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REVISITING A PROPOSED DEFINITION OF PROFESSIONAL SERVICE FIRMS

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We have attempted to explain why professional service firms (PSFs) even in some of the most canonical examples (e.g., law firms) fail to follow the traditional definition. Growth in the size and geographic diversification of law firms has transformed their organizational structures and in some cases even allowed outside investment. We believe an attempt at defining organizational structure and ownership for any industry, including PSFs, is exposed to creating too many exceptions that may fall outside the confines of the definition. In particular, the problem of defining an industry is that while a given definition may in one context neatly correspond to the existing organizational structure and ownership, changes in the context can render the definition irrelevant over time. As an alternative to defining an industry, it might be more productive to examine how organizations and their respective industries become organized as contexts change.

In a recent *Academy of Management Review* article, Professor Andrew von Nordenflycht (2010) focused on defining professional service firms (PSFs). In the article von Nordenflycht argues that past research leaves the term *professional service firms* either undefined, or at best provides only examples, such as law firms, accounting firms, "etc." In addition, he argues that while most scholars agree that law firms and accounting firms fit the "definition" of PSFs, there is "little consensus on what the 'etc.' refers to. Does it include ad agencies? Physician practices? Software firms? Why or why not?" (2010: 155). The author's contributions include (1) identifying three distinctive characteristics associated with PSFs (i.e., knowledge intensity, low capital intensity, and a professionalized workforce), (2) arguing that while all PSFs share "knowledge intensity," they may vary based on the degree of intensity of the other two characteristics (i.e., capital intensity and professionalized workforce), and (3) describing managerial challenges facing each structural form and providing solutions. In this dialogue we discuss the limitations of the proposed definition, question the managerial challenges von Nordenflycht associates with PSFs, and critique the corresponding solutions he offers.

THE PROPOSED DEFINITION

Based on a review of the PSF literature for a definition, von Nordenflycht "landed on three characteristics— knowledge intensity, low capital intensity, and a professionalized workforce—as central ones" (2010: 159). These three distinctive characteristics were chosen "because (1) they can be well defined, (2) they are commonly noted as distinctive characteristics . . . , and (3) they have been linked in the literature . . . to distinctive managerial challenges or organizational outcomes" (2010: 159). Focusing on the three characteristics, von Nordenflycht (2010) suggests "developing a taxonomy of knowledge-intensive firms" that vary in the degree of degree of capital intensity and workforce professionalization (2010: 157).

Knowledge Intensity and Professionalized Workforce

Knowledge intensity is touted as "perhaps the most fundamental distinctive characteristic of PSFs" which is said to permeate throughout the organization, including "frontline workers" (von Nordenflycht, 2010: 159). However, knowledge intensity creates two problems for PSFs: cat herding and opaque quality (von Nordenflycht, 2010). We discuss each in turn.

Cat herding. Cat herding refers to the challenges of "retaining and directing" skilled and professionalized employees with "substantial human capital (such as complex knowledge)" who have "a strong bargaining position relative to the firm, since their skills are scarce and, in many instances, transferable across firms" (von Nordenflycht, 2010: 160). Regulation by organized professions through their codes provides for "strong preferences for autonomy," (2010: 160) and "a responsibility to protect the interests of clients and/or society . . . against a 'commercial' or 'economic' ethos that allows unfettered pursuit of self-interest" (2010: 163). An implication of such regulation is "muted competition," both against potential entrants into the profession through licensing requirements and among professionals. Thus, "in the name of preserving the profession's trustworthiness, professional codes tend to prohibit a range of commercially competitive behavior, including soliciting competitors' clients, advertising in any way, . . . and even competing on price" (2010: 164). The organizational slack resulting from such muted competition provides an opportunity

> to address the challenges of cat herding in ways that would not be possible in more competitive environments. For example, firms may be better able to satisfy employee preferences for autonomy by adopting highly autonomous and informal structures, whose consequent lack of internal coordination might be too inefficient in more competitive environment (2010: 164).

Von Nordenflycht provides two organizational solutions to help with the problem of cat herding: (1) alternative incentive mechanisms, "such as contingent and/or deferred compensation," and (2) allowing "autonomy and informality in organizational structure" (2010: 161).

We argue that whether professionals (with substantial and complex human capital) appear to behave like cats or like well-mannered employees depends on (1) how easily they can be replaced by the employer (i.e., how competitive the labor market is for their expertise) and/or (2) whether the task and its contexts require an autonomous or decentralized decision-making structure. On the first issue, the more competitive the market for their expertise, the more likely professionals will lose their job if they behave like cats. Given market competition and the transferability of human capital in many professional organizations, such employees are replaceable and, thus, easily salvageable. Although transferability of human capital may afford an employee a catlike behavior, since he or she may threaten to move to a competitor (were it not for a noncompete clause), transferability also affords the firm the ability to hire from competitors. Thus, cat herding problems do not arise because knowledge is complex; they may arise because of lack of competition in the market for a given professional. However, even in this case there is a limit to catlike behaviors. Consider, for example, one of the most canonical examples of PSFs: law firms. In this case a cursory examination would reveal a high degree of competition among a group of highly touted professionals: lawyers. Besides the online legal service advertisements, one cannot avoid repeated commercials by law firms inviting injured workers or patients suffering from side effects of medication to patronize their services. In addition, a significant increase in lateral movements by associates and partners across firms strongly suggests competition in the labor market for such professionalized talent (Henderson & Bierman, 2009).

We argue that an alternative explanation for the appearance of catlike behavior (i.e., autonomy at work) is a context that requires decentralized decision making for efficiency reasons. Think of professors in classrooms, surgeons in operating rooms, or lawyers in courtrooms—all three groups are led by their own initiative in performing their tasks, with relatively little day-to-day regard for administrative superiors. Such catlike behavior is organizationally efficient, given the idiosyncratic nature of the tasks, requiring decentralized decision rights. Unanticipated events may occur that provide time-dependent information at the "local" level, to which professionals react autonomously. In these contexts the professional has the relevant information to behave independently and autonomously, not the supervisor. Thus, allowing autonomy *is not* a concession to professionals in service organizations but, rather, an efficient organizational response to the decentralized nature of information held by professionals.

Opaque quality. Opaque quality means that complex knowledge of the expert "is hard for nonexperts (i.e., customers) to evaluate, even after the output is produced and delivered" (von Nordenflycht, 2010: 161). Von Nordenflycht argues that opaque quality gives rise to at least four types of measures PSFs undertake in response to the challenge of opaqueness: bonding, reputation, appearance, and ethical codes. An example he invokes for bonding is the "unlimited liability partnership" structure to induce "partners to monitor and pressure each other to provide quality service since each is at risk for any actions of the others that expose the firm to financial or legal liability" (2010: 161).

