity and role conflict are concerned, results suggested the existence of a raked variation between clusters. Lower section of Table 5.14 shows that role ambiguity significantly differed across clusters (p-value < .01), as well as role conflict (p-value < .05). MANOVA results were coherent with tests of difference on individual variables —as shown in the lower section of Table 5.14—. Finally, difference in turn over intent was statistically significant —as indicated in the lower section of Table 5.14—, while the perceived attractiveness of dual ladder career did not significantly differ across clusters.

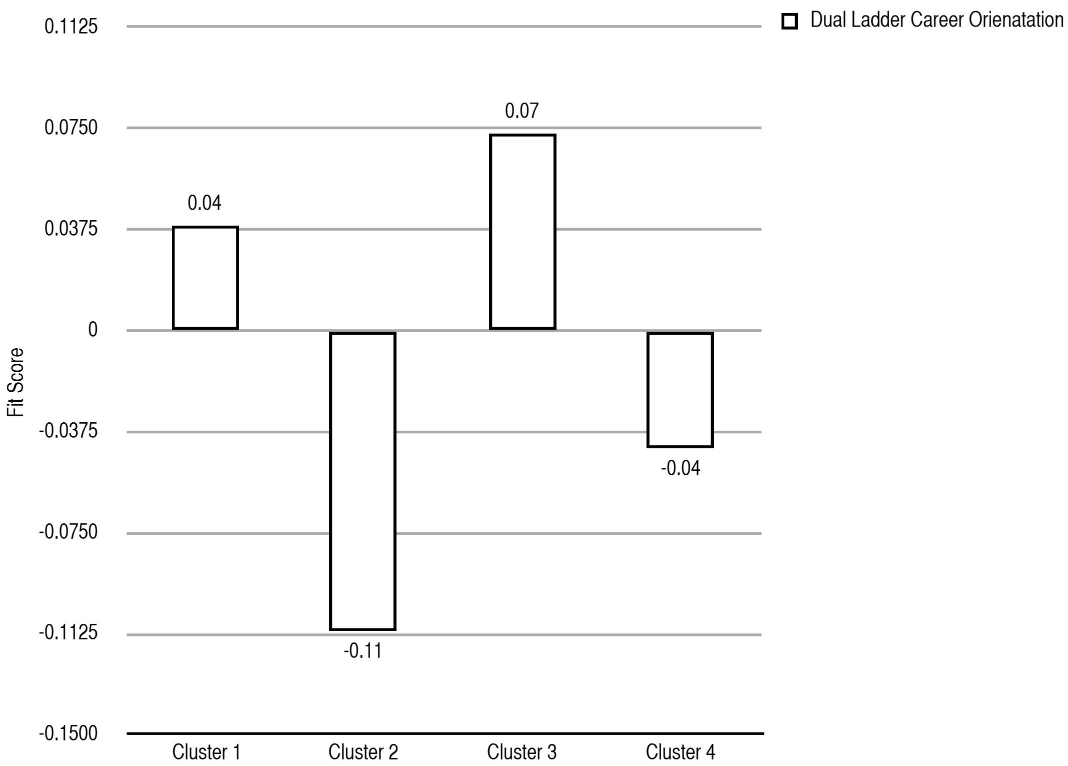
Figure 5.18 – Criterion Validity of Cluster Solution: Identification




0.40
0.30
0.20
0.10
0
-0.10
-0.20
-0.30
-0.40
Fit Score
0.18
0.04
0.07
0.33
-0.07
0.11
-0.33
0.17
0.17
-0.29
-0.14
-0.34
Cluster 1
Cluster 2
Cluster 3
Cluster 4
Contextual Performance
Scientific Performance
Project Contribution


0.60
0.45
0.30
0.15
0
-0.15
-0.30
-0.45
-0.60
Fit Score
-0.19
-0.19
-0.44
-0.23
0.01
0.32
0.56
0.30
Cluster 1
Cluster 2
Cluster 3
Cluster 4
Role Ambiguity
Role Conflict


Turnover Intention
Fit Score
0.60
0.45
0.30
0.15
0
-0.15
-0.30
0.53
0.09
-0.18
-0.15
Cluster 1
Cluster 2
Cluster 3
Cluster 4


Dual Ladder Career Orienatation
Fit Score
0.1125
0.0750
0.0375
0
-0.0375
-0.0750
-0.1125
-0.1500
0.04
0.07
-0.11
-0.04
Cluster 1
Cluster 2
Cluster 3
Cluster 4

Integration of Results

Inferential tests supported both statistical validity and internal validity of the designed cluster solution. Table 5.15 integrates these complex set of information so as to facilitate the interpretation of “fit patterns”, and to derive implications for organizational behavior. Table 5.15 is shaped as a two-way table where rows and columns are associated to clusters , and cell content refers to outcomes of mean difference tests. Cells report a “>” sign, when the average fit score for “row cluster” exceeds the fir score for “column cluster”, while a “<“ identifies the opposite situation. A “-“ indicates no statistical difference among fit scores related to different clusters. The far right column concerns the comparison of fit scores related to each cluster with overall fit scores —computed on the basis of remaining clusters—. As one can see, information contained in this column supports the distinctiveness of the designed cluster solution.

The comparison of Cluster 1 and Cluster 2 suggested that scientists in the latter cluster experimented lower levels of role ambiguity and role conflict as well. Taking into account cluster features in terms of fit/misfit patterns, it seems that negative consequences in terms of role ambiguity and role conflict may be attributable to two factors: (i) compared to Cluster 1, scientists in Cluster 2 had higher scores on SW-, SS-, SJ; (ii) scientist in Cluster 2 had on average negative SO fit score. The comparison of Cluster 1 and Cluster 3 indicated that role ambiguity, role conflict and turn over intent were higher in the latter cluster. Moreover contextual performance was lower in Cluster 3. Taking into account cluster differences in terms of fit scores, these results seem to suggest that SJ misfit has serious implications for conflict and contextual performance as well. The comparison of Cluster 1 with Cluster 4 marked differences. Scientist in the latter cluster —who experimented misfit along all dimensions of the environment— had lower contextual and project contribution levels. Furthermore scientists in this cluster experimented higher levels of role ambiguity, role conflict and lower workgroup identification. However, it was not possible to derive implications for scientists’ attitudes and behaviours, in that the two clusters were at the odds int terms of fit-misfit patterns. Further information in this sense was provided by comparing Cluster 4 with Cluster 2 and Cluster 3. The comparison of Cluster 2 and Cluster 3 highlighted that scientists in the latter cluster had higher levels of extra-workgroup knowledge transfer and higher scientific performance, but inferior levels of contextual performance, higher role ambiguity and role conflict. If one considers key features of the two clusters, in terms of fit/misfit patterns, then attention should be primarily directed to the role of SJ fit, which was negative in Cluster 3, and significantly different from positive score registered in Cluster 2. Results achieved by comparing Cluster 2 and Cluster 4 provided very similar results to the comparison of Cluster

1 and Cluster 4. Substantially scientists in Cluster 4 had lower contextual performance and lower project contribution, showing also lower identification with their workgroup. Moreover, scientists in this cluster tended to experimented role ambiguity, role conflict, and higher turn over intent. Comparison of Cluster 3 and Cluster 4 confirmed that scientists in the latter cluster had higher role ambiguity and higher turn over intent. However, differences in contextual performance and role conflict were not statistically significant. The additional element provided is that scientific performance in this group tended to be lower that in Cluster 3. If one considers that Cluster 3 differed to Cluster 2 for SJ fit score —which was negative in the former cluster— then results offered a series of insights. All others being equals, SJ misfit seems to be associated to lower contextual performance —that was not significantly different in Cluster 3 and Cluster 4, while it did differ across Cluster 2 and Cluster 4-. Following the same logic, SJ misfit seems to be associated to higher levels of role ambiguity.

Table 5.15 – Test of Mean Differences Between Clusters

	Differences Among Pairs of Cluster				Differences Among Cluster "i" and Overall Mean
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	
Cluster 1	Work. Id.				-
	Org. Id.				-
	Prof.Id				-
	Intra-Wor. Know. Transf.				> •
	Extra-Wor. Know. Transf.				-
	Scientific Performance				-
	Project Contribution				-
	Contextual Performance				> •
	Role Ambiguity				< ••
	Role Conflict				< ••
	Turn Over Intention				< •••
	Dual Ladder				-
Cluster 2	-	Work. Id.			> •
	-	Org. Id.			-
	-	Prof.Id			-
	-	Intra-Wor. Know. Transf.			< ••
	-	Extra-Wor. Know. Transf.			-
	-	Scientific Performance			-
	-	Project Contribution			-
	-	Contextual Performance			> •••
	< •	Role Ambiguity			< •••
	< •	Role Conflict			< •
	-	Turn Over Intention			< •
	-	Dual Ladder			-
Cluster 3	-	-	Work. Id.		-
	-	-	Org. Id.		-
	-	-	Prof.Id		-
	-	-	Intra-Wor. Know. Transf.		-
	-	> •	Extra-Wor. Know. Transf.		> •
	-	> •	Scientific Performance		> •
	-	-	Project Contribution		> •
	< •••	< ••••	Contextual Performance		< ••
	> •	> ••	Role Ambiguity		-
	> •••	> •••	Role Conflict		> ••
	> •	-	Turn Over Intention		-
	-	-	Dual Ladder		-
Cluster 4	< •	< ••	-	Work. Id.	< •
	-	-	-	Org. Id.	-
	-	-	-	Prof.Id	-
	< ••	< •	-	Intra-Wor. Know. Transf.	-
	-	-	-	Extra-Wor. Know. Transf.	-
	-	-	< •	Scientific Performance	-
	< •••	< •	< ••	Project Contribution	> •••
	< •••	< ••••	-	Contextual Performance	< •••
	> ••••	> ••••	> ••	Role Ambiguity	> ••••
	> ••••	> •••	-	Role Conflict	> •••
	> ••••	> •••	> ••	Turn Over Intention	> ••••
	-	-	-	Dual Ladder	-

N=242

Cluster means are compared using one-tail t-test.
• p<0.10, •• p<0.05, ••• p<0.01, •••• p<0.001

CHAPTER 6

Introduction

CHAPTER 6

Discussion and Conclusions

6.1 - Summary and Integration of Findings

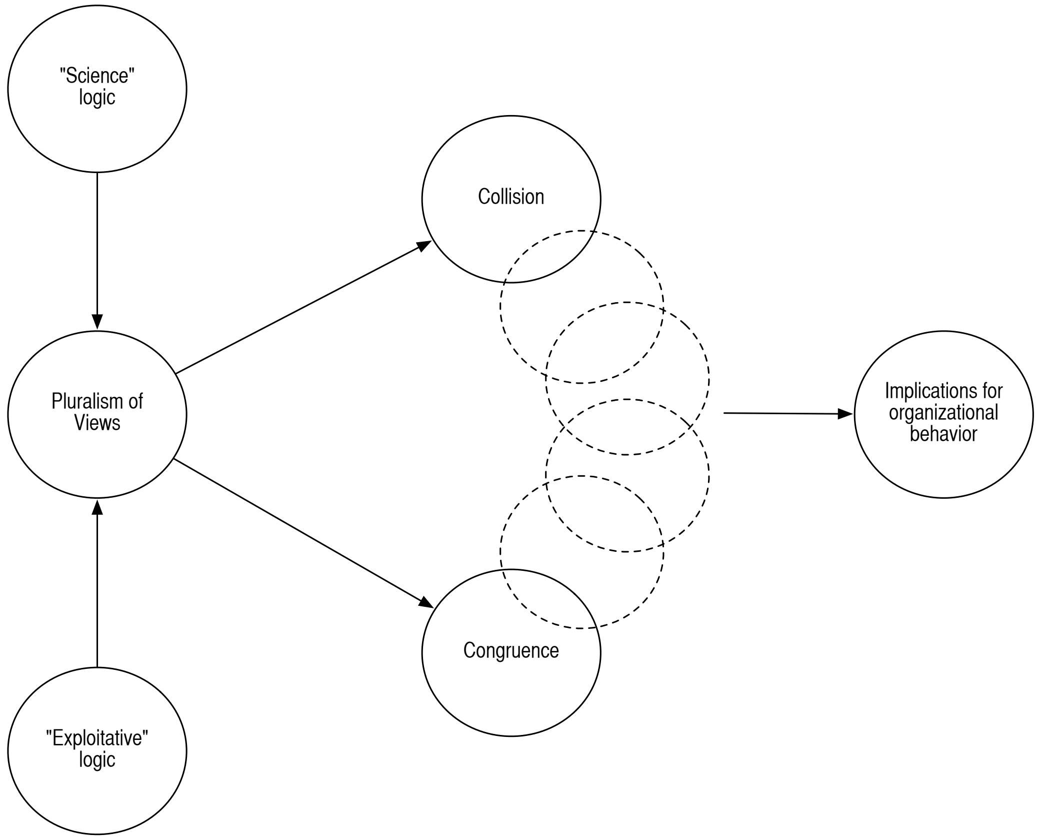
The purpose of this dissertation study was to explore the relation among science and business from a novel perspective, that combines micro-organizational arguments and macro-level insights, from the emerging stream of institutional pluralism (Kraatz & Block, 2008) and the sociology of science (Cetina, 1987; Knorr-Cetina, 1999; Latour & Woolgar, 1979). For sake of clarity I recall the conceptual framework of the dissertation —Figure 6.1—. In particular the thesis had two primary goals:

- *Explaining why and when different institutional of knowledge production —science Vs. exploitative logic— collide in science-based firms;*

- *Bringing to light the consequences of collisions of different institutional logics for organizational behavior, and, at a higher level, for the innovation process.*

In order to address these research questions, I focused on the cross-level determinants of attitudes and behaviours of scientists who work in R&D departments of science-based firms —where scientists and managers work side by side to generate scientific advancements and, together, retain "best quality" proposals of innovation—. In so doing I relied on the premises that values, beliefs, and organizing templates of scientists are crucially shaped by a multiplicity of institutions that operate at different levels (March & Simon 1958). On the one hand attitudes and behaviours of scientists are embedded in the broader epistemic community (Knorr-Cetina, 1999); on the other hand scientists are exposed to formal and informal organizational practices that coordinate actions in the R&D department (Cardinal, 2001). Therefore, the study of these multiple sources of regulation of attention, attitudes and behaviours may offer the unique chance to explore potential collisions of different institutional logics of knowledge production. Within this logic, I used the interactionist perspective, and the related concept of fit to evaluate the congruence between scientist and environmental elements, as taste for science of people in the workgroup, knowledge production preferences on the part of the suepervisor, organizing templates implied by job characteristics and organizational.