Is the opaque quality of services provided by PSFs an explanation for unlimited liability? Our observations indicate that most traditional PSFs are organized as *limited liability* partnerships (i.e., LLP). For example, virtually all of the largest 200 law firms in the United States have the LLP postfix after their name. In addition, the U.S. and European subsidiaries of the major accounting firms have similar structures—for example, KPMG Europe LLP and KPMG America LLP. All the KPMG operations in different areas of the world are set up independently as LLPs so as to prevent cross-liabilities and cap liability exposure (Greenwood & Empson, 2003). There are a few reasons for adoption of limited liability. First, given the large size of many PSFs, assumption of liability by each partner for the entire organization is too costly and, thus, economically infeasible. Second, cross-monitoring of partners by partners is impractical when the PSFs are geographically diversified, with many national and multinational branches. Assumption of unlimited liability in these situations would expose each partner to high risks if he or she were not in a position to monitor the behavior of other partners. Finally, as the size of PSFs increases, the free-rider problem by each partner can prevent effective monitoring. For example, while the cost of monitoring other partners would be absorbed by a given partner, its benefits would be spread across all partners, thus arguably creating a free-rider problem. Given the impracticality of cross-monitoring in large and geographically diversified PSFs, unlimited liability has been replaced by limited liability in many cases.

We believe high monitoring costs have another organizational implication: contingent compensation systems. Contrary to von Nordenflycht's claim that "contingent and/or deferred compensation" (2010: 161) systems are a response to the cat-herding challenge, we believe instead that the high monitoring costs are the main explanation for the adoption of such compensation systems, where each partner's compensation is contingent on his or her performance only. In general, when monitoring costs are high, organizations use contingent pay systems as a substitute for monitoring and control—in such systems employees become their own monitors since shirking at work will directly cost them part of their compensation (Brickley, Smith, & Zimmerman, 2008; Milgrom & Roberts, 1992).

Low Capital Intensity

While von Nordenflycht's paper allows for flexibility in capital intensity, low capital intensity has a special place in his framework. In particular, low capital intensity is said to have two implications. First, PSFs requiring low capital intensity will further increase "employee bargaining power" (1) because relatively speaking, if capital intensity is low, human capital intensity becomes even more important; (2) with the low cost of capital, employees may "easily start up their own firms"; and (3) "without nonhuman capital to specialize to, there is less likelihood of generating firm-specific human capital, which would reduce employee mobility" (2010: 162). Thus, "if knowledge intensity creates the cat herding problem, adding low capital intensity turns into a situation where the assets go down the elevator each night . . . and the firm can't control whether they come back" (2010: 162). Second, low capital intensity creates the *opportunity* to lower "the need for raising investment funds and thereby reduces the need to organize in ways that protect outside investors" (2010: 162). The author states that, not having outside investors as monitors, the firm may resort to alternative compensation measures and to employee autonomy and informality as two measures of managing cat herding problems.

With all due respect, we disagree with both implications. First, as discussed above, whether cat mentalities dominate PSFs hinges on the competitiveness of the labor market for the profession in question. Competition and, thus, transferability in such markets afford the firm the ability to replace those "who choose not to ride up the elevator." Second, in spite of whether ownership is internal or external, alternative compensation measures and greater employee autonomy may or may not be efficient organizational characteristics on their own. Given the nature of tasks in PSFs, such as law firms, hospitals, universities, and the like, jobs are designed to afford professionals decision rights and, hence, autonomy. We stress that such autonomy in decision rights does not signify a compromise or a concession to professionals who would otherwise behave like cats but represents an organizational approach to efficient utilization of local information held by professionals (Brickley et al., 2008; Milgrom & Roberts, 1992).

Ownership Structure

Regarding ownership structure of PSFs, von Nordenflycht argues that there "is a resistance to having nonprofessionals, especially commercially oriented nonprofessionals (such as investors), involved in the ownership and governance of professional firms," because PSFs have a "core of professional codes of ethics," whereas commercially oriented investors would encourage "unfettered pursuit of self-interest" (2010: 163). This argument also appears open to question. We believe that the alternative ownership structures that PSFs assume will ultimately represent the most efficient organizational approaches to risk sharing. A casual examination of the most touted and canonical PSFs (e.g., law firms) indicates that some PSFs have even embraced the corporate form. For example, law firms in Australia are now permitted to sell shares of stock on the open market. This kind of ownership allows for considerable risk spread-

TABLE 1
Summary of Some Key Arguments

Concept	von Nordenflycht's (2010) Argument	Our Argument
Knowledge intensity: Direction difficulties	• Not being able to direct or supervise employees is a problem (pp. 160-161). • The solution is to give the employee autonomy—by not trying to direct or supervise (pp. 160-161).	Independence in behavior is not the same thing as "cat herding" behavior. The former arises because of the nature of tasks and information asymmetry between professionals and their supervisors. Consider professors in classrooms, surgeons in operating rooms, and lawyers in courtrooms: all three groups are led by their own initiative as they perform their respective jobs, with no regard for administrative superiors. When the relevant information of the context is held by the professional and the task is idiosyncratic, efficient organizational structure requires a decentralized decision rights system. While professionals in these contexts appear to behave like independent cats, such behaviors are efficient in these contexts.
Professionalized workforce: Autonomy	"Firms may be better able to satisfy employee preferences for autonomy by adopting highly autonomous and informal structures, whose consequent lack of internal coordination might be too inefficient in more competitive environments" (p. 164).	The need for (or lack of) employee autonomy (i.e., decentralization of decision rights) within an organization has less to do with its employees' personal preferences and more to do with deciding a structure that is efficient given the context of the task and the location of the relevant information in the hierarchy.
Knowledge intensity: Retaining difficulties	There are difficulties in retaining skilled employees with "substantial human capital (such as complex knowledge)" who have "a strong bargaining position relative to the firm, since their skills are scarce and, in many instances, transferable across firms" (p. 160).	• Transferability/mobility also affords the firm the ability to hire from competitors. • There is a limit to job switching, because a professional will face difficulty in moving if known to have such catlike behavior • Hence, in a free market, catlike behavior of excessively switching jobs will be solved on its own over time.
Opaque quality (customers are nonexperts; cannot evaluate quality of service)	PSFs resolve opaqueness via "*unlimited liability partnership*" structures to induce "partners to monitor and pressure each other to provide quality service since each is at risk for any actions of the others that expose the firm to financial or legal liability" (p. 161).	Most traditional PSFs and their subsidiaries are organized as *limited liability partnerships* (i.e., LLPs). In other words, personal wealth is not exposed to liability when such PSFs or subsidiaries are sued. The goal is to prevent cross-liabilities when faced with lawsuits; opaqueness is the least of their concerns here.
Low capital intensity: Employee mobility	Low capital intensity increases "employee bargaining power; . . . . if knowledge intensity creates the cat herding problem, adding low capital intensity turns it into a situation where the assets go down the elevator each night . . . and the firm can't control whether they come back" (p. 162).	Competition and transferability in markets afford the firm the ability to replace those who choose not to ride up the elevator in the morning.
Ownership structure: No outside ownership	• Low capital intensity gives the firm the opportunity to avoid outside investors as monitors so that the firm has the freedom to adopt efficient measures of alternative compensation, employee autonomy, and informality (p. 162). • There "is a resistance to having nonprofessionals, especially commercially oriented nonprofessionals (such as investors), involved in the ownership and governance," because PSFs have a "core of professional codes of ethics," whereas commercially oriented investors encourage "unfettered pursuit of self-interest" (p. 163).	• These arguments are questionable and contrary to the corporate governance literature. Why would an outside investor object to organizational measures if they are efficient? Outside investors support measures that are perceived to improve efficiency and performance because their wealth is at stake. • In a number of countries, law firms have embraced the "corporate form," with stocks traded on the open market. Further, outside investors in the United States (such as hedge funds) invest in plaintiffs' cases as a substitute for direct investment in law firms.

ing in large class action and contingent fee cases (Regan, 2009).

Finally, while law firms in the United States are not currently permitted to share risks with outside equity investors in this manner, outside investments have nevertheless crept into the U.S. legal system through the back door. Instead of directly investing in law firms, outside investors in the United States (in this case, hedge funds) have recently started investing in plaintiffs' cases—cases that would probably not otherwise be brought by plaintiffs for the risk of losing. Investment in a portfolio of such cases lowers the cost associated with risk and works as a substitute for investment in law firms by outside investors (Glater, 2009).

DISCUSSION AND CONCLUDING REMARKS

We believe the proper question is not how to define a PSF but how a given service becomes optimally organized. The difference in these two approaches is significant. In this dialogue we have attempted to explain why PSFs, even in some of the most "canonical" examples (e.g., law firms), fail to follow the "traditional" definition. Growth in the size and geographic diversification of law firms have transformed their organizational structures and in some cases even allowed outside investment. Moreover, most large law firms in the United States at least, are organizationally structured as LLPs and are increasingly active in marketing and advertising their services.

In sum, we believe an attempt at defining organizational structure and ownership for any distinct group of firms, including PSFs, is exposed to creating too many exceptions that may fall outside the confines of the definition. In particular, the problem of defining PSFs is that while a given definition may in one context neatly correspond to the existing organizational structure and ownership, changes in the context can render the definition irrelevant over time. As an alternative to defining a distinct group of firms, it might be more productive to examine how a distinct group of firms becomes optimally organized as contexts change. Indeed, this appears to represent a key opportunity for future research in this area. We provide a summary of our primary critiques of von Nordenflycht's arguments in Table 1.

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WHAT IS A PROFESSIONAL SERVICE FIRM? TOWARD A THEORY AND TAXONOMY OF KNOWLEDGE-INTENSIVE FIRMS

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I develop a theory of the distinctive characteristics of professional service firms and their organizational implications. I identify three distinctive characteristics—knowledge intensity, low capital intensity, and a professionalized workforce—with which I propose a taxonomy of four types of knowledge-intensive firms whose varying degrees of professional service intensity generate different organizational outcomes. The analysis highlights the danger of conflating the implications of professionalization with those of knowledge intensity and calls for comparative research across a wider range of professional services.

There is growing interest in professional service firms (PSFs) among organization theorists (Empson, 2001a; Greenwood, Suddaby, & McDougald, 2006; Hinings & Leblebici, 2003). PSFs are of interest because they are presumed to be distinct from other types of firms: they face a distinctive environment that demands distinctive theories of management (Greenwood, Li, Prakash, & Deephouse, 2005; Hinings & Leblebici, 2003; Lowendahl, 2000; Maister, 1993; Malhotra, Morris, & Hinings, 2006). Interest in PSFs is further fueled by the notion that they are distinct in ways that will be increasingly relevant to non-PSFs. Often described as extreme examples of knowledge intensity, PSFs are seen as models for an increasingly knowledge-based economy (Empson, 2007; Gardner, Anand, & Morris, 2008; Gilson & Mnookin, 1989; Greenwood et al., 2006; Hinings & Leblebici, 2003; Lowendahl, 2000; Maister, 1982; Scott, 1998; Teece, 2003; Winch & Schneider, 1993).

However, a significant obstacle to progress in understanding PSFs is the ambiguity of the central term: what *is* a PSF? In many instances of research on PSFs, the term is either undefined or is defined only indirectly, by providing a brief list of examples: "PSFs, such as law firms, accounting firms, etc." Table 1 lists a wide range of industries that have been listed in recent studies as examples of professional services. It reveals clear consensus on the canonical examples—law and accounting firms—but little consensus on what the "etc." refers to. Does it include ad agencies? Physician practices? Software firms? Why or why not?

This ambiguity hinders research in two ways. First, it leads to a constrained body of empirical work. Since researchers gravitate to settings that are unambiguously professional services, empirical research focuses overwhelmingly on the narrow set of canonical industries (law, accounting, consulting). There is also little work that *compares* different professional services, with most studies focusing on one specific industry and then asserting that the results apply to PSFs in general.

Second, the lack of boundary conditions for the term PSF means that we cannot actually test existing theories about how PSFs are distinctive, since we cannot specify to which types of firms any proposed theory should apply. Should theories developed while studying law firms also apply to ad agencies, hospitals, or R&D labs? And if ad agencies, hospitals, or R&D labs are organized in a different fashion than law firms, does this mean that they are not PSFs, or does it mean that the organization of law firms is less paradigmatic than is often assumed? In its current state the PSF literature might be considered simply a literature of law and account-

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TABLE 1
Cited Examples of Professional Service Firms

Industry	Count (Out of 30)
Accounting	26
Law	26
Management consulting	25
IT consulting/design	8
HR consulting	4
Technology consulting	1
Engineering consulting/design	16
Advertising	15
Architecture	13
Investment banking	11
Marketing/public relations	7
Physician practices/medicine	5
Real estate agencies	5
Insurance brokerage	4
Software development	4
Actuarial services	3
Executive recruiting	3
Media production (film, TV, music)	3
Research firms/R&D labs	3
Education/teaching	2
Financial advising	2
Investment management (hedge funds, VC, mutual funds)	2
Talent agencies	2
Universities	2
Fashion design	1
Graphic design	1
Hospitals	1
Professional sports	1
Project management	1
Quantity surveying	1
Risk management services	1
Social work agencies	1