Figure 6.1 – The Framework of the Dissertation



Exploratory empirical evidences have shown that scientists are not a homogenous group of individuals —as largely believed—. Rather, scientists are heterogeneous organizational members, whose decisional premises are shaped my a multiplicity of institutions. Moreover, collisions of different decisional premises, related to "science logic" and "exploitative logic" are the rule rather than the exception. Therefore, a micro-macro research approach is the most useful and consistent approach to study organizational behavior in science-based settings —and in professional organizations in a broader sense—. Figures 6.2 and 6.3 make a step back to the conceptual models that relate fit to: (i) knowledge transfer and performance, and (ii) boundary span role stressors —i.e. role ambiguity and role stress—. To this end, I assembled the paths to summarize the degree of support for each of the relationships in the model. Dashed lines indicated that scientist and environmental components do not operate according to a fit effect. Conversely, continuos lines indicate that fit effect is supported.

Figure 6.2 – Conceptual Model Relating Fit to Performance and Knowledge Transfer: Summary

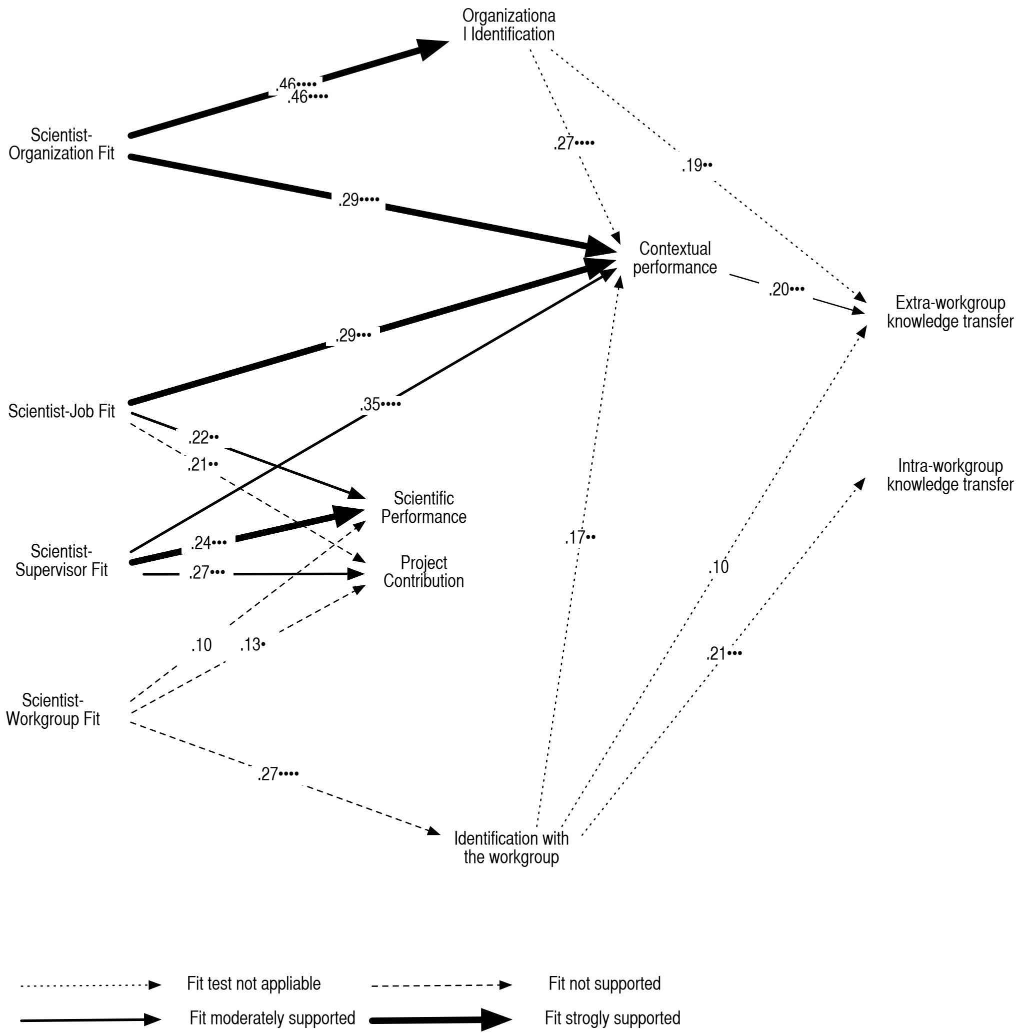
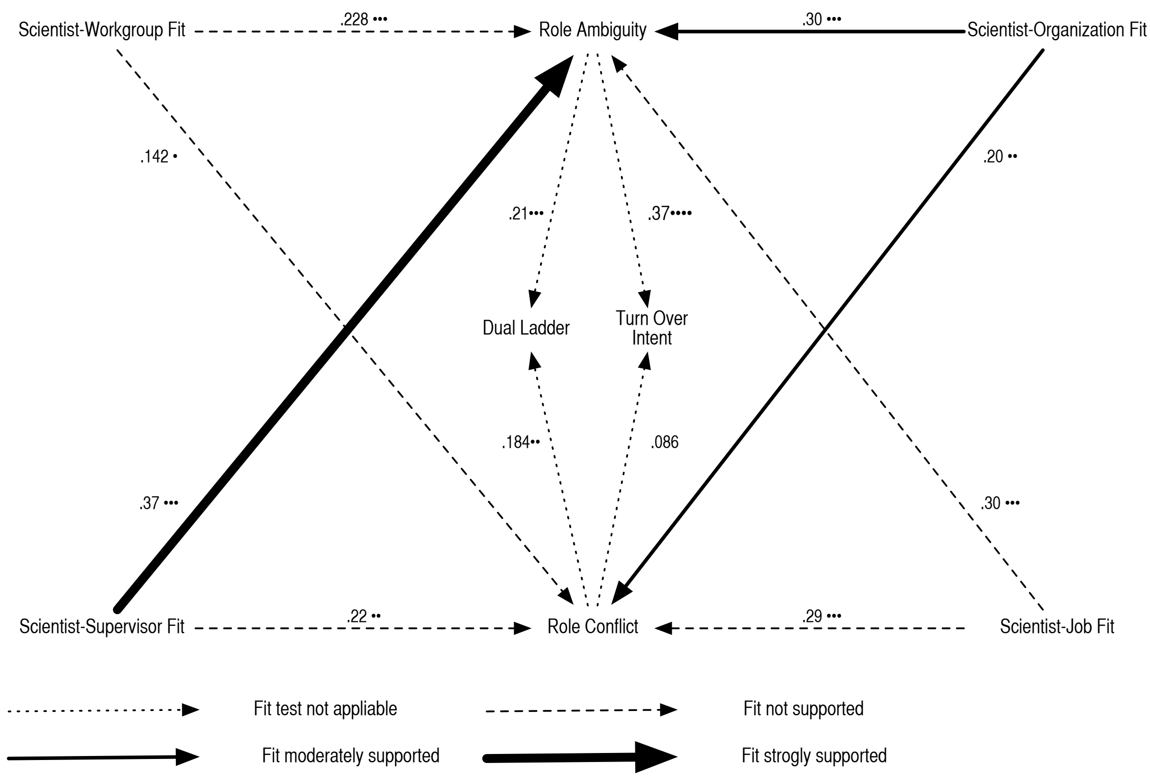


Figure 6.3 – Conceptual Model Relating Fit to Boundary Span Role Stressors: Summary



6.2 - Contributions to OB

The results of this study have several theoretical implications for organizational behavior research. First, PE fit stream provides a unique set of tools and a framework of reasoning. But it is no a theory. I have tried to contribute to this stream by linking Institutional Theory to the interactionist perspective. Second, this study is the first attempt to provide a configurational perspective on PE fit. Empirical evidences have shown that configurations of within PE fit may provide solid theoretical and managerial implications.

6.3 - Contributions to OT

The dissertation study has a cross-level nature, in that "fit" is composed of a person-level component and an environmental-level component. Conversely outcome variables refer to the individual-level, being concerned with attitudes —e.g., social identification or role stressors— and behaviors —e.g., task-performance, contextual performance, knowledge transfer—. In spite of this, organizational-level implications arise from the study. First, fit (misfit) conditions simply underscore the (mis)alignment between the person and the environment, suggesting that the congruence (collision) of different institutional logics. Therefore, fit (misfit) offers direct implications for organizational responses to institutional pluralism. Second, several individual-level outcomes included in the study have been found to foster —to inhibit— organizational effectiveness. In particular, a number of meta-analytic reviews have shown that knowledge transfer has a positive effect on innovation (van Wijk, Jansen, & Lyles, 2008). Analogously, contextual performance has been found to increase organizational effectiveness in a broader sense (Podsakoff, Whiting, Podsakoff, & Blume, 2009). On the other hand role ambiguity and role conflict have been found to negatively affect organizational-level outcomes via communication (Gong, Shenkar, Luo, & Nyaw, 2001).

My study offers several implications for organizational theory. First, focusing on interactions among individual and environmental elements I have clarified the antecedents of organizational choice in organized anarchies, where individuals lack clear goals, decision structures are fluid, and ambiguity surrounds the decision making process. Second, the study provides strong implications about how individual allocate scarce time and energy among competing activities —as scientific research and internal technology transfer—. Third, the study complements theory knowledge transfer based on shared social identities. I have shown in fact that knowledge transfer reflects motivational aspects and normative commitment toward the organization.

6.4 - Contributions to Technology and Innovation Management

The context of science-based setting served as a "laboratory" where to address the research questions. Though, the conceptual model can provides a novel perspective on management of science-based business that accounts of specific micro-organizational challenges and rooted their origins in the broader social structure. Several works have dealt with tangle problem of R&D project selection in presence of high technological uncertainty. The large majority of these works have tried to address this problem by providing complex analytical techniques (Cook & Roll, 1988; Fox & Baker, 1985; Goldstein & Singer, 1986; Gupta, Kyparisis, & Ip, 1992; Liberatore, 1987; Machacha & Bhattacharya, 2000; Mandakovic & Souder, 1985; Meade & Presley, 2002). However, these models have been largely criticized because of the difficulties to employ these techniques in "real-world" organizations (Martino, 1995). Furthermore, no empirical evidences supported the effectiveness of these techniques. It follows that organizations tend to favor unstructured approaches —usually defined "strategic approaches"—. According to this logic a recent review (Brunner, MacCormack, & Zinner, 2008) suggested that a behavioral approach may aid to clarify how real world organizations actually select ideas —especially when they deal with huge uncertainty—.

My study contributes to this literature in two ways. First, it highlights that scientists can play a crucial role to improve the quality of decisions the project selection area (Loch, Pich, Terwiesch, & Urbschat, 2001). Scientists are the repository of tacit knowledge that can be used as an "input" in the organizational decision making so as to retaining best quality ideas. However, the condition surrounding the knowledge transfer are strictly related to both identification processes and motivational aspects. So, in order to activate this valuable body of knowledge organizations should carefully take into account how individual and environmental components interact to affect identification and motivation. Second, scientists may play a crucial role in affecting project performance. The emerging literature on ambidexterity at the individual level has mainly focused on personal characteristics, enabling individual to operate across explorative and exploitative domains. I suggest that individual ambidexterity may derive from scientist-environment fit, in that fit modify the distribution of energy and attention through contextual performance and identification.

Appendix A: Interviewer's Guide

Focus	Question
Idea generation	•Please think to you organizational setting; how does a promising idea become an "R&D project"?
	•Please think to idea generation and idea screening activities you are engaged in; to what extent you rely on external knowledge accomplishing this tasks?
	•...more specifically, what are the external links you rely on?
	•What role do scientists play over the different phases of idea generation/idea screening?
Scientist-environment fit	•Please, think to the work you (scientists*) conducted during last year; to what extent your (their) job fit your (their) goals and values?
	•Please, think to a typical day of work; to what extent the task you (scientists) conducted match your (their) interests?
	•Are there tasks within the boundaries of your work (scientists' work) you (they) don't perceive as core?
	•...why do you (they) undertake such a kind of activities?
	•Did you perceive that your colleagues (scientists) differ in terms of "taste for science"?
Nature of the decision making process: perceived conflict and ambiguity	•Please think to decision processes in your setting; to what extent are they ambiguous? ...are they characterized by conflict among organizational members?
	•What statement best fits the activity of your organization:
	•"we have solutions in search for a problem"
	•"we have problems in search for solutions"
Quality of the decision making process	•Please consider your experience in this organization; to what extent the decisional procedures and criteria are effective in retaining best quality ideas?
	•How effective are you in shaping and organizing R&D project/new product development team?
Case selection	•According to your knowledge are there case studies which that fits the focus of the research project we are talking about?

Appendix B: Supplementary Statistical Analysis

RelationBetween Fit, Performance and Knowledge Transfer

C!: SW Fit

Dependent Variable:	Workgroup Identification	Contextual Performance	Task Performance	
			Scientific Performance	Project Contribution
Fit content	Taste for Science	Taste for Science	Taste for Science	Taste for Science
E	0.11	0.30	0.18	0.09
	0.18	0.17	0.15	0.16
S	-0.07	0.07	0.22	0.02
	0.16	0.16	0.13	0.15
E^2	0.28 •	0.09	0.08	0.14
	0.12	0.11	0.10	0.11
ES	-0.12	-0.30 •	-0.33	-0.17
	0.17	0.16	0.14	0.15
S^2	0.08	0.11	0.11	0.09
	0.12	0.12	0.10	0.11
Controls	Yes	Yes	Yes	Yes
N	264	264	264	264
R-sq	0.10	0.131	0.109	0.04

Standardized beta coefficients; Standard errors in second row
•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

C2: SS Fit

Dependent Variable:	Contextual Performance		Task Performance			
			Scientific Performance		Project Contribution	
Fit Content	Knowledge Acquisition	Knowledge Enhancement	Knowledge Acquisition	Knowledge Enhancement	Knowledge Acquisition	Knowledge Enhancement
E	0.33	0.28	0.06	-0.04	-0.15	0.05
	0.21	0.16	0.18	0.14	0.19	0.15
S	-0.09	0.07	0.03	-0.08	0.12	-0.17
	0.22	0.17	0.19	0.15	0.20	0.15
E^2	-0.08	-0.24	-0.09	-0.18	-0.14	-0.16
	0.13	0.10	0.12	0.09	0.12	0.09
ES	-0.25	-0.05	0.08	0.21	0.30	0.00
	0.21	0.14	0.18	0.12	0.19	0.13
S^2	0.30	0.20	0.18	0.23	0.13	0.44 •
	0.13	0.13	0.12	0.11	0.12	0.12
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	264	264	264	264	264	264
R-sq	0.159	0.159	0.09	0.08	0.09	0.08

Standardized beta coefficients; Standard errors in second row
•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