Note on method: The sample of articles was derived from three searches. First, I searched for articles with the phrase "professional service" in the title or abstract in the following journals: *Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Human Relations, Journal of Management, Journal of Management Studies, Organization Science, Organization Studies,* and *Organizational Behavior and Human Decision Processes.* Second, I used the same search phrase in Google Scholar (to identify books as well as articles outside of the above journals). Third, I added articles mentioned frequently in the articles from the first two searches. The sample, which contained fifty-two articles and books, is by no means comprehensive but offers a broad, illustrative view of the breadth of PSF examples and definitions. Of these fifty-two works, thirty provided specific examples of professional services. The count after each industry (or occupation) represents the number of articles among the thirty that listed that industry as an example of a professional service.

ing firms. If it is to be more than that, it needs more explicit criteria about what constitutes a PSF.

Of course, the ambiguity of the term PSF stems to a large degree from the ambiguity of the term *professional*, which has a wide range of meanings. Perhaps the central characteristic associated with professionals is their mastery of a particular expertise or knowledge base. Thus, an expansive definition of PSF would be any firm reliant on a workforce with substantial expertise—that is, a definition equivalent to knowledge-intensive firms or knowledge-based organizations (Anand, Gardner, & Morris, 2007; Teece, 2003; Winch & Schneider, 1993). In fact, this characteristic seems to be the unifying link across most of Table 1.

However, academic analyses usually define the root term, *profession*, on the basis of *multiple* characteristics, of which a distinct knowledge base is only one. For instance, sociologists generally distinguish professions from other occupations by their strong control over the application of their knowledge base via a range of institutions, such as training and licensing (Abbott, 1991; Starbuck, 1992; Torres, 1991). This characteristic applies much more strongly to some fields in Table 1 (e.g., law, accounting) than to others (e.g., management consulting, advertising). To the extent that these defining characteristics *aside from knowledge intensity* have important implications for the management and organization of firms, it makes it problematic to define PSFs as equivalent to knowledge-intensive firms, since insights developed in one setting may not apply to all the others in Table 1. In other words, while distinctive organizational features of law and accounting firms *may* stem from the knowledge intensity that they share with a broader set of firms, those features could also stem from more idiosyncratic characteristics, making them irrelevant to most other settings.

To address this problem, in this paper I develop an explicit and systematic theory about the *multiple* sources of PSF distinctiveness and their managerial and organizational implications. Based on a review of recent PSF-related literature, I focus on three important characteristics: *knowledge intensity, low capital intensity*, and a *professionalized workforce*. For each characteristic I hypothesize its resulting managerial challenges and opportunities, as well as the distinctive organizational features that may be responses to those challenges and opportunities.

However, I do *not* propose a singular definition of PSFs as firms that meet all three characteristics. Such a dichotomous definition (PSF versus non-PSF) poses several problems. It excludes some fields that rank highly as examples of PSFs in Table 1 but that are very weakly professionalized, such as management consulting, which would give the definition poor face validity. And such a restrictive definition would render PSF research ineffective in offering insights into managing knowledge intensity, since findings might stem from low capital intensity or a professionalized workforce instead.

To embrace the broad universe of knowledge-intensive firms while still accounting for the other two important characteristics, I suggest that we will make more progress by thinking in terms of *degrees of professional service intensity*, based on the presence of more or fewer of the three characteristics. Thus, I develop a taxonomy of knowledge-intensive firms that vary in the degree of professional service intensity, based on variation in capital intensity and workforce professionalization. I then predict how the categories differ from each other in terms of organizational outcomes, and I offer several illustrations.

This theoretical framework makes several key contributions, both to interpreting the generalizability of existing research and to guiding future research. First, it highlights the dangers in applying findings from one specific setting to professional services in general, without assessing whether those findings stem from more general rather than more idiosyncratic characteristics. For example, a number of scholars have shown that law and accounting partnerships feature informal management processes, including few formal rules or systems and little strategic planning (Greenwood, Hinings, & Brown, 1990; Hinings, Greenwood, & Cooper, 1999; Malhotra et al., 2006), and others have interpreted this informality as an appropriate response to the challenges of knowledge intensity (Greenwood & Empson, 2003; Starbuck, 1992; Winch & Schneider, 1993). But law and accounting firms also have highly professionalized workforces, which I argue may dampen the level of competition in those industries. So informality in the form of little planning and few formal systems may instead represent poor management, made feasible by a less competitive environment. Thus, without a clearer understanding of the multiple sources of PSF distinctiveness, we may be touting sloppy management as a best practice!

Second, the framework has several implications for the design of future research. Not only does it open up a wide range of additional industries to study in the context of PSFs but it also highlights the need for empirical work in settings beyond law and accounting, especially work that *compares* the former with the latter, in order to test theories that link distinctive characteristics to specific organizational outcomes. Furthermore, by focusing the definition of PSFs on characteristics, rather than on lists of specific industries, the framework may help explain within-industry variation in organizational structures, such as the fact that some two-thirds of U.K. law firms do not use the up-or-out promotion system so commonly associated with law firms (Morris & Pinnington, 1998). At the very least this framework points to such intraindustry variation as another important source for comparative empirical work.

In the next section I begin the analysis with a brief conceptual history of the term *professional service firm,* including a discussion of antecedent literature on professions and professional organizations.

PSFs: A (BRIEF) CONCEPTUAL HISTORY

Organizations employing significant numbers of professionals have been a recurrent subject of research in organization theory since the 1960s. This is because professionals are assumed to have preferences that conflict with the nature of bureaucratic organization (Barley, 2005; Blau & Scott, 1962). In fact, the professions have fueled a stream of sociological research since early in the twentieth century, precisely because the autonomy and social status of individual professionals stood out as exceptions to the rationalization of much of economic life into hierarchical bureaucracies (Abbott, 1988).

In a major portion of this professions literature, scholars attempted to identify the essential characteristics of professions (Carr-Saunders & Wilson, 1933; Cogan, 1953; Goode, 1957; Millerson, 1964; Wilensky, 1964). Parsons (1939), however, also provided a functional interpretation of these characteristics, which has persisted as one of the primary understandings of professions (Friedson, 1994; Gross & Kieser, 2006). In this view an "asymmetry of expertise" between experts and their nonexpert clients makes clients unable to assess the skill level of the expert and/or the quality of the expert's rendered service. Professions' ethical codes and autonomous control over the education, licensing, and disciplining of their members are seen as means to guarantee expertise and trustworthiness. Thus, professions are assumed to operate according to principles antithetical to the nature of commercially oriented hierarchical bureaucracies (Barley & Tolbert, 1991; Greenwood et al., 2006; Malhotra et al., 2006).

In the 1960s, noticing that members of professions were nonetheless working inside large organizations, organizational sociologists began to investigate the nature of organizations of professionals, labeled *professional organizations* or *professional bureaucracies* (Bucher & Stelling, 1969; Friedson, 1970; Hall, 1968; Kornhauser, 1962; Litwak, 1961; Miller, 1967; Montagna, 1968; Scott, 1965; Smigel, 1964). Motivated by the presumption of conflict between professional and bureaucratic principles of control, these scholars sought to understand both how organizations affected the nature, status, and satisfaction of professionals and how the employment of professionals affected the nature of organizations. In general, results indicated that professional organizations did display distinctive features, such as professionals' greater autonomy and participation in organizational governance. Much of this research focused on fields that were canonical examples of professions: medicine, law, and accounting. And the organizations studied included both commercial firms (e.g., law firms, accounting firms) and large nonprofit or state bureaucracies (e.g., hospitals, social work agencies).

Research on professional organizations, with its focus on the institutional alternatives of professional versus bureaucratic control and on the "classic" professions, has continued (Barley & Tolbert, 1991; Brock, Powell, & Hinings, 1999; Mintzberg, 1979). However, in the early 1990s a related but distinct body of literature on professional service firms emerged (Cooper, Hinings, Greenwood, & Brown, 1996; Greenwood et al., 1990; Hinings, Brown, & Greenwood, 1991; Maister, 1993; Winch & Schneider, 1993). While some of the works still invoked concepts from the sociology of the professions (Cooper et al., 1996; Greenwood et al., 1990; Hinings et al., 1991), this literature was more managerially oriented. It focused more on commercial firms and less on nonprofit and state bureaucracies; thus, law and accounting firms remained core examples, but medicine-related organizations were less prevalent, replaced by management consulting firms. The effect of professionals on organizations was still a primary question, but the effect of organizations on professions was less so.

In addition, the issue of how to motivate and retain highly skilled and mobile labor became at least as important as the older questions of how to reconcile bureaucratic versus professional principles or how to deal with the asymmetry of expertise. This new focus on PSFs was linked to the emergence of research on knowledge-intensive firms, of which PSFs were often considered primary examples (Alvesson, 1995; Starbuck, 1992; Winch & Schneider, 1993), as well as to the rapid growth of the management consulting industry, especially within the large accounting firms.

With this managerial turn and a shift to the issues of skilled labor in general, research on PSFs became less anchored to the professions, in the classic sociological sense, and seemed potentially relevant to a wider set of firms (Greenwood et al., 2005), as evidenced by the breadth of industries and occupations listed in Table 1. Of course, this also exacerbated the ambiguity of the term PSF. So even though a core idea underlying the literature on PSFs is that such firms share a set of distinctive challenges that lead to distinctive organizational outcomes, it remains problematic to say just which outcomes are relevant to how broad a set of firms.

A primary example of this difficulty is the interpretation of the dominant organizational form of law and accounting firms—the *professional partnership* (Anand et al., 2007; Greenwood et al., 1990; Maister, 1993). Because of its close association with law and accounting firms, the professional partnership is commonly viewed as a response to the unique challenges facing PSFs and, thus, is proposed as an organizational model for knowledge-intensive firms in general (Blair & Kochan, 2000; Gilson & Mnookin, 1989; Greenwood & Empson, 2003; Winch & Schneider, 1993).

In fact, the close association between PSFs and professional partnerships has led to frequent conflation of the two terms. For example, Hinings et al. (1991) focused on analyzing the behavior of a professional partnership (i.e., an organization distinguished by unique governance features) but then used that term interchangeably with professional service firm, which implied that all PSFs are defined by a common governance structure. However, while professional partnerships do exist outside of law and accounting, many of the fields listed in Table 1 are not dominated by professional partnerships. Furthermore, the use of partnership features is not even universal across firms within the law and accounting fields (Morris & Pinnington, 1998; Tolbert & Stern, 1991). Conflating the two terms obscures the fact that whether PSFs are organized as professional partnerships and whether the latter is indeed a response to the unique conditions of the former are ultimately empirical questions that need to be investigated.

To understand just how broadly applicable the supposedly distinctive features of PSFs are, we need an explicit theory of the multiple sources of PSF distinctiveness and their implications for management and organization. That is the task of the next section.

DISTINCTIVE CHARACTERISTICS, MANAGERIAL IMPLICATIONS, AND ORGANIZATIONAL RESPONSES

In this section I identify three distinctive characteristics often associated with PSFs and hypothesize the managerial implications of those characteristics, as well as the potential organizational responses to those implications. Of the fifty-two articles and books used to compile Table 1 (see the note under Table 1), only twenty-one offer a definition of the term PSF. These definitions encompass a wide range of distinctive characteristics relating to the nature of a firm's asset base, workforce, output, or key managerial challenges. In reviewing these definitions, I landed on three characteristics—knowledge intensity, low capital intensity, and a professionalized workforce—as the central ones. I selected these three because (1) they can be well defined, (2) they are commonly noted as distinctive characteristics (not necessarily using the same labels, but with phrases that connote much of their meaning), and (3) they have been linked in the literature (or can readily be linked) to distinctive managerial challenges or organizational outcomes. In the remainder of this section, I define each characteristic and discuss its implications. In this discussion I seek to provide leading examples of relevant organizational implications, rather than an exhaustive or comprehensive list.