C3:SJ Fit

Dependent Variab	Contextual Performance			Task Performance					
				Scientific Performance			Project Contribution		
Fit Content	Science Incentives	Decision Autonomy	Decision Centralization	Science Incentives	Decision Autonomy	Decision Centralization	Science Incentives	Decision Autonomy	Decision Centralization
E	0.33 ••	0.73 ••••	0.27 ••	0.06	0.42 ••	0.11	0.02	0.40 ••	0.14
	0.14	0.18	0.08	0.12	0.16	0.07	0.13	0.18	0.08
S	-0.00	-0.36 •	0.01	0.30 •	-0.31	0.09	0.16	-0.27	-0.00
	0.13	0.19	0.09	0.12	0.17	0.08	0.13	0.18	0.08
E^2	-0.08	0.39 ••	0.17	-0.08	0.23	0.11	-0.06	0.18	0.09
	0.09	0.10	0.06	0.08	0.09	0.05	0.09	0.10	0.06
ES	-0.06	-0.51 ••	-0.12	0.13	-0.36 ••	0.04	0.10	-0.36 ••	-0.19
	0.11	0.14	0.08	0.10	0.13	0.07	0.11	0.14	0.08
S^2	0.15	0.12	0.19 •	0.01	0.12	0.03	0.10	0.18	0.16
	0.07	0.09	0.07	0.06	0.08	0.06	0.07	0.09	0.06
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	264	264	264	264	264	264	264	264	264
R-sq	0.23	0.19	0.14	0.12	0.05	0.05	0.01	0.06	0.05

Standardized beta coefficients; Standard errors in second row
•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

C4: SO FIt

Dependent Variable:	Organizational Identification				Contextual Performance			
Value content	Altruism	Pay	Prestige	Security	Altruism	Pay	Prestige	Security
E	-0.05	0.14	-0.03	0.06	0.01	0.28 •	0.14	0.08
	0.10 ••	0.12	0.12	0.08	0.10	0.12	0.12	0.09
S	0.22	0.49 •••	0.28 ••	0.27 ••	0.16	0.60 ••••	0.21 •	0.23 •
	0.10	0.20	0.12	0.10	0.10	0.20	0.12	0.11
E^2	-0.11	-0.10	0.11	-0.20 •••	-0.15	-0.03	-0.02	-0.08
	0.07	0.07	0.08	0.05	0.07	0.07	0.08	0.05
ES	0.59 ••••	0.13	0.14	0.28 •••	0.36 ••	-0.14	-0.06	-0.04
	0.08	0.11	0.10	0.06	0.08	0.11	0.09	0.07
S^2	-0.29 •••	-0.09	-0.01	0.03	-0.12	-0.37 ••	0.10	-0.05
	0.06	0.10	0.09	0.06	0.06	0.10	0.09	0.07
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	264	264	264	264	264	264	264	264
R-sq	0.232	0.255	0.178	0.245	0.169	0.180	0.148	0.113

Standardized beta coefficients; Standard errors in second row
•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

RelationBetween Fit and Boundary-Span Role Stressor

C6: SW Fit

Dependent Variable:	Role Ambiguity	Role Conflict	Turn Over Intent	Dual Ladder Desirability
Fit content	Taste for Science	Taste for Science	Taste for Science	Taste for Science
E	-0.28	-0.14	-0.07	0.11
	0.18	0.18	0.11	0.14
S	0.26 •	0.18	0.14	-0.15
	0.16	0.16	0.09	0.13
E^2	-0.18	-0.07	-0.29 ••	-0.06
	0.12	0.12	0.07	0.09
ES	0.25	0.20	0.18	0.05
	0.17	0.17	0.10	0.13
S^2	-0.20	-0.08	-0.04	-0.08
	0.12	0.12	0.07	0.10
Controls	Yes	Yes	Yes	Yes
N	264	264	264	264
R-sq	0.13	0.101	0.064	0.133

Standardized beta coefficients; Standard errors in second row
•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

C7: SS Fit

Dependent Variable:	Role Ambiguity		Role Conflict	
Fit Content	Knowledge Acquisition	Knowledge Enhancement	Knowledge Acquisition	Knowledge Enhancement
E	-0.34	-0.18	0.07	-0.11
	0.21	0.16	0.22	0.17
S	0.09	-0.21	0.19	-0.06
	0.22	0.16	0.23	0.17
E^2	0.02	0.42 ••	0.25 •	0.44 ••
	0.14	0.11	0.14	0.11
ES	-0.18	-0.49 ••	-0.22	-0.40 •
	0.22	0.15	0.23	0.16
S^2	0.15	0.18	-0.10	0.07
	0.14	0.13	0.15	0.13
Controls	Yes	Yes	Yes	Yes
N	264	264	264	264
R-sq	0.227	0.21	0.13	0.12

Standardized beta coefficients; Standard errors in second row
•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

C8: SJ Fit

Dependent Variable:	Role Ambiguity			Role Conflict		
Fit Content	Science Incentives	Decision Autonomy	Decision Centralization	Science Incentives	Decision Autonomy	Decision Centralization
E	-0.30 ••	-0.69 •••	0.07	0.23	-0.17	0.10
	0.14	0.19	0.08	0.15	0.19	0.08
S	0.10	0.32	-0.19	0.17	0.14	0.17
	0.13	0.19	0.09	0.14	0.19	0.09
E^2	-0.02	-0.47 •••	0.17 •	0.21 •	-0.07	0.24 ••
	0.10	0.11	0.06	0.10	0.11	0.06
ES	-0.11	0.29	-0.27 ••	-0.16	-0.11	-0.10
	0.11	0.15	0.09	0.12	0.15	0.08
S^2	-0.12	-0.05	-0.06	-0.21 ••	-0.11	-0.10
	0.07	0.09	0.07	0.07	0.10	0.07
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	264	264	264	264	264	264
R-sq	0.20	0.18	0.14	0.16	0.15	0.16

C9: SO Fit

Dependent Variable:	Role Ambiguity				Role Conflict			
Value content	Altruism	Pay	Prestige	Security	Altruism	Pay	Prestige	Security
E	0.03	-0.13	-0.15	0.08	-0.12	-0.22	-0.01	0.23 ••
	0.10	0.12	0.12	0.08	0.10	0.13	0.12	0.09
S	-0.24	-0.33	0.04	-0.33 •••	-0.16	-0.11	0.12	0.00
	0.10	0.20	0.12	0.10	0.10	0.21	0.12	0.11
E^2	-0.05	0.19	0.15	-0.10	-0.05	0.12	0.02	-0.09
	0.07	0.07	0.08	0.05	0.07	0.07	0.08	0.05
ES	-0.11	-0.09	-0.17	-0.28 ••	0.12	0.10	-0.24 ••	-0.34 •••
	0.09	0.11	0.10	0.06	0.09	0.11	0.10	0.07
S^2	0.08	0.11	-0.04	0.17	0.09	0.12	0.16	-0.02
	0.06	0.10	0.09	0.06	0.06	0.10	0.09	0.06
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	264	264	264	264	264	264	264	264
R-sq	0.15	0.21	0.13	0.20	0.10	0.11	0.126	0.153

Standardized beta coefficients; Standard errors in second row
•p<0.1, ••p<0.05, •••p<0.01, ••••p<0.001

References

Adkins, C., Ravlin, E., & Meglino, B. 1996. Value congruence between co-workers and its relationship to work outcomes. ***Group & Organization Management***, 21(4): 439.

Adler, P. S., Goldoftas, B., & Levine, D. I. 1999. Flexibility versus efficiency? A case study of model changeovers in the Toyota production system. ***Organization Science***, 10(1): 43-68.

Aghion, P., Dewatripont, M., & Stein, J. C. 2008. Academic freedom, private-sector focus, and the process of innovation. ***Rand Journal of Economics***, 39(3): 617-635.

Aiken, L. S., West, S. G., & Reno, R. R. 1991. ***Multiple regression: Testing and interpreting interactions***: Sage Publications, Inc.

Aiken, M., & Hage, J. 1968. Organizational interdependence and intra-organizational structure. ***American Sociological Review***, 33(6): 912-930.

Alexander, V. D. 1996. Pictures at an exhibition: Conflicting pressures in museums and the display of art. ***American Journal of Sociology***, 101(4): 797-839.

Alexander, V. D. 1998. Hybrids of modernity: Anthropology, the nation state and the universal exhibition. ***American Journal of Sociology***, 103(4): 1104-1106.

Alford, R., & Friedland, R. 1985. ***Powers of theory: Capitalism, the state, and democracy***: Cambridge Univ Pr.

Allen, T. 1977. ***Managing the flow of technology***: MIT press Cambridge, MA.

Allen, T. J., & Katz, R. 1986. The Dual Ladder - Motivational Solution or Managerial Delusion. ***R & D Management***, 16(2): 185-197.

Alutto, J., & Acito, F. 1974. Decisional participation and sources of job satisfaction: A study of manufacturing personnel. ***Academy of Management Journal***, 17(1): 160-167.

Amabile, T., Collins, M., Conti, R., Phillips, E., Picariello, M., Ruscio, J., & Whitney, D. ***Creativity in Context: Update to The Social Psychology of Creativitiy***.

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. 1996. Assessing the work environment for creativity. ***Academy of Management Journal***, 39(5): 1154-1184.

Ancona, D. G., & Caldwell, D. F. 1992. Bridging the Boundary - External Activity and Performance in Organizational Teams. ***Administrative Science Quarterly***, 37(4): 634-665.

Andriopoulos, C., & Lewis, M. W. 2009. Exploitation-Exploration Tensions and Organizational Ambidexterity: Managing Paradoxes of Innovation. ***Organization Science***, 20(4): 696-717.

Antonioni, D., & Park, H. 2001. The effects of personality similarity on peer ratings of contextual work behaviors. ***Personnel Psychology***, 54(2): 331-360.

Argote, L., & Greve, H. R. 2007. A Behavioral Theory of the Firm - 40 years and counting: Introduction and impact. ***Organization Science***, 18(3): 337-349.

Argote, L., Ingram, P., Levine, J. M., & Moreland, R. L. 2000. Knowledge transfer in organizations: Learning from the experience of others. ***Organizational Behavior and Human Decision Processes***, 82(1): 1-8.

Argyris, C. 1973. Personality and organization theory revisited. ***Administrative Science Quarterly***: 141-167.

Arora, A., Gambardella, A., Magazzini, L., & Pammolli, F. 2009. A Breath of Fresh Air? Firm Type, Scale, Scope, and Selection Effects in Drug Development. ***Management Science***, 55(10): 1638-1653.

Arthur, W., Bell, S. T., Villado, A. J., & Doverspike, D. 2006. The use of person-organization fit in employment decision making: An assessment of its criterion-related validity. ***Journal of Applied Psychology***, 91(4): 786-801.

Ashforth, B. E., & Mael, F. 1989. Social Identity Theory and the Organization. ***Academy of Management Review***, 14(1): 20-39.

Bailetti, A. J., & Callahan, J. R. 1993. The Engineering-Management Synthesis - Evidence from Graduate Programs in Telecommunications. ***Ieee Transactions on Engineering Management***, 40(1): 30-40.
Baker, D. D., & Cullen, J. B. 1993. Administrative Reorganization and Configurational Context - the Contingent Effects of Age, Size, and Change in Size. ***Academy of Management Journal***, 36(6): 1251-1277.
Barley, S. R. 1996. Technicians in the workplace: Ethnographic evidence for bringing work into organization studies. ***Administrative Science Quarterly***, 41(3): 404-441.
Barley, S. R., & Kunda, G. 1992. Design and Devotion - Surges of Rational and Normative Ideologies of Control in Managerial Discourse. ***Administrative Science Quarterly***, 37(3): 363-399.
Barley, S. R., & Tolbert, P. S. 1997. Institutionalization and structuration: Studying the links between action and institution. ***Organization Studies***, 18(1): 93.
Barnard, C. I. 1938. ***The functions of the executive***. Cambridge, MA: Harvard University Press.
Barrett, R. S. 1995. Employee Selection with the Performance Priority Survey. ***Personnel Psychology***, 48(3): 653-662.
Bartel, C. A. 2001. Social comparisons in boundary-spanning work: Effects of community outreach on members' organizational identity and identification. ***Administrative Science Quarterly***, 46(3): 379-413.
Bartels, J., Pruyn, A., De Jong, M., & Joustra, I. 2007. Multiple organizational identification levels and the impact of perceived external prestige and communication climate. ***Journal of Organizational Behavior***, 28(2): 173-190.
Bechky, B. A. 2003a. Object lessons: Workplace artifacts as representations of occupational jurisdiction. ***American Journal of Sociology***, 109(3): 720-752.
Bechky, B. A. 2003b. Sharing meaning across occupational communities: The transformation of understanding on a production floor. ***Organization Science***, 14(3): 312-330.
Benner, M. J., & Tushman, M. L. 2003. Exploitation, exploration, and process management: The productivity dilemma revisited. ***Academy of Management Review***, 28(2): 238-256.
Blumenthal, D., Campbell, E. G., Gokhale, M., Yucel, R., Clarridge, B., Hilgartner, S., & Holtzman, N. A. 2006. Data withholding in genetics and the other life sciences: prevalences and predictors. ***Academic Medicine***, 81(2): 137.
Bollen, K. A., & Jackman, R. W. 1990. Regression diagnostics: An expository treatment of outliers and influential cases. ***Modern methods of data analysis***: 257-291.
Borman, W., & Motowidlo, S. 1993. Expanding the criterion domain to include elements of contextual performance. ***Personnel selection in organizations***, 71: 98.
Boudreau, K., Lacetera, N., & Lakhani, K. 2009. Parallel search, incentives and problem type: Revisiting the competition and innovation link, ***Social Science Research Network***.
Box, G., & Draper, N. R. 1987. ***Empirical model-building and response surfaces***. New York: John Wiley and Sons, .
Bretz, R. D., & Judge, T. A. 1994. Person-Organization Fit and the Theory of Work Adjustment - Implications for Satisfaction, Tenure, and Career Success. ***Journal of Vocational Behavior***, 44(1): 32-54.
Brief, A. P., Burke, M. J., Robinson, B. S., George, J. M., & Webster, J. 1988. Should Negative Affectivity Remain an Unmeasured Variable in the Study of Job Stress. ***Journal of Applied Psychology***, 73(2): 193-198.
Brown, J. S., & Duguid, P. 2001. Knowledge and organization: A social-practice perspective. ***Organization Science***, 12(2): 198-213.
Brunner, D., MacCormack, A., & Zinner, D. E. 2008. R&D Project Selection and Portfolio Management: A Review of the Past, a Description of the Present, and a Sketch of the Future. In S. Shane (Ed.), ***Handbook of Technology Management***: Blackwell Publishing. .