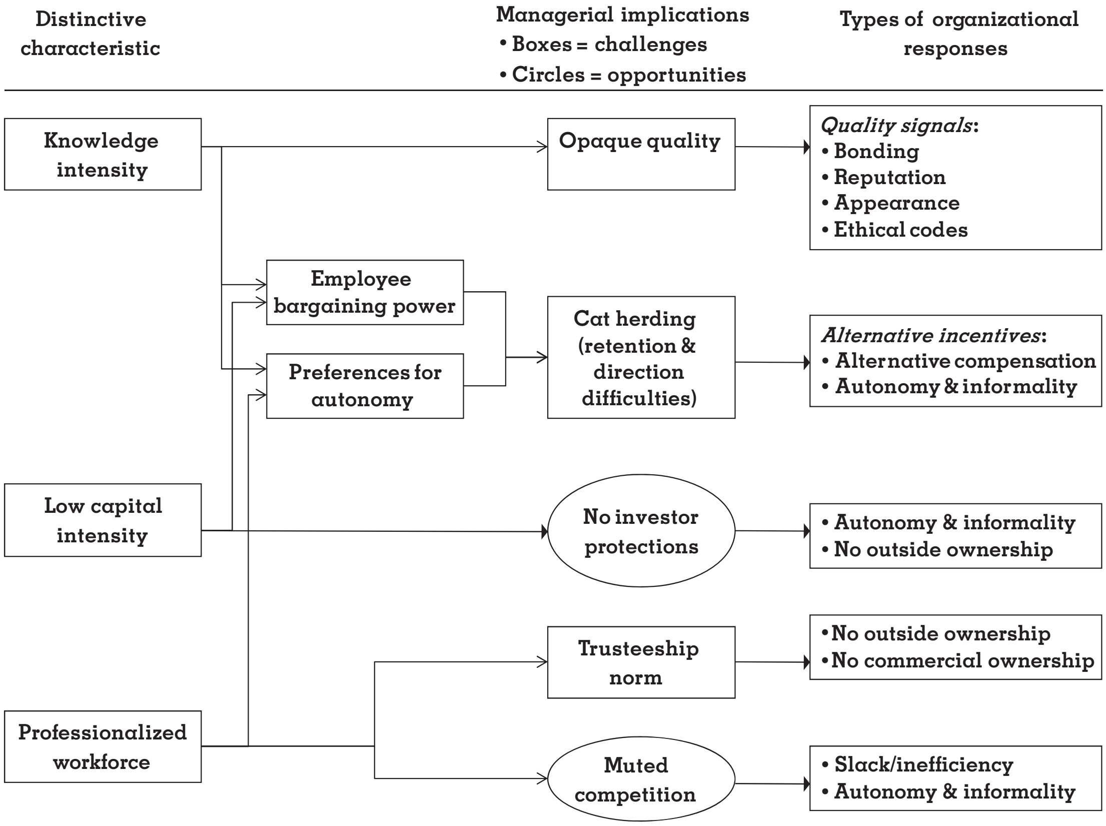
The theory I develop is summarized in Figure 1. This figure lists the three key characteristics on the left-hand side, the resultant managerial challenges and opportunities in the middle, and the potential organizational responses to those challenges and opportunities on the right-hand side. The theory's implicit hypotheses are represented by the arrows connecting the three sets of concepts (note that some organizational responses are listed multiple times so as to avoid a confusing web of criss-crossing arrows).

Knowledge Intensity

Knowledge intensity is perhaps the most fundamental distinctive characteristic of PSFs, depending on how knowledge intensity is defined. Knowledge intensity indicates that production of a firm's output relies on a substantial body of complex knowledge (e.g., Starbuck, 1992; Winch & Schneider, 1993). But there is some debate as to whether knowledge intensity refers only to knowledge embodied in individuals (Alvesson, 2000) or also to knowledge embedded in equipment, products, and organizational routines (Morris & Empson, 1998; Starbuck, 1992). I rely here on the former interpretation, which is more appropriate in the context of PSFs and is the definition most scholars have in mind when they label PSFs as knowledge intensive. (The latter interpretation ultimately leads to the inclusion of an overly broad universe of firms—for example, McDonald's could be considered knowledge intensive because of the knowledge embedded in the routines that govern each outlet [Starbuck, 1992]).

This person-centric definition of knowledge intensity essentially implies that the firm relies on an intellectually skilled workforce, not just among its executive or support functions (e.g., R&D) but also among its "frontline workers" (Alvesson, 2000; Starbuck, 1992). In fact, *human capital intensity* might be a reasonable alternative label for this characteristic. Knowledge intensity, interpreted in this way, is identified as a distinctive characteristic of PSFs by 86 percent (eighteen of twenty-one) of the reviewed defini-

FIGURE 1
Relationships Among Distinctive Characteristics, Managerial Implications, and Organizational Responses



tions. It is also a characteristic that applies to almost all of the businesses listed in Table 1.

There are two key managerial challenges that result from knowledge intensity. I describe both here, along with the types of organizational responses they may engender.

Cat herding: One challenge arising from an intellectually skilled workforce is retaining and directing those skilled employees. Employees with substantial human capital (such as complex knowledge) are in a strong bargaining position relative to the firm, since their skills are scarce and, in many instances, transferable across firms (Teece, 2003). Thus, employees have strong outside options, making them hard to retain. They are also hard to direct, with scholars often arguing that highly skilled individuals have strong preferences for autonomy and a consequent distaste for direction, supervision, and formal organizational processes (DeLong & Nanda, 2003; Greenwood & Empson, 2003; Lorsch & Tierney, 2002; Starbuck, 1992; Winch & Schneider, 1993). Employee bargaining power and preferences for autonomy, taken together, make authority more problematic in knowledge-intensive firms (Anand et al., 2007; Lorsch & Tierney, 2002; Lowendahl, 2000; Teece, 2003), since it is harder to direct members of the workforce to do things they do not want to do. Such firms may need to do more "guiding, nudging, and persuading," rather than commanding (Malhotra et al., 2006: 175), and may find that traditional authority and compensation systems are less effective (Eccles & Crane, 1988; Gilson & Mnookin, 1985; Greenwood & Empson, 2003; Lorsch & Tierney, 2002; Maister, 1993; Teece, 2003). Thus, managing knowledge-intensive firms is often described as "herding cats" (Lowendahl, 2000: 68).

There are a number of potential organizational responses to the cat herding challenge, which fall under the broad heading of "alternative incentive mechanisms." A complete discussion is beyond the scope of this paper (e.g., see Coff, 1997), but to illustrate the types of organizational features we might expect to see among knowledge-intensive firms, two categories are worth mentioning: alternative compensation mechanisms (such as contingent and/or deferred compensation) and autonomy and informality in organizational structure.

Where traditional authority is problematic, various forms of contingent compensation linking employee pay to performance outcomes might induce employees to direct their efforts toward the interests of the firm (Coff, 1997; Roberts, 2004). Contingent compensation might operate at the individual level, as with commission-based pay and performance bonuses; the group level; or the firm level, as with equity stakes. Where retention is problematic, various forms of deferred compensation that induce employees to stay with the firm, such as stock options, restricted stock grants, and pensions, might be more prevalent (Roberts, 2004). In this way knowledge-intensive firms might be characterized by the broad application of compensation techniques usually reserved for senior managers at traditional firms.