Burgelman, R. A. 1983. Corporate Entrepreneurship and Strategic Management: Insights from a Process Study. ***Management Science***, 29(12): 1349-1364.
Burgers, W. P., Hill, C. W. L., & Kim, W. C. 1993. A Theory of Global Strategic Alliances - the Case of the Global Auto Industry. ***Strategic Management Journal***, 14(6): 419-432.
Burke, M. J., Brief, A. P., & George, J. M. 1993. The Role of Negative Affectivity in Understanding Relations between Self-Reports of Stressors and Strains - a Comment on the Applied-Psychology Literature. ***Journal of Applied Psychology***, 78(3): 402-412.
Burke, P. J. 1997. An identity model for network exchange. ***American Sociological Review***, 62(1): 134-150.
Burns, T., & Stalker, G. 1961. The management ofinnovation. ***London: Tavis-tock***.
Bush, V. 1945. ***Science: The endless frontier***. Washington, DC: United States Government Printing Office.
Cable, D. M., & DeRue, D. S. 2002. The convergent and discriminant validity of subjective fit perceptions. ***Journal of Applied Psychology***, 87(5): 875-884.
Cable, D. M., & Edwards, J. R. 2004. Complementary and supplementary fit: A theoretical and empirical integration. ***Journal of Applied Psychology***, 89(5): 822-834.
Cable, D. M., & Judge, T. A. 1996. Person-organization fit, job choice decisions, and organizational entry. ***Organizational Behavior and Human Decision Processes***, 67(3): 294-311.
Cable, D. M., & Judge, T. A. 1997. Interviewers' perceptions of person-organization fit and organizational selection decisions. ***Journal of Applied Psychology***, 82(4): 546-561.
Caldwell, D. F., & Oreilly, C. A. 1990. Measuring Person-Job Fit with a Profile-Comparison Process. ***Journal of Applied Psychology***, 75(6): 648-657.
Caldwell, S. D., Herold, D. A., & Fedor, D. B. 2004. Toward an understanding of the relationships among organizational change, individual differences, and changes in person-environment fit: A cross-level study. ***Journal of Applied Psychology***, 89(5): 868-882.
Campbell, E. G., Weissman, J. S., Causino, N., & Blumenthal, D. 2000. Data withholding in academic medicine: characteristics of faculty denied access to research results and biomaterials. ***Research Policy***, 29(2): 303-312.
Cao, Q., Gedajlovic, E., & Zhang, H. P. 2009. Unpacking Organizational Ambidexterity: Dimensions, Contingencies, and Synergistic Effects. ***Organization Science***, 20(4): 781-796.
Cardinal, L. B. 2001. Technological innovation in the pharmaceutical industry: The use of organizational control in managing research and development. ***Organization Science***, 12(1): 19-36.
Carley, K. 1991. A Theory of Group Stability. ***American Sociological Review***, 56(3): 331-354.
Carlile, P. R. 2002. A pragmatic view of knowledge and boundaries: Boundary objects in new product development. ***Organization Science***, 13(4): 442-455.
Carlile, P. R. 2004. Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. ***Organization Science***, 15(5): 555-568.
Cetina, K. Sociality with objects: social relations in postsocial knowledge societies. ***Theory, Culture and Society***, 14(4): 1-30.
Cetina, K. K. 1987. Opening Pandora Box - a Sociological-Analysis of Scientists Discourse - Gilbert,Gn, Mulkay,M. ***American Journal of Sociology***, 92(6): 1518-1520.
Chan, D. 1996. Cognitive misfit of problem-solving style at work: A facet of person-organization fit. ***Organizational Behavior and Human Decision Processes***, 68(3): 194-207.
Chandy, R., Hopstaken, B., Narasimhan, O., & Prabhu, J. 2006. From invention to innovation: Conversion ability in product development. ***Journal of Marketing Research***, 43(3): 494-508.
Chapman, D. S., Uggerslev, K. L., Carroll, S. A., Piasentin, K. A., & Jones, D. A. 2005. Applicant attraction to organizations and job choice: A meta-analytic review of the correlates of recruiting outcomes. ***Journal of Applied Psychology***, 90(5): 928-944.

Chatman, J. A. 1989. Improving Interactional Organizational Research - a Model of Person-Organization Fit. ***Academy of Management Review***, 14(3): 333-349.
Chatman, J. A. 1991. Matching People and Organizations - Selection and Socialization in Public Accounting Firms. ***Administrative Science Quarterly***, 36(3): 459-484.
Chatman, J. A., & Barsade, S. G. 1995. Personality, Organizational Culture, and Cooperation - Evidence from a Business Simulation. ***Administrative Science Quarterly***, 40(3): 423-443.
Chatman, J. A., Caldwell, D. F., & O'Reilly, C. A. 1999. Managerial personality and performance: A semi-idiographic approach. ***Journal of Research in Personality***, 33(4): 514-545.
Chen, W. R., & Miller, K. D. 2007. Situational and institutional determinants of firms' R&D search intensity. ***Strategic Management Journal***, 28(4): 369-381.
Cheng, Y. T., & VandeVen, A. H. 1996. Learning the innovation journey: Order out of chaos? ***Organization Science***, 7(6): 593-614.
Cherrington, D., & Lynn England, J. 1980. The desire for an enriched job as a moderator of the enrichment--satisfaction relationship* 1. ***Organizational Behavior and Human Performance***, 25(1): 139-159.
Cheung, G. W. 2009. Introducing the Latent Congruence Model for Improving the Assessment of Similarity, Agreement, and Fit in Organizational Research. ***Organizational Research Methods***, 12(1): 6-33.
Choi, J. N. 2004. Person-environment fit and creative behavior: Differential impacts of supplies-values and demands-abilities versions of fit. ***Human Relations***, 57(5): 531-552.
Christensen, C. 1997. ***The innovator's dilemma***. Boston, MA: Harvard Business School Press.
Christensen, C., Grossman, J., & Hwang, J. 2009. ***The innovator's prescription: a disruptive solution for health care***: McGraw Hill Professional.
Christiansen, N., Villanova, P., & Mikulay, S. 1997. Political influence compatibility: fitting the person to the climate. ***Journal of Organizational Behavior***, 18(6): 709-730.
Clemens, E. S. 2003. Organizations, policy, and the natural environment: Institutional and strategic perspectives. ***Administrative Science Quarterly***, 48(3): 538-541.
Cockburn, I., & Henderson, R. 1996. Public-private interaction in pharmaceutical research. ***Proceedings of the National Academy of Sciences of the United States of America***, 93(23): 12725-12730.
Cockburn, I., Henderson, R., & Stern, S. 1999. Balancing incentives: The tension between basic and applied research. ***NBER working paper***.
Cockburn, I. M., & Henderson, R. M. 1998. Absorptive capacity, coauthoring behavior, and the organization of research in drug discovery. ***Journal of Industrial Economics***, 46(2): 157-182.
Cockburn, I. M., Henderson, R. M., & Stern, S. 2000. Untangling the origins of competitive advantage. ***Strategic Management Journal***, 21(10-11): 1123-1145.
Cohen, M. D., March, J. G., & Olsen, J. P. 1972. A Garbage Can Model of Organizational Choice. ***Administrative Science Quarterly***, 17(1): 1-25.
Cohen, W. M., & Levinthal, D. A. 1990. Absorptive-Capacity - a New Perspective on Learning and Innovation. ***Administrative Science Quarterly***, 35(1): 128-152.
Colyvas, J. A., & Powell, W. W. 2006. Roads to Institutionalization: The Remaking of Boundaries between Public and Private Science. ***Research in Organizational Behavior, Vol 27***, 27: 305-353.
Cook, J., & Wall, T. 1980. New work attitude measures of trust, organizational commitment and personal need non-fulfilment. ***Journal of Occupational Psychology***.
Cook, W. D., & Roll, Y. 1988. R-and-D Project Selection - Productivity Considerations. ***R & D Management***, 18(3): 251-256.
Corley, K. G., & Gioia, D. A. 2004. Identity ambiguity and change in the wake of a corporate spin-off. ***Administrative Science Quarterly***, 49(2): 173-208.

Cummings, J. N. 2004. Work groups, structural diversity, and knowledge sharing in a global organization. ***Management Science***, 50(3): 352-364.
Cyert, R., & James, G. 1963. A Behavioral Theory of the Firm: Englewood Cliffs, NJ: Prentice-Hall.
D'aunno, T., Succi, M., & Alexander, J. A. 2000. The role of institutional and market forces in divergent organizational change. ***Administrative Science Quarterly***, 45(4): 679-703.
Dasgupta, P., & David, P. A. 1994. Toward a New Economics of Science. ***Research Policy***, 23(5): 487-521.
Daunno, T., Sutton, R. I., & Price, R. H. 1991. Isomorphism and External Support in Conflicting Institutional Environments - a Study of Drug-Abuse Treatment Units. ***Academy of Management Journal***, 34(3): 636-661.
Dawis, R., & Lofquist, L. 1984. ***A psychological theory of work adjustment***: Univ. of Minnesota Press.
Day, D. V., & Bedeian, A. G. 1995. Personality Similarity and Work-Related Outcomes among African-American Nursing Personnel - a Test of the Supplementary Model of Person-Environment Congruence. ***Journal of Vocational Behavior***, 46(1): 55-70.
Denis, J. L., Lamothe, L., & Langley, A. 2001. The dynamics of collective leadership and strategic change in pluralistic organizations. ***Academy of Management Journal***, 44(4): 809-837.
Dewar, R., & Werbel, J. 1979. Universalistic and contingency predictions of employee satisfaction and conflict. ***Administrative Science Quarterly***, 24(3): 426-448.
Diamond, A. M. 1986. What is a citation worth? ***The journal of human resources***, 21(2): 200-215.
Diehl, M., & Stroebe, W. 1991. Productivity Loss in Idea-generating Groups - Tracking Down the Blocking Effect. ***Journal of Personality and Social Psychology***, 61(3): 392-403.
Dillman, D. A. 2007. ***Mail and internet surveys: The tailored design method***: John Wiley & Sons Inc.
DiMaggio, P. J., & Powell, W. W. 1983. The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. ***American Sociological Review***, 48(2): 147-160.
DiTomaso, N., Post, C., Smith, D. R., Farris, G. F., & Cordero, R. 2007. Effects of structural position on allocation and evaluation decisions for scientists and engineers in industrial R&D. ***Administrative Science Quarterly***, 52(2): 175-207.
Donaldson, T., & Preston, L. E. 1995. The Stakeholder Theory of the Corporation - Concepts, Evidence, and Implications. ***Academy of Management Review***, 20(1): 65-91.
Doty, D. H., Glick, W. H., & Huber, G. P. 1993. Fit, Equifinality, and Organizational-Effectiveness - a Test of 2 Configurational Theories. ***Academy of Management Journal***, 36(6): 1196-1250.
Dougherty, D. 1992. Interpretive Barriers to Successful Product Innovation in Large Firms. ***Organization Science***, 3(2): 179-202.
Dougherty, D. 2001. Reimagining the differentiation and integration of work for sustained product innovation. ***Organization Science***, 12(5): 612-631.
Dougherty, T. W., & Pritchard, R. D. 1985. The Measurement of Role Variables - Exploratory Examination of a New Approach. ***Organizational Behavior and Human Decision Processes***, 35(2): 141-155.
Drazin, R., Glynn, M. A., & Kazanjian, R. 2000. Purpose-built theories: A reply to Ford. ***Academy of Management Review***, 25(2): 285-287.
Drazin, R., & Kazanjian, R. K. 1993. Applying the Del Technique to the Analysis of Cross-Classification Data - a Test of Ceo Succession and Top Management Team Development. ***Academy of Management Journal***, 36(6): 1374-1399.
Drazin, R., & Vandeven, A. H. 1986. Alternative Forms of Fit in Contingency Theory. ***Administrative Science Quarterly***, 30(4): 514-539.

Duncan, R. 1976. The ambidextrous organization: Designing dual structures for innovation. ***The management of organization design: Strategies and implementation***, 1: 167-188.
Dunn, M. B., & Jones, C. 2010. Institutional Logics and Institutional Pluralism: The Contestation of Care and Science Logics in Medical Education, 1967-2005. ***Administrative Science Quarterly***, 55(1): 114-149.
Dunne, D., & Dougherty, D. 2006. Learning for Innovation in Science-Based Industries: The Case of Pharmaceutical Drug Discovery: Rutgers University Working Paper.
Dunne, D., & Dougherty, D. 2009. ***The Collective Sense of the Scientist***.
Durand, R., Bruyaka, O., & Mangematin, V. 2008. Do Science and Money Go Together? The Case of the French Biotech Industry. ***Strategic Management Journal***, 29(12): 1281-1299.
Durand, R., Rao, H., & Monin, P. 2007. Code and conduct in French cuisine: Impact of code changes on external evaluations. ***Strategic Management Journal***, 28(5): 455-472.
Dutton, J. E., & Dukerich, J. M. 1991. Keeping an Eye on the Mirror - Image and Identity in Organizational Adaptation. ***Academy of Management Journal***, 34(3): 517-554.
Edwards, J. 2008. Person–Environment Fit in Organizations: An Assessment of Theoretical Progress. ***The Academy of Management Annals***, 2(1): 167-230.
Edwards, J. A. 2007. The accumulation of knowledge in person- environment fit research, ***Society for Industrial and Organizational Psychology***. New York.
Edwards, J. A., & Shipp, A. J. 2007. The relationship between person-environment fit and outcomes: an integrative theoretical framework. In C. Ostroff, & T. A. Judge (Eds.), ***Perspective on organizational fit***: 209-258. New York: Taylor and Francis.
Edwards, J. R. 1993. Problems with the Use of Profile Similarity Indexes in the Study of Congruence in Organizational Research. ***Personnel Psychology***, 46(3): 641-665.
Edwards, J. R. 1994a. Regression-Analysis as an Alternative to Difference Scores. ***Journal of Management***, 20(3): 683-689.
Edwards, J. R. 1994b. The Study of Congruence in Organizational-Behavior Research - Critique and a Proposed Alternative. ***Organizational Behavior and Human Decision Processes***, 58(1): 51-100.
Edwards, J. R. 1995. Alternatives to difference scores as dependent variables in the study of congruence in organizational research. ***Organizational Behavior and Human Decision Processes***, 64(3): 307-324.
Edwards, J. R. 1996. An examination of competing versions of the person-environment fit approach to stress. ***Academy of Management Journal***, 39(2): 292-339.
Edwards, J. R. 2001a. Multidimensional constructs in organizational behavior research: An integrative analytical framework. ***Organizational Research Methods***, 4(2): 144-192.
Edwards, J. R. 2001b. Ten difference score myths. ***Organizational Research Methods***, 4(3): 265-287.
Edwards, J. R. 2009. Latent Variable Modeling in Congruence Research Current Problems and Future Directions. ***Organizational Research Methods***, 12(1): 34-62.
Edwards, J. R. 2010. Reconsidering Theoretical Progress in Organizational and Management Research. ***Organizational Research Methods***, 13(4): 615-619.
Edwards, J. R., & Baglioni, A. J. 1991. Relationship between Type-a Behavior Pattern and Mental and Physical Symptoms - a Comparison of Global and Component Measures. ***Journal of Applied Psychology***, 76(2): 276-290.
Edwards, J. R., Baglioni, A. J., & Cooper, C. L. 1990. Examining the Relationships among Self-Report Measures of the Type-a Behavior Pattern - the Effects of Dimensionality, Measurement Error, and Differences in Underlying Constructs. ***Journal of Applied Psychology***, 75(4): 440-454.
Edwards, J. R., & Berry, J. W. 2010. The Presence of Something or the Absence of Nothing: Increasing Theoretical Precision in Management Research. ***Organizational Research Methods***, 13(4): 668-689.

Edwards, J. R., & Cable, D. A. 2009. The Value of Value Congruence. ***Journal of Applied Psychology***, 94(3): 654-677.
Edwards, J. R., Cable, D. M., Williamson, I. O., Lambert, L. S., & Shipp, A. J. 2006. The phenomenology of fit: Linking the person and environment to the subjective experience of person-environment fit. ***Journal of Applied Psychology***, 91(4): 802-827.
Edwards, J. R., & Harrison, R. V. 1993. Job Demands and Worker Health - 3-Dimensional Reexamination of the Relationship between Person-Environment Fit and Strain. ***Journal of Applied Psychology***, 78(4): 628-648.
Edwards, J. R., & Parry, M. E. 1993. On the Use of Polynomial Regression Equations as an Alternative to Difference Scores in Organizational Research. ***Academy of Management Journal***, 36(6): 1577-1613.
Edwards, J. R., Scully, J. A., & Brtek, M. D. 1999. The measurement of work: Hierachical representation of the multimethod job design questionnaire. ***Personnel Psychology***, 52(2): 305-334.
Efron, B., & Tibshirani, R. J. 1993. ***An introduction to the bootstrap***. New York: Chapman&Hall.
Eisenhardt, K. M. 2000. Paradox, spirals, ambivalence: The new language of change and pluralism. ***Academy of Management Review***, 25(4): 703-705.
Eisenhardt, K. M., & Martin, J. A. 2000. Dynamic capabilities: What are they? ***Strategic Management Journal***, 21(10-11): 1105-1121.
Ellemers, N., De Gilder, D., & Haslam, S. A. 2004. Motivating individuals and groups at work: A social identity perspective on leadership and group performance. ***Academy of Management Review***, 29(3): 459-478.
Elsbach, K. D., Barr, P. S., & Hargadon, A. B. 2005. Identifying situated cognition in organizations. ***Organization Science***, 16(4): 422-433.
Elsbach, K. D., & Sutton, R. I. 1992. Acquiring Organizational Legitimacy through Illegitimate Actions - a Marriage of Institutional and Impression Management Theories. ***Academy of Management Journal***, 35(4): 699-738.
Engle, E. M., & Lord, R. G. 1997. Implicit theories, self-schemas, and leader-member exchange. ***Academy of Management Journal***, 40(4): 988-1010.
Enz, C. A. 1988. The Role of Value Congruity in Intraorganizational Power. ***Administrative Science Quarterly***, 33(2): 284-304.
Erdogan, B., & Enders, J. 2007. Support from the top: Supervisors' perceived organizational support as a moderator of leader-member exchange to satisfaction and performance relationships. ***Journal of Applied Psychology***, 92(2): 321-330.
Ethiraj, S. K., & Levinthal, D. 2004. Bounded rationality and the search for organizational architecture: An evolutionary perspective on the design of organizations and their evolvability. ***Administrative Science Quarterly***, 49(3): 404-437.
Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. 1984. Organization Strategy and Structural Differences for Radical versus Incremental Innovation. ***Management Science***, 30(6): 682-695.
Fang, C., Lee, J., & Schilling, M. A. 2010. Balancing Exploration and Exploitation Through Structural Design: The Isolation of Subgroups and Organizational Learning. ***Organization Science***, 21(3): 625-642.
Fang, C., & Levinthal, D. 2009. Near-Term Liability of Exploitation: Exploration and Exploitation in Multistage Problems. ***Organization Science***, 20(3): 538-551.
Faraj, S., & Sproull, L. 2000. Coordinating expertise in software development teams. ***Management Science***, 46(12): 1554-1568.
Faraj, S., & Xiao, Y. 2006. Coordination in fast-response organizations. ***Management Science***, 52(8): 1155-1169.
Farh, J. L., Podsakoff, P. M., & Organ, D. W. 1990. Accounting for Organizational Citizenship Behavior - Leader Fairness and Task Scope Versus Satisfaction. ***Journal of Management***, 16(4): 705-721.

Fauchart, E., & von Hippel, E. 2008. Norms-based intellectual property systems: The case of French chefs. ***Organization Science***, 19(2): 187-201.
Ferris, G. R., Youngblood, S. A., & Yates, V. L. 1985. Personality, Training Performance, and Withdrawal - a Test of the Person Group Fit Hypothesis for Organizational Newcomers. ***Journal of Vocational Behavior***, 27(3): 377-388.
Fiol, C. M., Pratt, M. G., & O'Connor, E. J. 2009. Managing Intractable Identity Conflicts. ***Academy of Management Review***, 34(1): 32-55.
Fiss, P. C. 2007. A set-theoretic approach to organizational configurations. ***Academy of Management Review***, 32(4): 1180-1198.
Fleming, L. 2001. Recombinant uncertainty in technological search. ***Management Science***, 47(1): 117-132.
Fleming, L., & Sorenson, O. 2004. Science as a map in technological search. ***Strategic Management Journal***, 25(8-9): 909-928.
Floyd, S. W., & Lane, P. J. 2000. Strategizing throughout the organization: Managing role conflict in strategic renewal. ***Academy of Management Review***, 25(1): 154-177.
Flynn, F. J. 2005. Identity orientations and forms of social exchange in organizations. ***Academy of Management Review***, 30(4): 737-750.
Fox, G. E., & Baker, N. R. 1985. Project Selection Decision-Making Linked to a Dynamic Environment. ***Management Science***, 31(10): 1272-1285.
French, J., Caplan, R., & Van Harrison, R. 1982. ***The mechanisms of job stress and strain***: J. Wiley.
Friedland, R., & Alford, R. R. 1991. Bringing society back in: Symbols, practices, and institutional contradictions. In W. Powell, & P. DiMaggio (Eds.), ***The new institution-alism in organizational analysis***: 232-263. Chicago: The University of Chicago Press.
Gambardella, A. 1995. ***Science and innovation: The US pharmaceutical industry during the 1980s***: Cambridge Univ Pr.
Ganster, D. C., Fusilier, M. R., & Mayes, B. T. 1986. Role of Social Support in the Experience of Stress at Work. ***Journal of Applied Psychology***, 71(1): 102-110.
Gatignon, H., Tushman, M. L., Smith, W., & Anderson, P. 2002. A structural approach to assessing innovation: Construct development of innovation locus, type, and characteristics. ***Management Science***, 48(9): 1103-1122.
Gavetti, G., & Levinthal, D. 2000. Looking forward and looking backward: Cognitive and experiential search. ***Administrative Science Quarterly***, 45(1): 113-137.
Gavetti, G., Levinthal, D., & Ocasio, W. 2007. Neo-carnegie: The carnegie school ' s past, present, and reconstructing for the future. ***Organization Science***, 18(3): 523-536.
Gibbons, M. 1994. ***The new production of knowledge: the dynamics of science and research in contemporary societies***: Sage Publications Ltd.
Gibson, C. B., & Birkinshaw, J. 2004. The antecedents, consequences, and mediating role of organizational ambidexterity. ***Academy of Management Journal***, 47(2): 209-226.
Gilbert, C. G. 2005. Unbundling the structure of inertia: Resource versus routine rigidity. ***Academy of Management Journal***, 48(5): 741-763.
Gilbert, C. G. 2006. Change in the presence of residual fit: Can competing frames coexist? ***Organization Science***, 17(1): 150-167.
Gilboa, S., Shirom, A., Fried, Y., & Cooper, C. 2008. A meta-analysis of work demand stressors and job performance: Examining main and moderating effects. ***Personnel Psychology***, 61(2): 227-271.
Gittelman, M. 2007. Does geography matter for science-based firms? Epistemic communities and the geography of research and patenting in biotechnology. ***Organization Science***, 18(4): 724-741.
Gittelman, M., & Kogut, B. 2003. Does good science lead to valuable knowledge? Biotechnology firms and the evolutionary logic of citation patterns. ***Management Science***, 49(4): 366-382.

Glynn, M. 2008. Beyond constraint: how institutions enable identities. In R. Greenwood, C. Oliver, K. Sahlin, & R. Suddaby (Eds.), ***The Sage handbook of organizational institutionalism***: 413-430: Sage.
Glynn, M. A. 2000. When cymbals become symbols: Conflict over organizational identity within a symphony orchestra. ***Organization Science***, 11(3): 285-298.
Glynn, M. A., Barr, P. S., & Dacin, M. T. 2000. Pluralism and the problem of variety. ***Academy of Management Review***, 25(4): 726-734.
Goldstein, P. M., & Singer, H. M. 1986. A Note on Economic-Models for Research-and-Development Project Selection in the Presence of Project Interactions. ***Management Science***, 32(10): 1356-1360.
Gong, Y. P., Shenkar, O., Luo, Y. D., & Nyaw, M. K. 2001. Role conflict and ambiguity of CEOs in international joint ventures: A transaction cost perspective. ***Journal of Applied Psychology***, 86(4): 764-773.
Gonzalez-Roma, V., Schaufeli, W. B., Bakker, A. B., & Lloret, S. 2006. Burnout and work engagement: Independent factors or opposite poles? ***Journal of Vocational Behavior***, 68(1): 165-174.
Gotsi, M., Andriopoulos, C., Lewis, M. W., & Ingram, A. E. 2010. Managing creatives: Paradoxical approaches to identity regulation. ***Human Relations***, 63(6): 781-805.
Gouldner, A. W. 1957. Cosmopolitans and Locals: Toward an Analysis of Latent Social Roles.I. ***Administrative Science Quarterly***, 2(3): 281-306.
Gouldner, A. W. 1958. Cosmopolitans and Locals: Toward an Analysis of Latent Social Roles. II. ***Administrative Science Quarterly***, 2(4): 444-480.
Graf, R., & Riddell, J. 1972. Helping behavior as a function of interpersonal perception. ***The Journal of Social Psychology***, 86(2): 227-231.
Greenhaus, J., Seidel, C., & Marinis, M. 1983. The impact of expectations and values on job attitudes* 1. ***Organizational Behavior and Human Performance***, 31(3): 394-417.
Greenwood, R., Diaz, A. M., Li, S. X., & Lorente, J. C. 2010. The Multiplicity of Institutional Logics and the Heterogeneity of Organizational Responses. ***Organization Science***, 21(2): 521-539.
Greenwood, R., & Hinings, C. R. 1996. Understanding radical organizational change: Bringing together the old and the new institutionalism. ***Academy of Management Review***, 21(4): 1022-1054.
Gresov, C. 1989. Exploring Fit and Misfit with Multiple Contingencies. ***Administrative Science Quarterly***, 34(3): 431-453.
Gresov, C., & Drazin, R. 1997. Equifinality: Functional equivalence in organization design. ***Academy of Management Review***, 22(2): 403-428.
Greve, H. R. 2003. A behavioral theory of R&D expenditures and innovations: Evidence from shipbuilding. ***Academy of Management Journal***, 46(6): 685-702.
Greve, H. R. 2007. Exploration and exploitation in product innovation. ***Industrial and Corporate Change***, 16(5): 945-975.
Griffeth, R. W., Hom, P. W., & Gaertner, S. 2000. A meta-analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium. ***Journal of Management***, 26(3): 463-488.
Groysberg, B., & Lee, L. E. 2009. Hiring Stars and Their Colleagues: Exploration and Exploitation in Professional Service Firms. ***Organization Science***, 20(4): 740-758.
Gulati, R., & Puranam, P. 2009. Renewal Through Reorganization: The Value of Inconsistencies Between Formal and Informal Organization. ***Organization Science***, 20(2): 422-440.
Gupta, A. K., Smith, K. G., & Shalley, C. E. 2006. The interplay between exploration and exploitation. ***Academy of Management Journal***, 49(4): 693-706.
Gupta, A. K., Tesluk, P. E., & Taylor, M. S. 2007. Innovation at and across multiple levels of analysis. ***Organization Science***, 18(6): 885-897.

Gupta, S. K., Kyparisis, J., & Ip, C. M. 1992. Project Selection and Sequencing to Maximize Net Present Value of the Total Return. ***Management Science***, 38(5): 751-752.
Guston, D. H. 2000. Retiring the social contract for science. ***Issues in Science and Technology***, 16(4): 32-36.
Guston, D. H. 2001. Boundary organizations in environmental policy and science: An introduction. ***Science Technology & Human Values***, 26(4): 399-408.
Haas, M. R., & Park, S. 2010. To Share or Not to Share? Professional Norms, Reference Groups, and Information Withholding Among Life Scientists. ***Organization Science***, 21(4): 873-891.
Hagstrom, W. 1965. ***The scientific community***. New York.
Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. 2006. ***Multivariate Data Analysis*** (Sixth ed.): Pearson International Edition.
Hansen, M. T. 1999. The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. ***Administrative Science Quarterly***, 44(1): 82-111.
Harrison, P. D., & Harrell, A. 1993. Impact of Adverse Selection on Managers Project Evaluation Decisions. ***Academy of Management Journal***, 36(3): 635-643.
Haveman, H. A., & Rao, H. 1997. Structuring a theory of moral sentiments: Institutional and organizational coevolution in the early thrift industry. ***American Journal of Sociology***, 102(6): 1606-1651.
Heinze, T., & Kuhlmann, S. 2008. Across institutional boundaries? Research collaboration in German public sector nanoscience. ***Research Policy***, 37(5): 888-899.
Heise, D. R. 1972. Employing nominal variables, induced variables, and block variables in path analyses. ***Sociological Methods & Research***, 1(2): 147.
Henderson, R., & Cockburn, I. 1994. Measuring Competence - Exploring Firm Effects in Pharmaceutical Research. ***Strategic Management Journal***, 15: 63-84.
Henderson, R., & Cockburn, I. 1996. Scale, scope, and spillovers: The determinants of research productivity in drug discovery. ***Rand Journal of Economics***, 27(1): 32-59.
Higgins, C. A., & Judge, T. A. 2004. The effect of applicant influence tactics on recruiter perceptions of fit and hiring recommendations: A field study. ***Journal of Applied Psychology***, 89(4): 622-632.
Hitt, M. A., Beamish, P. W., Jackson, S. E., & Mathieu, J. E. 2007. Building theoretical and empirical bridges across levels: Multilevel research in management. ***Academy of Management Journal***, 50(6): 1385-1399.
Hoffman, A. J., & Ocasio, W. 2001. Not all events are attended equally: Toward a middle-range theory of industry attention to external events. ***Organization Science***, 12(4): 414-434.
Hoffman, B. J., & Woehr, D. J. 2006. A quantitative review of the relationship between person-organization fit and behavioral outcomes. ***Journal of Vocational Behavior***, 68(3): 389-399.
Hollenbeck, J. R. 1989. Control-Theory and the Perception of Work Environments - the Effects of Focus of Attention on Affective and Behavioral Reactions to Work. ***Organizational Behavior and Human Decision Processes***, 43(3): 406-430.
Hollenbeck, J. R., Ilgen, D. R., Sego, D. J., Hedlund, J., Major, D. A., & Phillips, J. 1995. Multilevel Theory of Team Decision-Making - Decision Performance in Teams Incorporating Distributed Expertise. ***Journal of Applied Psychology***, 80(2): 292-316.
Hollenbeck, J. R., Moon, H., Ellis, A. P. J., West, B. J., Ilgen, D. R., Sheppard, L., Porter, C. O. L. H., & Wagner, J. A. 2002. Structural contingency theory and individual differences: Examination of external and internal person-team fit. ***Journal of Applied Psychology***, 87(3): 599-606.
Hounshell, D., & Smith, J. 1988. ***Science and corporate strategy: Du Pont R&D, 1902-1980***: Cambridge Univ Pr.