Relative to traditional firms, knowledge-intensive firms may also display more autonomy for employees and more informality in organizational processes as a way to better satisfy employees' preferences for autonomy (Greenwood & Empson, 2003; Greenwood et al., 1990; Hinings et al., 1991; Malhotra et al., 2006). Specific manifestations of autonomy may include greater decentralization of decision making to employees and/or greater participation of employees in firm-level decisions, the latter having been consistently linked to greater employee satisfaction (Coff, 1997). Specific manifestations of informality include fewer formal rules, looser reporting relationships, and even "rotating management," where managerial positions rotate among senior employees for finite terms (Greenwood et al., 1990).

Opaque quality. The second core implication of knowledge intensity is what might be called "opaque quality." This refers to situations where the quality of an expert's output is hard for nonexperts (i.e., customers) to evaluate, even after the output is produced and delivered (Broschak, 2004; Empson, 2001b; Levin & Tadelis, 2005; Lowendahl, 2000).[1] Illustrations of opaque quality are quite easy to conjure in the professional services context: Was the ad agency's campaign responsible for a sales increase? Was the lawyer's argument responsible for the client's acquittal? Was the consultant's report responsible for the company's bankruptcy?

The challenge of opaque quality gives rise to the need for mechanisms to signal quality. There are at least four types of such mechanisms: bonding, reputation, appearance, and ethical codes. *Bonding* mechanisms include organizational features that guarantee quality by creating penalties for producing low quality. For example, scholars have argued that quality might be ensured by organizing as an unlimited liability partnership, which induces partners to monitor and pressure each other to provide quality service since each is at risk for any actions of the others that expose the firm to financial or legal liability (Greenwood & Empson, 2003). Another example has been suggested by Levin and Tadelis (2005), who argue that distributing profits equally among employee owners creates incentives to hire fewer but higher-quality employees so as not to dilute profits per owner, and this yields higher-quality output.

Reputation is another way of signaling high-quality output, so where quality is opaque, developing and maintaining a reputation is likely to be very important (Greenwood et al., 2005; Lowendahl, 2000; Nanda, 2003). A related type of quality signal is the *appearance* of a firm or its employees, which may provide a rough proxy for quality. One manifestation is the social and personal characteristics of the firm's employees, since those are things clients *can* observe and evaluate (Alvesson, 2001; Empson, 2001b; Lowendahl, 2000; Starbuck, 1992). As Starbuck writes: "Clients have to base their judgments on familiar, generic symbols of expertise. Do the experts speak as persons with much education? . . . Are the experts well dressed?" (1992: 731). The importance of appearance may also place constraints

[1] This is related to the "asymmetry of expertise" concept from the sociological literature on professions, mentioned earlier. However, the issue of the unobservability of quality is not unique to professionals and has also been addressed in the economics literature as an example of "information asymmetry." To avoid confusion among asymmetries and to signal that the concept is not unique to professionalized contexts, I use the term *opaque quality*.

on a firm's level of diversification. Since specialization has been argued to be a signal of competence (Greenwood et al., 2005; Ruef & Scott, 1998), firms facing opaque quality may need to stay relatively undiversified (Greenwood et al., 2005; Starbuck, 1992).

Last, scholars have also suggested that the establishment of *ethical codes* is a way to signal quality (Leicht & Lyman, 2006; Nanda, 2003). Experts pledge to uphold a code of conduct whose goal is to protect clients' interests, and their adherence to this code is enforced by the experts' professional association. This mechanism could be organized around firms or around individual experts (as an occupation). Since ethical codes are one of the core features of a profession (Nanda, 2003), the professionalization of an occupation (described in more detail below) may be a response to opaque quality, as implied by the asymmetry of expertise argument in the professions literature (Abbott, 1988; Gross & Kieser, 2006; Parsons, 1939).

Knowledge intensity, then, is a substantial source of distinctive challenges and organizational outcomes. It can be theoretically linked to two key challenges—cat herding and opaque quality. These, in turn, can be linked to two families of organizational responses—alternative incentives and quality signals—each of which encompasses a wide range of specific organizational features. However, the core PSF examples of law and accounting can *also* be characterized by low capital intensity and professionalized workforces, which is not true of all knowledge-intensive firms. As I detail below, these two characteristics have their own important managerial and organizational implications.

Low Capital Intensity

Low capital intensity indicates that a firm's production does not involve significant amounts of nonhuman assets, such as inventory, factories and equipment, and even intangible nonhuman assets like patents and copyrights. Note that low capital intensity is not a necessary implication of knowledge intensity: one can imagine firms whose production requires *both* an intellectually skilled workforce *and* significant nonhuman assets (e.g., hospitals, where a large fraction of the workforce has advanced degrees but where nonhuman capital, such as medical equipment and a large, specialized building, is also critical). Thus, I define knowledge intensity independently of the level of capital intensity.

For knowledge-intensive firms, low capital intensity has two important implications. First, it further increases employee bargaining power for three reasons. If production does not require much capital, employees' skills become even more important. Employees' outside options also increase since they can more easily start up their own firms. And without nonhuman capital to specialize to, there is less likelihood of generating firm-specific human capital, which would reduce employee mobility (Teece, 2003). If knowledge intensity creates the cat herding problem, adding low capital intensity turns it into a situation where the assets go down the elevator each night (Coff, 1997; Lorsch & Tierney, 2002; Scott, 1998), and the firm can't control whether they come back.

But low capital intensity also generates a related *opportunity*. It reduces the need for raising investment funds and thereby reduces the need to organize in ways that protect outside investors. This may then allow firms to adopt organizational features that better address the cat herding challenge. For example, attracting outside investment likely requires allocating a substantial share of equity to outside investors. It also may require firms to be more centralized and formalized in order to maintain greater control over the firm so as to assuage investors' concerns about having their funds expropriated (Masten, 2006). In contrast, an absence of outside investment would allow *all* of the firm's equity to be allocated to employees to maximize the effect of contingent and deferred compensation. And it would allow firms to adopt more autonomy and informality to better satisfy employee preferences. Thus, among knowledge-intensive firms, variation in their level of capital intensity is hypothesized to affect the intensity of their use of alternative incentive mechanisms, as well as the likelihood or extent of outside ownership.

Professionalized Workforce

A third important characteristic comes from the "professional" in PSF. While there has been much debate about whether specific fields are or are not professions, a broad consensus has developed on the institutional features associated with professions (Abbott, 1991; Starbuck, 1992; Torres, 1991). Torres (1991), for example, synthesized arguments from a wide range of studies into three key features of a profession.[2] The first is a particular *knowledge* base. The second is *regulation and control* of that knowledge base and its application. This encompasses several features: that a profession has a monopoly on the use of that knowledge; that it regulates that monopoly autonomously, rather than being regulated by the state; and that such regulation not only excludes nonprofessionals but also mitigates competition *among* professionals. The third feature is an *ideology*. This refers to the professional codes of ethics (Goode, 1957; Nanda, 2002), as well as less explicit norms that define appropriate behavior for professionals.