Howell, J. M., & Avolio, B. J. 1993. Transformational Leadership, Transactional Leadership, Locus of Control, and Support for Innovation - Key Predictors of Consolidated-Business-Unit Performance. ***Journal of Applied Psychology***, 78(6): 891-902.
Huang, K. G., & Murray, F. E. 2009. Does Patent Strategy Shape the Long-Run Supply of Public Knowledge? Evidence from Human Genetics. ***Academy of Management Journal***, 52(6): 1193-1221.
Hunter, J. 1983. A causal analysis of cognitive ability, job knowledge, job performance, and supervisor ratings. ***Performance measurement and theory***: 257-266.
Ibarra, H. 1999. Provisional selves: Experimenting with image and identity in professional adaptation. ***Administrative Science Quarterly***, 44(4): 764-791.
Igra, A. 1979. On forming variable set composites to summarize a block recursive model. ***Social Science Research***, 8(3): 253-264.
Ilgen, D. R., & Hollenbeck, J. R. 1991. The structure of work: Job design and roles. ***Handbook of industrial and organizational psychology***, 2: 165ñ207.
Inkpen, A. C., & Tsang, E. W. K. 2005. Social capital, networks, and knowledge transfer. ***Academy of Management Review***, 30(1): 146-165.
Jansen, J. J. P., George, G., Van den Bosch, F. A. J., & Volberda, H. W. 2008. Senior team attributes and organizational ambidexterity: The moderating role of transformational leadership. ***Journal of Management Studies***, 45(5): 982-1007.
Jansen, J. J. P., Tempelaar, M. P., van den Bosch, F. A. J., & Volberda, H. W. 2009. Structural Differentiation and Ambidexterity: The Mediating Role of Integration Mechanisms. ***Organization Science***, 20(4): 797-811.
Janssen, O., & Van Yperen, N. W. 2004. Employees' goal orientations, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction. ***Academy of Management Journal***, 47(3): 368-384.
Johnson, M. D., Morgeson, F. P., Ilgen, D. R., Meyer, C. J., & Lloyd, J. W. 2006. Multiple professional identities: Examining differences in identification across work-related targets. ***Journal of Applied Psychology***, 91(2): 498-506.
Kane, A. A. 2010. Unlocking Knowledge Transfer Potential: Knowledge Demonstrability and Superordinate Social Identity. ***Organization Science***, 21(3): 643-660.
Kane, A. A., Argote, L., & Levine, J. M. 2005. Knowledge transfer between groups via personnel rotation: Effects of social identity and knowledge quality. ***Organizational Behavior and Human Decision Processes***, 96(1): 56-71.
Katz, D., & Robert, L. 1978. ***The social psychology of organizations***: New York: Wiley.
Katz, R., Tushman, M., & Allen, T. J. 1995. The Influence of Supervisory Promotion and Network Location on Subordinate Careers in a Dual Ladder Rd-and-E Setting. ***Management Science***, 41(5): 848-863.
Kaufmann, G. M., & Beehr, T. A. 1986. Interactions between Job Stressors and Social Support - Some Counterintuitive Results. ***Journal of Applied Psychology***, 71(3): 522-526.
Kellogg, K. C., Orlikowski, W. J., & Yates, J. A. 2006. Life in the trading zone: Structuring coordination across boundaries in postbureaucratic organizations. ***Organization Science***, 17(1): 22-44.
Kelman, S. 2006. Book review essay: 9/11 and the challenges of public management. ***Administrative Science Quarterly***, 51(1): 129-142.
Ketchen, D. J., Thomas, J. B., & Snow, C. C. 1993. Organizational Configurations and Performance - a Comparison of Theoretical Approaches. ***Academy of Management Journal***, 36(6): 1278-1313.
Khuri, A., & John, A. 1987. ***Response Surfaces: Designs and Analysis***: New York: Dekker.
Kidwell, R. E., & Bennett, N. 1993. Employee Propensity to Withhold Effort - a Conceptual-Model to Intersect 3 Avenues of Research. ***Academy of Management Review***, 18(3): 429-456.

Kim, T. Y., Shin, D., Oh, H., & Jeong, Y. C. 2007. Inside the iron cage: Organizational political dynamics and institutional changes in presidential selection systems in Korean universities, 1985-2002. ***Administrative Science Quarterly***, 52(2): 286-323.
Kimberly, J. R., & Evanisko, M. J. 1981. Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. ***The Academy of Management Journal***, 24(4): 689-713.
Klein, K. J., Tosi, H., & Cannella, A. A. 1999. Multilevel theory building: Benefits, barriers, and new developments. ***Academy of Management Review***, 24(2): 243-248.
Knorr-Cetina, K. 1999. ***Epistemic cultures: How the sciences make knowledge***: Harvard Univ Pr.
Knudsen, T., & Levinthal, D. A. 2007. Two faces of search: Alternative generation and alternative evaluation. ***Organization Science***, 18(1): 39-54.
Koput, K. W. 1997. A chaotic model of innovative search: Some answers, many questions. ***Organization Science***, 8(5): 528-542.
Koput, K. W. 2003. Path dependence and creation. ***Administrative Science Quarterly***, 48(1): 154-156.
Kostova, T., & Zaheer, S. 1999. Organizational legitimacy under conditions of complexity: The case of the multinational enterprise. ***Academy of Management Review***, 24(1): 64-81.
Kozlowski, S., & Klein, K. 2000a. A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes.
Kozlowski, S. W. J., & Klein, K. 2000b. A Multilevel Approach to theory and Research in Organizations: Contextual, Temporal and Emeergent Process. In K. Klein, & S. W. J. Kozlowski (Eds.), ***Multivel Theory, Research, and Methods in Organizations***: 3-91. San Francisco: Joley-Bass.
Kraatz, M., & Block, E. S. 2008. Organizational implications of institutional pluralism. In R. Greenwood, C. Oliver, K. Shalin, & R. Suddaby (Eds.), ***The Sage Handbook of Organizational Institutionalism***: 243-275. London: Sage.
Kraatz, M., & Ikenberry, S. O. 2005. Governing academia. ***Administrative Science Quarterly***, 50(2): 317-320.
Krimsky, S. 2003. ***Science in the private interest***: Rowman & Littlefield Publishers.
Kristof, A. L. 1996. Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. ***Personnel Psychology***, 49(1): 1-49.
Kristof-Brown, A., & Jansen, K. 2007. Issue of prson-organization fit. In C. Ostroff, & T. A. Judge (Eds.), ***Perspective on organizational fit***: 123-154. New York: Francis and Taylor.
Kristof-Brown, A. L. 2000. Perceived applicant fit: Distinguishing between recruiters' perceptions of person-job and person-organization fit. ***Personnel Psychology***, 53(3): 643-671.
Kristof-Brown, A. L., Jansen, K. J., & Colbert, A. E. 2002. A policy-capturing study of the simultaneous effects of fit with jobs, groups, and organizations. ***Journal of Applied Psychology***, 87(5): 985-993.
Kristof-Brown, A. L., & Stevens, C. K. 2001. Goal congruence in project teams: Does the fit between members' personal mastery and performance goals matter? ***Journal of Applied Psychology***, 86(6): 1083-1095.
Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. 2005. Consequences of individuals' fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit. ***Personnel Psychology***, 58(2): 281-342.
Latour, B. 1987. ***Science in action***: Harvard University Press.
Latour, B., & Woolgar, S. 1979. ***Laboratory life: The social construction of scienti c facts***. London.
Lauver, K. J., & Kristof-Brown, A. 2001. Distinguishing between employees' perceptions of person-job and person-organization fit. ***Journal of Vocational Behavior***, 59(3): 454-470.

Lavie, D., & Rosenkopf, L. 2006. Balancing exploration and exploitation in alliance formation. ***Academy of Management Journal***, 49(4): 797-818.
Lawrence, P., & Lorsch, J. 1967. Differentiation and integration in complex organizations. ***Administrative Science Quarterly***, 12(1): 1-47.
Lazer, D., & Friedman, A. 2007. The network structure of exploration and exploitation. ***Administrative Science Quarterly***, 52(4): 667-694.
LeBoeuf, R. A., Shafir, E., & Bayuk, J. B. 2010. The conflicting choices of alternating selves. ***Organizational Behavior and Human Decision Processes***, 111(1): 48-61.
Lee, S. M. 1969. Organizational Identification of Scientists. ***The Academy of Management Journal***, 12(3): 327-337.
Leicht, K., & Fennell, M. 2001. ***Professional work: A sociological approach***: Wiley-Blackwell.
Leicht, K., & Fennell, M. 2008. Institutionalism and the professions, ***The Sage handbook of organizational institutionalism***: 431-448.
LePine, J. A., Hollenbeck, J. R., Ilgen, D. R., & Hedlund, J. 1997. Effects of individual differences on the performance of hierarchical decision-making teams: Much more than g. ***Journal of Applied Psychology***, 82(5): 803-811.
Levine, J. M., Higgins, E. T., & Choi, H. S. 2000. Development of strategic norms in groups. ***Organizational Behavior and Human Decision Processes***, 82(1): 88-101.
Levinthal, D., & Posen, H. E. 2007. Myopia of selection: Does organizational adaptation limit the efficacy of population selection? ***Administrative Science Quarterly***, 52(4): 586-620.
Levinthal, D. A. 1997. Adaptation on rugged landscapes. ***Management Science***, 43(7): 934-950.
Lewin, K. 1951. ***Field theory in social science: selected theoretical papers.***: Harpers.
Liberatore, M. J. 1987. An Extension of the Analytic Hierarchy Process for Industrial Research-and-Development Project Selection and Resource-Allocation. ***Ieee Transactions on Engineering Management***, 34(1): 12-18.
Lieberman, M. 2005. A literature citation study of science-technology coupling in electronics. ***Proceedings of the IEEE***, 66(1): 5-13.
Lin, Z., & Carley, K. M. 1997. Organizational response: The cost performance tradeoff. ***Management Science***, 43(2): 217-234.
Livingstone, L. P., Nelson, D. L., & Barr, S. H. 1997. Person-environment fit and creativity: An examination of supply-value and demand-ability versions of fit. ***Journal of Management***, 23(2): 119-146.
Loch, C. H., Pich, M. T., Terwiesch, C., & Urbschat, M. 2001. Selecting R&D projects at BMW: A case study of adopting mathematical programming models. ***Ieee Transactions on Engineering Management***, 48(1): 70-80.
London, M., & Wohlers, A. J. 1991. Agreement between Subordinate and Self-Ratings in Upward Feedback. ***Personnel Psychology***, 44(2): 375-390.
Lounsbury, M. 2001. Institutional sources of practice variation: Staffing college and university recycling programs. ***Administrative Science Quarterly***, 46(1): 29-56.
Lounsbury, M. 2007. A tale of two cities: Competing logics and practice variation in the professionalizing of mutual funds. ***Academy of Management Journal***, 50(2): 289-307.
Lubatkin, M. H., Simsek, Z., Ling, Y., & Veiga, J. F. 2006. Ambidexterity and performance in small- to medium-sized firms: The pivotal role of top management team behavioral integration. ***Journal of Management***, 32(5): 646-672.
Lynton, R. P. 1969. Linking an Innovative Subystem into the System. ***Administrative Science Quarterly***, 14(3): 398-416.
Machacha, L. L., & Bhattacharya, P. 2000. A fuzzy-logic-based approach to project selection. ***Ieee Transactions on Engineering Management***, 47(1): 65-73.
Mael, F., & Ashforth, B. E. 1992. Alumni and Their Alma-Mater - a Partial Test of the Reformulated Model of Organizational Identification. ***Journal of Organizational Behavior***, 13(2): 103-123.
Mandakovic, T., & Souder, W. E. 1985. An Interactive Decomposable Heuristic for Project Selection. ***Management Science***, 31(10): 1257-1271.

March, J., & Olsen, J. 1989. ***Rediscovering institutions: The organizational basis of politics***: Free Pr.
March, J. G., & Olsen, J. P. 1976. ***Ambiguity and choice in organizations***: A Scandinavian University Press Publication.
Markovsky, B., Skvoretz, J., Willer, D., Lovaglia, M. J., & Erger, J. 1993. The Seeds of Weak Power - an Extension of Network Exchange Theory. ***American Sociological Review***, 58(2): 197-209.
Marquis, C., & Lounsbury, M. 2007. Vive la resistance: Competing logics and the consolidation of US community banking. ***Academy of Management Journal***, 50(4): 799-820.
Martino, J. P. 1995. ***Research and development project selection***: John Wiley & Sons Inc.
Mathieu, J. E., & Zajac, D. M. 1990. A Review and Metaanalysis of the Antecedents, Correlates, and Consequences of Organizational Commitment. ***Psychological Bulletin***, 108(2): 171-194.
Mayer, K. J., & Argyres, N. S. 2004. Learning to contract: Evidence from the personal computer industry. ***Organization Science***, 15(4): 394-410.
Mayer, R. C., & Gavin, M. B. 2005. Trust in management and performance: Who minds the shop while the employees watch the boss? ***Academy of Management Journal***, 48(5): 874-888.
Meade, L. A., & Presley, A. 2002. R&D project selection using the analytic network process. ***Ieee Transactions on Engineering Management***, 49(1): 59-66.
Meglino, B. M., & Ravlin, E. C. 1998. Individual values in organizations: Concepts, controversies, and research. ***Journal of Management***, 24(3): 351-389.
Merton, R. 1957. Priorities in Scientific Discovery: A Chapter in the Sociology of Science, ***American Sociological Review***, Vol. 22: 635-659.
Merton, R., & Storer, N. 1973. ***The sociology of science***: Univ. of Chicago Press Chicago.
Merton, R. K. 1976. ***Sociological ambivalence and other essays***: Free Pr.
Merton, R. K., & Rossi, A. S. 1968. Contributions to the theory of reference group behavior. ***Social Theory and Social Structure***: 279-334.
Meyer, A. D., Tsui, A. S., & Hinings, C. R. 1993. Configurational Approaches to Organizational Analysis. ***Academy of Management Journal***, 36(6): 1175-1195.
Meyer, J., & Rowan, B. 1977. Institutionalized organizations: Formal structure as myth and ceremony. ***American Journal of Sociology***: 340-363.
Meyer, J., Rowan, B., Powell, W., & DiMaggio, P. 1991. The new institutionalism in organizational analysis. ***Chicago: Univ***.
Meyer, J., Scott, W. R., & Strang, D. 1987. Centralization, Fragmentation, and School-District Complexity. ***Administrative Science Quarterly***, 32(2): 186-201.
Meyer, J. P., Bobocel, D. R., & Allen, N. J. 1991. Development of Organizational Commitment during the 1st Year of Employment - a Longitudinal-Study of Preentry and Postentry Influences. ***Journal of Management***, 17(4): 717-733.
Meyer, M. 2000. Does science push technology? Patents citing scientific literature. ***Research Policy***, 29(3): 409-434.
Mihm, J., Loch, C. H., Wilkinson, D., & Huberman, B. A. 2010. Hierarchical Structure and Search in Complex Organizations. ***Management Science***, 56(5): 831-848.
Mitchell, R. K., Agle, B. R., & Wood, D. J. 1997. Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. ***Academy of Management Review***, 22(4): 853-886.
Mitchell, T. R., Holtom, B. C., Lee, T. W., Sablynski, C. J., & Erez, M. 2001. Why people stay: Using job embeddedness to predict voluntary turnover. ***Academy of Management Journal***, 44(6): 1102-1121.
Mom, T. J. M., Van den Bosch, F. A. J., & Volberda, H. W. 2007. Investigating managers' exploration and exploitation activities: The influence of top-down, bottom-up, and horizontal knowledge inflows*. ***Journal of Management Studies***, 44(6): 910-931.

Mom, T. J. M., van den Bosch, F. A. J., & Volberda, H. W. 2009. Understanding Variation in Managers' Ambidexterity: Investigating Direct and Interaction Effects of Formal Structural and Personal Coordination Mechanisms. ***Organization Science***, 20(4): 812-828.
Morgeson, F. P., & Humphrey, S. E. 2006. The Work Design Questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. ***Journal of Applied Psychology***, 91(6): 1321-1339.
Morrison, E. W. 1994. Role Definitions and Organizational Citizenship Behavior - the Importance of the Employees Perspective. ***Academy of Management Journal***, 37(6): 1543-1567.
Motowidlo, S. 2003. Job performance, ***Handbook of psychology: Industrial and organizational pscyhology***, Vol. 12: 39-53: Wiley Online Library.
Motowildo, S., Borman, W., & Schmit, M. 1997. A theory of individual differences in task and contextual performance. ***Human Performance***, 10(2): 71-83.
Mowery, D. C. 1990. The Development of Industrial-Research in United-States Manufacturing. ***American Economic Review***, 80(2): 345-349.
Mowery, D. C. 2009. Plus ca change: Industrial RD in the third industrial revolution. ***Industrial and Corporate Change***, 18(1): 1-50.
Mowery, D. C., & Ziedonis, A. A. 2002. Academic patent quality and quantity before and after the Bayh-Dole act in the United States. ***Research Policy***, 31(3): 399-418.
Muchinsky, P. M., & Monohan, C. J. 1987. What Is Person Environment Congruence - Supplementary Versus Complementary Models of Fit. ***Journal of Vocational Behavior***, 31(3): 268-277.
Murray, F. 2002. Innovation as co-evolution of scientific and technological networks: exploring tissue engineering. ***Research Policy***, 31(8-9): 1389-1403.
Murray, F. 2010. The Oncomouse That Roared: Hybrid Exchange Strategies as a Source of Distinction at the Boundary of Overlapping Institutions. ***American Journal of Sociology***, 116(2): 341-388.
Murray, F., & O'mahony, S. 2007. Exploring the foundations of cumulative innovation: Implications for organization science. ***Organization Science***, 18(6): 1006-1021.
Murray, F., & Stern, S. 2008. Learning to Live with Patents: Acquiescence & adaptation to the law by the life sciences community. ***DRUID Working Papers***.
Nelson, R. 1959. The Simple Economics of Basic Scientific Research, ***The Journal of Political Economy***, Vol. 67: 297-306.
Nelson, R., & Winter, S. 1982. ***An evolutionary theory of economic change***: Belknap Press.
Neuman, G. A., & Wright, J. 1999. Team effectiveness: Beyond skills and cognitive ability. ***Journal of Applied Psychology***, 84(3): 376-389.
Nightingale, P. 1998. A cognitive model of innovation. ***Research Policy***, 27(7): 689-709.
O'Brien, G., & Dowling, P. 1980. The effects of congruency between perceived and desired job attributes upon job satisfaction. ***Journal of Occupational Psychology***.
O'mahony, S., & Bechky, B. A. 2008. Boundary Organizations: Enabling Collaboration among Unexpected Allies. ***Administrative Science Quarterly***, 53(3): 422-459.
O'reilly, C. A., & Tushman, M. L. 2004. The ambidextrous organisation. ***Harvard Business Review***, 82(4): 74-+.
O'reilly, C. A., & Tushman, M. L. 2008. Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. ***Research in Organizational Behavior, Vol 28***, 28: 185-206.
Ocasio, W. 1997. Towards an attention-based view of the firm. ***Strategic Management Journal***, 18: 187-206.
Odriscoll, M. P., & Beehr, T. A. 1994. Supervisor Behaviors, Role Stressors and Uncertainty as Predictors of Personal Outcomes for Subordinates. ***Journal of Organizational Behavior***, 15(2): 141-155.
Oliver, C. 1991. Strategic responses to isntitutional processes. ***Academy of Management Review***, 16(1): 145-179.

Oreilly, C., & Chatman, J. 1986. Organizational Commitment and Psychological Attachment - the Effects of Compliance, Identification, and Internalization on Pro-Social Behavior. ***Journal of Applied Psychology***, 71(3): 492-499.
Oreilly, C. A., Chatman, J., & Caldwell, D. F. 1991. People and Organizational Culture - a Profile Comparison Approach to Assessing Person-Organization Fit. ***Academy of Management Journal***, 34(3): 487-516.
Organ, D. W. 1990. The Motivational Basis of Organizational Citizenship Behavior. ***Research in Organizational Behavior***, 12: 43-72.
Organ, D. W., & Konovsky, M. 1989. Cognitive Versus Affective Determinants of Organizational Citizenship Behavior. ***Journal of Applied Psychology***, 74(1): 157-164.
Organ, D. W., & Ryan, K. 1995. A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. ***Personnel Psychology***, 48(4): 775-802.
Ostroff, C., & Schulte, M. 2007. Multiple Perspectives of Fit in Organizations Across Levels of Analysis. In C. Ostroff, & T. A. Judge (Eds.), ***Perspectives on Organizational Fit***: 3-70. New York: Taylor & Francis.
Pache, A. C., & Santos, F. 2010. When Worlds Collide: The Internal Dynamics of Organizational Responses to Conflicting Institutional Demands. ***Academy of Management Review***, 35(3): 455-476.
Parasuraman, S., & Purohit, Y. 2000. Distress and Boredom Among Orchestra Musicians: The Two Faces of Stress* 1. ***Journal of Occupational Health Psychology***, 5(1): 74-83.
Paruchuri, S. 2010. Intraorganizational Networks, Interorganizational Networks, and the Impact of Central Inventors: A Longitudinal Study of Pharmaceutical Firms. ***Organization Science***, 21(1): 63-80.
Paruchuri, S., Nerkar, A., & Hambrick, D. C. 2006. Acquisition integration and productivity losses in the technical core: Disruption of inventors in acquired companies. ***Organization Science***, 17(5): 545-562.
Pedhazur, E. J. 1982. ***Multiple regression in behavioral research: Prediction and explanation***. New York: Holt, Rinehart & Winston.
Pelz, D., & Andrews, F. 1966. Scientists in organizations Productive climates for research and development.
Pelz, D. C. 1959. Interaction and Attitudes between Scientists and the Auxiliary Staff: I. Viewpoint of Staff. ***Administrative Science Quarterly***, 4(3): 321-336.
Pelz, D. C. 1960. Interaction and Attitudes between Scientists and the Auxiliary Staff: II. Viewpoint of Scientists. ***Administrative Science Quarterly***, 4(4): 410-425.
Pelz, D. C. 1967. Creative Tensions in the Research and Development Climate. ***Science***, 157(3785): 160-165.
Pich, M. T., Loch, C. H., & De Meyer, A. 2002. On uncertainty, ambiguity, and complexity in project management. ***Management Science***, 48(8): 1008-1023.
Pisano, G. 2006a. ***Science business: the promise, the reality, and the future of biotech***: Harvard Business Press.
Pisano, G. P. 2006b. Can science be a business? Lessons from biotech. ***Harvard Business Review***, 84(10): 114-+.
Pisano, G. P. 2010. The evolution of science-based business: innovating how we innovate. ***Industrial and Corporate Change***, 19(2): 465-482.
Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., & Blume, B. D. 2009. Individual- and Organizational-Level Consequences of Organizational Citizenship Behaviors: A Meta-Analysis. ***Journal of Applied Psychology***, 94(1): 122-141.
Podsakoff, P. M., Ahearne, M., & MacKenzie, S. B. 1997. Organizational citizenship behavior and the quantity and quality of work group performance. ***Journal of Applied Psychology***, 82(2): 262-270.
Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. 2000. Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. ***Journal of Management***, 26(3): 513-563.

Porte, T. R. L. 1965. Conditions of Strain and Accommodation in Industrial Research Organizations. ***Administrative Science Quarterly***, 10(1): 21-38.
Powell, L. A. 1999a. The people's lobby: Organizational innovation and the rise of interest group politics in the United States, 1890-1925. ***American Journal of Sociology***, 104(4): 1248-1250.
Powell, W. 1999b. The social construction of an organisational field: the case of biotechnology. ***International Journal of Biotechnology***, 1(1): 42-66.
Powell, W., & Colyvas, J. 2008. Microfoundations of institutional theory, ***Handbook of organizational institutionalism***: 276-298.
Powell, W. W., Koput, K. W., & SmithDoerr, L. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. ***Administrative Science Quarterly***, 41(1): 116-145.
Pratt, M. G., & Foreman, P. O. 2000. Classifying managerial responses to multiple organizational identities. ***Academy of Management Review***, 25(1): 18-42.
Pratt, M. G., & Rafaeli, A. 1997. Organizational dress as a symbol of multilayered social identities. ***Academy of Management Journal***, 40(4): 862-898.
Pratt, M. G., Rockmann, K. W., & Kaufmann, J. B. 2006. Constructing professional identity: The role of work and identity learning cycles in the customization of identity among medical residents. ***Academy of Management Journal***, 49(2): 235-262.
Purdy, J. M., & Gray, B. 2009. Conflicting Logics, Mechanisms of Diffusion, and Multilevel Dynamics in Emerging Institutional Fields. ***Academy of Management Journal***, 52(2): 355-380.
Raisch, S., & Birkinshaw, J. 2008. Organizational ambidexterity: Antecedents, outcomes, and moderators. ***Journal of Management***, 34(3): 375-409.
Raisch, S., Birkinshaw, J., Probst, G., & Tushman, M. L. 2009. Organizational Ambidexterity: Balancing Exploitation and Exploration for Sustained Performance. ***Organization Science***, 20(4): 685-695.
Rao, H., Monin, P., & Durand, R. 2003. Institutional change in Toque Ville: Nouvelle cuisine as an identity movement in French gastronomy. ***American Journal of Sociology***, 108(4): 795-843.
Resnik, D. 2007. ***The price of truth: how money affects the norms of science***: Oxford University Press, USA.
Rice, R. W., Bennett, D. E., & Mcfarlin, D. B. 1989. Standards of Comparison and Job-Satisfaction. ***Journal of Applied Psychology***, 74(4): 591-598.
Richter, A. W., West, M. A., Van Dick, R., & Dawson, J. F. 2006. Boundary spanners' identification, intergroup contact, and effective intergroup relations. ***Academy of Management Journal***, 49(6): 1252-1269.
Riketta, M. 2005. Organizational identification: A meta-analysis. ***Journal of Vocational Behavior***, 66(2): 358-384.
Rivkin, J. W., & Siggelkow, N. 2003. Balancing search and stability: Interdependencies among elements of organizational design. ***Management Science***, 49(3): 290-311.
Rivkin, J. W., & Siggelkow, N. 2007. Patterned interactions in complex systems: Implications for exploration. ***Management Science***, 53(7): 1068-1085.
Rizzo, J. R., House, R. J., & Lirtzman, S. I. 1970. Role conflict and ambiguity in complex organizations. ***Administrative Science Quarterly***, 15(2): 150-163.
Roberts, E., & Fusfeld, A. 1982. Critical Functions: Needed Roles in the Innovation Process. ***Working paper - Alfred P. Sloan School of Management***: 1-54.
Romer, P. M. 1994. The Origins of Endogenous Growth. ***Journal of Economic Perspectives***, 8(1): 3-22.
Rosenberg, N. 1990. Why Do Firms Do Basic Research with Their Own Money. ***Research Policy***, 19(2): 165-174.
Rothaermel, F. T., & Alexandre, M. T. 2009. Ambidexterity in Technology Sourcing: The Moderating Role of Absorptive Capacity. ***Organization Science***, 20(4): 759-780.

Rothaermel, F. T., & Deeds, D. L. 2004. Exploration and exploitation alliances in biotechnology: A system of new product development. ***Strategic Management Journal***, 25(3): 201-221.
Rounds, J. B., Dawis, R. V., & Lofquist, L. H. 1987. Measurement of Person Environment Fit and Prediction of Satisfaction in the Theory of Work Adjustment. ***Journal of Vocational Behavior***, 31(3): 297-318.
Rousseau, D. 1985. Issues of levels in organizational research: Multi-level and cross-level. ***Research in Organizational Behavior***, 7: 1-37.
Rulke, D. L., & Galaskiewicz, J. 2000. Distribution of knowledge, group network structure, and group performance. ***Management Science***, 46(5): 612-625.
Saks, A. M., & Ashforth, B. E. 1997a. A longitudinal investigation of the relationships between job information sources, applicant perceptions of fit, and work outcomes. ***Personnel Psychology***, 50(2): 395-426.
Saks, A. M., & Ashforth, B. E. 1997b. Organizational socialization: Making sense of the past and present as a prologue for the future. ***Journal of Vocational Behavior***, 51(2): 234-279.
Saks, A. M., & Ashforth, B. E. 2002. Is job search related to employment quality? It all depends on the fit. ***Journal of Applied Psychology***, 87(4): 646-654.
Santos, F. M., & Eisenhardt, K. M. 2009. Constructing Markets and Shaping Boundaries: Entrepreneurial Power in Nascent Fields. ***Academy of Management Journal***, 52(4): 643-671.
Schaubroeck, J., Ganster, D. C., Sime, W. E., & Ditman, D. 1993. A Field Experiment Testing Supervisory Role Clarification. ***Personnel Psychology***, 46(1): 1-25.
Schaubroeck, J., & Lam, S. S. K. 2002. How similarity to peers and supervisor influences organizational advancement in different cultures. ***Academy of Management Journal***, 45(6): 1120-1136.
Schneider, B. 1983. Interactional Psychology and Organizational Behavior. ***Research in Organizational Behavior***(5): 31.
Schneider, B. 1987a. E = F(P,B) - the Road to a Radical Approach to Person Environment Fit. ***Journal of Vocational Behavior***, 31(3): 353-361.
Schneider, B. 1987b. The People Make the Place. ***Personnel Psychology***, 40(3): 437-453.
Schneider, B., Goldstein, H. W., & Smith, D. B. 1995. The ASA framework: An update. ***Personnel Psychology***, 48(4): 747-773.
Schwartz, S. H. 1992. Universals in the Content and Structure of Values - Theoretical Advances and Empirical Tests in 20 Countries. ***Advances in Experimental Social Psychology***, 25: 1-65.
Scotchmer, S. 1991. Standing on the shoulders of giants: cumulative research and the patent law. ***The Journal of Economic Perspectives***, 5(1): 29-41.
Scotchmer, S. 2004. ***Innovation and incentives***: The MIT Press.
Scott, W. R. 1983. Health care organizations in the 1980s: The convergence of public and professional control systems. ***Organizational environments: Ritual and rationality***, 99: 113.
Scott, W. R. 2001. ***Institutions and organizations***: Thousand Oaks, CA: Sage.
Scott, W. R., Meyer, J. W., Powell, W., & DiMaggio, P. 1991. The new institutionalism in organizational analysis.
Selznick, P. 1996. Institutionalism "old" and "new". ***Administrative Science Quarterly***, 41(2): 270-277.
Seo, M. G., & Creed, W. E. D. 2002. Institutional contradictions, praxis, and institutional change: A dialectical perspective. ***Academy of Management Review***, 27(2): 222-247.
Shadish, W., Cook, T., & Campbell, D. 2002. Experimental and quasi-experimental designs for generalized causal inference.
Shapin, S. 2008. ***The scientific life: a moral history of a late modern vocation***: University of Chicago Press.

Shepard, H. A. 1956. Nine Dilemmas in Industrial Research. ***Administrative Science Quarterly***, 1(3): 295-309.
Siggelkow, N., & Levinthal, D. A. 2003. Temporarily divide to conquer: Centralized, decentralized, and reintegrated organizational approaches to exploration and adaptation. ***Organization Science***, 14(6): 650-669.
Siggelkow, N., & Rivkin, J. W. 2005. Speed and search: Designing organizations for turbulence and complexity. ***Organization Science***, 16(2): 101-122.
Siggelkow, N., & Rivkin, J. W. 2006. When exploration backfires: Unintended consequences of multilevel organizational search. ***Academy of Management Journal***, 49(4): 779-795.
Simon, H. 1947. ***Administrative behavior: A study of decision-making processes in administrative organizations***: Free Pr.
Simon, H. 1955. A behavioral model of rational choice. ***The quarterly journal of economics***, 69(1): 99-118.
Simon, H., & March, J. G. 1958. ***Organizaations***. New York: Jhon Wiley and Sons.
Simsek, Z. 2009. Organizational Ambidexterity: Towards a Multilevel Understanding. ***Journal of Management Studies***, 46(4): 597-624.
Sismondo, S. 2009. ***An introduction to science and technology studies***: Blackwell Pub.
Smith, A. D., & Zeithaml, C. 1996. Garbage cans and advancing hypercompetition: The creation and exploitation of new capabilities and strategic flexibility in two regional bell operating companies. ***Organization Science***, 7(4): 388-399.
Smith, C., Organ, D., & Near, J. 1983. Organizational citizenship behavior: Its nature and antecedents. ***Journal of Applied Psychology***, 68(4): 653-663.
Smith, W. K., & Tushman, M. L. 2005. Managing strategic contradictions: A top management model for managing innovation streams. ***Organization Science***, 16(5): 522-536.
Sobrero, M., & Roberts, E. B. 2001. The trade-off between efficiency and learning in interorganizational relationships for product development. ***Management Science***, 47(4): 493-511.
Sobrero, M., & Roberts, E. B. 2002. Strategic management of supplier-manufacturer relations in new product development. ***Research Policy***, 31(1): 159-182.
Sorenson, O., & Fleming, L. 2004. Science and the diffusion of knowledge. ***Research Policy***, 33(10): 1615-1634.
Spokane, A. R., Meir, E. I., & Catalano, M. 2000. Person-environment congruence and Holland's theory: A review and reconsideration. ***Journal of Vocational Behavior***, 57(2): 137-187.
Stamper, C. L., & Johlke, M. C. 2003. The impact of perceived organizational support on the relationship between boundary spanner role stress and work outcomes. ***Journal of Management***, 29(4): 569-588.
Star, S. L., & Griesemer, J. R. 1989. Institutional ecology,'translations' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. ***Social Studies of Science***, 19(3): 387-420.
Stephan, P. E. 1996. The economics of science. ***Journal of Economic Literature***, 34(3): 1199-1235.
Stephan, P. E., & Everhart, S. S. 1998. The changing rewards to science: The case of biotechnology. ***Small Business Economics***, 10(2): 141-151.
Stern, S. 2004. Do scientists pay to be scientists? ***Management Science***, 50(6): 835-853.
Stokes, D. 1997. ***Pasteur's quadrant: Basic science and technological innovation***: Brookings Inst Pr.
Stone, M. M., & Brush, C. G. 1996. Planning in ambiguous contexts: The dilemma of meeting needs for commitment and demands for legitimacy. ***Strategic Management Journal***, 17(8): 633-652.
Suddaby, R., & Greenwood, R. 2005. Rhetorical strategies of legitimacy. ***Administrative Science Quarterly***, 50(1): 35-67.

Sutton, R. I., & Hargadon, A. 1996. Brainstorming groups in context: Effectiveness in a product design firm. ***Administrative Science Quarterly***, 41(4): 685-718.
Swann, W. B., Johnson, R. E., & Bosson, J. K. 2009. Identity negotiation at work. ***Research in Organizational Behavior, Vol 29***, 29: 81-109.
Tapscott, D., & Williams, A. 2007. The new science of sharing. ***The BusinessWeek Wikinomics Series***.
Taylor, A., & Helfat, C. E. 2009. Organizational Linkages for Surviving Technological Change: Complementary Assets, Middle Management, and Ambidexterity. ***Organization Science***, 20(4): 718-739.
Terborg, J. R. 1981. Interactional Psychology and Research on Human Behavior in Organizations. ***The Academy of Management Review***, 6(4): 569-576.
Terwiesch, C., & Ulrich, K. ***Innovation Tournaments: Creating and Selecting Exceptional Opportunities***. Boston, MA: Harvard Business Press.
Thomke, S., & Kuemmerle, W. 2002. Asset accumulation, interdependence and technological change: Evidence from pharmaceutical drug discovery. ***Strategic Management Journal***, 23(7): 619-635.
Thornton, P. 2004. ***Markets from culture: Institutional logics and organizational decisions in higher education publishing***: Stanford University Press.
Thornton, P., & Ocasio, W. 2008. Institutional logics, ***The Sage handbook of organizational institutionalism***: 99-129: Sage.
Thornton, P. H. 2002. The rise of the corporation in a craft industry: Conflict and conformity in institutional logics. ***Academy of Management Journal***, 45(1): 81-101.
Thornton, P. H., & Ocasio, W. 1999. Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958-1990. ***American Journal of Sociology***, 105(3): 801-843.
Thursby, J. G., & Thursby, M. C. 2002. Who is selling the Ivory Tower? Sources of growth in university licensing. ***Management Science***, 48(1): 90-104.
Tinsley, H. E. A. 2000. The congruence myth revisited. ***Journal of Vocational Behavior***, 56(3): 405-423.
Toole, A. A., & Czarnitzki, D. 2009. Exploring the Relationship Between Scientist Human Capital and Firm Performance: The Case of Biomedical Academic Entrepreneurs in the SBIR Program. ***Management Science***, 55(1): 101-114.
Townley, B. 2002. The role of competing rationalities in institutional change. ***Academy of Management Journal***, 45(1): 163-179.
Tsui, A. S., Egan, T. D., & Oreilly, C. A. 1992. Being Different - Relational Demography and Organizational Attachment. ***Administrative Science Quarterly***, 37(4): 549-579.
Tsui, A. S., & Oreilly, C. A. 1989. Beyond Simple Demographic Effects - the Importance of Relational Demography in Superior-Subordinate Dyads. ***Academy of Management Journal***, 32(2): 402-423.
Tsui, A. S., Porter, L. W., & Egan, T. D. 2002. When both similarities and dissimilarities matter: Extending the concept of relational demography. ***Human Relations***, 55(8): 899-929.
Tubre, T. C., & Collins, J. M. 2000. Jackson and Schuler (1985) revisited: A meta-analysis of the relationships between role ambiguity, role conflict, and job performance. ***Journal of Management***, 26(1): 155-169.
Turban, D. B., Dougherty, T. W., & Lee, F. K. 2002. Gender, race, and perceived similarity effects in developmental relationships: The moderating role of relationship duration. ***Journal of Vocational Behavior***, 61(2): 240-262.
Turban, D. B., & Jones, A. P. 1988. Supervisor Subordinate Similarity - Types, Effects, and Mechanisms. ***Journal of Applied Psychology***, 73(2): 228-234.
Tushman, M. 1977. Special boundary roles in the innovation process. ***Administrative Science Quarterly***, 22(4): 587-605.

Tushman, M., & Katz, R. 1980. External communication and project performance: An investigation into the role of gatekeepers. ***Management Science***, 26(11): 1071-1085.
Tushman, M., & OíReilly III, C. 2006. Ambidextrous organizations: Managing evolutionary and revolutionary change. ***Managing Innovation and Change***.
Tushman, M. L., & Rosenkopf, L. 1996. Executive succession, strategic reorientation and performance growth: A longitudinal study in the US cement industry. ***Management Science***, 42(7): 939-953.
Tziner, A., & Falbe, C. M. 1990. Actual and Preferred Climates of Achievement Orientation and Their Congruency - an Investigation of Their Relationships to Work Attitudes and Performance in 2 Occupational Strata. ***Journal of Organizational Behavior***, 11(2): 159-167.
Van Maanen, J., & Barley, S. 1984. Occupational communities: Culture and control in organizations. ***Research in Organizational Behavior***, 6(1): 287-365.
Van Vianen, A. E. M. 2000. Person-organization fit: The match between newcomers' and recruiters' preferences for organizational cultures. ***Personnel Psychology***, 53(1): 113-149.
van Wijk, R., Jansen, J. J. P., & Lyles, M. A. 2008. Inter- and intra-organizational knowledge transfer: A meta-analytic review and assessment of its antecedents and consequences. ***Journal of Management Studies***, 45(4): 830-853.
Vancouver, J. B., & Schmitt, N. W. 1991. An Exploratory Examination of Person-Organization Fit - Organizational Goal Congruence. ***Personnel Psychology***, 44(2): 333-352.
Vandeven, A. H. 1986. Central Problems in the Management of Innovation. ***Management Science***, 32(5): 590-607.
VandeWalle, D., & Cummings, L. L. 1997. A test of the influence of goal orientation on the feedback-seeking process. ***Journal of Applied Psychology***, 82(3): 390-400.
Vecchio, R. P., & Bullis, R. C. 2001. Moderators of the influence of supervisor-subordinate similarity on subordinate outcomes. ***Journal of Applied Psychology***, 86(5): 884-896.
Verquer, M. L., Beehr, T. A., & Wagner, S. H. 2003. A meta-analysis of relations between person-organization fit and work attitudes. ***Journal of Vocational Behavior***, 63(3): 473-489.
Vigoda, E. 2002. Stress-related aftermaths to workplace politics: the relationships among politics, job distress, and aggressive behavior in organizations. ***Journal of Organizational Behavior***, 23(5): 571-591.
Walsh, J. P., Cohen, W. M., & Cho, C. 2007. Where excludability matters: Material versus intellectual property in academic biomedical research. ***Research Policy***, 36(8): 1184-1203.
Wanous, J., & Lawler, E. 1972. Measurement and meaning of job satisfaction. ***Journal of Applied Psychology***, 56(2): 95-105.
Wanous, J. P., Poland, T. D., Premack, S. L., & Davis, K. S. 1992. The Effects of Met Expectations on Newcomer Attitudes and Behaviors - a Review and Metaanalysis. ***Journal of Applied Psychology***, 77(3): 288-297.
Washington, M., & Ventresca, M. J. 2004. How organizations change: The role of institutional support mechanisms in the incorporation of higher education visibility strategies, 1874-1995. ***Organization Science***, 15(1): 82-97.
Wayne, S. J., & Liden, R. C. 1995. Effects of Impression Management on Performance Ratings - a Longitudinal-Study. ***Academy of Management Journal***, 38(1): 232-260.
Weick, K. E. 1993. The Collapse of Sensemaking in Organizations - the Mann Gulch Disaster. ***Administrative Science Quarterly***, 38(4): 628-652.
Westerman, G., McFarlan, F. W., & Iansiti, M. 2006. Organization design and effectiveness over the innovation life cycle. ***Organization Science***, 17(2): 230-238.
Westphal, J. D., & Zajac, E. J. 1994. Substance and Symbolism in Ceos Long-Term Incentive Plans. ***Administrative Science Quarterly***, 39(3): 367-390.

Westphal, J. D., & Zajac, E. J. 1998. The symbolic management of stockholders: Corporate governance reforms and shareholder reactions. ***Administrative Science Quarterly***, 43(1): 127-153.

Wheelwright, S., & Clark, K. 1992. ***Revolutionizing product development: quantum leaps in speed, efficiency, and quality***: Free Pr.

Whittington, R. 1992. Putting Giddens into Action - Social-Systems and Managerial Agency. ***Journal of Management Studies***, 29(6): 693-712.

Yukl, G., & Fu, P. P. 1999. Determinants of delegation and consultation by managers. ***Journal of Organizational Behavior***, 20(2): 219-232.

Zalesny, M. D., & Highhouse, S. 1992. Accuracy in Performance Evaluations. ***Organizational Behavior and Human Decision Processes***, 51(1): 22-50.

Zilber, T. B. 2002. Institutionalization as an interplay between actions, meanings, and actors: The case of a rape crisis center in Israel. ***Academy of Management Journal***, 45(1): 234-254.

Zucker, L., Darby, M., & Brewer, M. 1998. Intellectual Human Capital and the Birth of U.S. Biotechnology Enterprises, ***The American Economic Review***, Vol. 88: 290-306.