The first feature, a particular knowledge base, is already captured by our primary characteristic of knowledge intensity. Thus, I use the term *professionalized workforce* to refer specifically to the presence of the other two institutional features of professionalization: ideology and self-regulation. As noted earlier, these features may be *outcomes* of knowledge intensity since they may represent one solution to the opaque quality challenge (Parsons, 1939). However, ideology and self-regulation are not *inevitable* outcomes of knowledge intensity. Not all knowledge-intensive fields alight on professionalization as the solution to opaque quality. Large management consulting firms, for example, have long opposed efforts to professionalize consulting by not joining industry associations and not supporting licensing efforts, seeking instead to address opaque quality via the alternative mechanism of firm-specific reputations (McKenna, 2006). Thus, a professionalized workforce characterizes some but not all knowledge-intensive arenas. What, then, are the managerial implications of the ideology and self-regulation that constitute a professionalized workforce?

A professional ideology consists of a set of norms, manifested both in explicit ethical codes enforced by professional associations and in internalized preferences often developed during professional training (Leicht & Lyman, 2006). One of the central professional norms is a strong preference for autonomy (Alvesson & Karreman, 2006; Bailyn, 1985; Briscoe, 2007; Friedson, 1970; Hall, 1968; Lipartito & Miranti, 1998; Scott, 1965). As noted earlier, a preference for autonomy has also been postulated to arise from knowledge intensity per se, independent of formal professionalization. So we can hypothesize that professionalization may further amplify employees' preference for autonomy.

Another core professional norm is the idea that professionals have a responsibility to protect the interests of clients and/or society in general. This norm—described by various labels such as *conflict of interest* (Nanda, 2003), *altruistic service* (Lowendahl, 2000), or *trusteeship* (Brint, 1994; Greenwood & Suddaby, 2005)—is at the core of professional codes of ethics and is often contrasted against a "commercial" or "economic" ethos that allows unfettered pursuit of self-interest (Greenwood et al., 2006; Lipartito & Miranti, 1998).

One managerial implication of this *trusteeship norm* is the existence of normative and coercive prohibitions against organizational forms that are perceived to threaten trusteeship behavior. A primary example is a resistance to having nonprofessionals, especially commercially oriented nonprofessionals (such as investors), involved in the ownership and governance of professional firms (von Nordenflycht, 2008). This is intended to prevent the introduction of pressures that might compromise the interests of clients. In some cases the professional code expressly prohibits nonprofessionals from sharing ownership in professional firms. In other cases, such as hospitals, organizing as a nonprofit is another way to minimize commercially oriented governance (Hansmann, 1996).

Self-regulation means that professionalized occupations have strong control over the practice of the occupation. A central association certifies membership into the profession, based on demonstrated expertise and adherence to the ethical code. And in the archetypal profession this certification is backed by the state such that no one can legally practice the profession without certification by the association (Gross &

[2] Torres actually postulated four categories, with the fourth being *association*, which refers to the existence of a central professional association. However, this seems to be a specific mechanism, such as educational institutions, ethical codes, and state licensing, which facilitates the three broad features—in particular, regulation/control. Thus, I implicitly subsume Torres' association feature within the regulation/control feature.

Kieser, 2006). In essence, this means that a profession has a self-regulated monopoly (Friedson, 1970; Larson, 1977).

A chief implication of this self-regulated monopoly is *muted competition*, from two sources. First, control over certification erects significant entry barriers into the occupation or industry. Second, self-regulation is also used to mute competition *among* professionals. Unfettered competition among providers of professional service is often seen as a threat to the trustworthiness of professionals in the eyes of clients, since it may encourage deterioration in the quality of service provided (Torres, 1991). So in the name of preserving the profession's trustworthiness, professional codes tend to prohibit a range of commercially competitive behavior, including soliciting competitors' clients, advertising in any way (Cox, DeSerpa, & Canby, 1982; Torres, 1991), and even competing on price (Morrison & Wilhelm, 2004; Torres, 1991).

Several bits of evidence support this idea that key features of professionalization reduce competition. Morrison and Wilhelm (2004) showed that in the securities trading industry profit margins decreased after commercial restrictions in the industry's professional code—including prohibition of outside ownership and price floors—were lifted. The Australian and U.K. governments recently legislated the removal of many organizational constraints embodied in the legal profession's code of ethics, with the express intention of increasing competition. And in the United States, key aspects of professionalization in a number of occupations have historically conflicted with—or been challenged via—antitrust statutes (Torres, 1991).

Muted competition has several organizational implications. In general, it likely results in higher levels of organizational slack (Cyert & March, 1963) or inefficiency (Tirole, 1988) since firms are able to survive without operating at high levels of efficiency. More specifically, muted competition may provide an opportunity to address the challenges of cat herding in ways that would not be possible in more competitive environments. For example, firms may be better able to satisfy employee preferences for autonomy by adopting highly autonomous and informal structures, whose consequent lack of internal coordination might be too inefficient in more competitive environments.

To summarize, I use the term *professionalization* here to refer to the distinctive features of professions *aside* from knowledge intensity—namely, self-regulation and ideology. Variation in the professionalization of a workforce thus refers to variation in the existence and strength of regulatory mechanisms and professional codes for that occupation or field. Thus, a field like law, where the professional association controls access to the ability to practice law and prohibits particular forms of ownership in law firms, is more professionalized than a field like management consulting, where there is no dominant professional association and no association either controls the ability to practice consulting or stipulates how consultancies can be organized.

More generally, variation in workforce professionalization might be measured as an index, combining some measure of the strength of regulating mechanisms—such as the existence of a dominant professional association, the existence and strength of licensing requirements, the strength of the association's enforcement power, and the existence of ethical codes that limit commercially oriented forms and practices—with the percent of a firm's workforce belonging to such professionalized occupations.

Finally, I hypothesize that greater professionalization of a firm's workforce has three effects. First, it affects the intensity with which a firm employs alternative incentive mechanisms, both because it amplifies the cat herding challenge and because it mutes competition, which allows adoption of more alternative incentive mechanisms with less regard for any added inefficiencies. Second, it may decrease the level of commercial and/or outside ownership because of the trusteeship norm. Third, it increases the level of organizational slack.

Taken together, the three characteristics discussed in this section have both overlapping and distinctive implications. On the one hand, all three characteristics increase the intensity of the cat herding challenge. On the other hand, each also generates unique challenges or opportunities. But defining PSFs as firms that face all three characteristics is problematic. It excludes a number of industries that rank quite highly as examples of PSFs but are *not* professionalized, such as management consulting, resulting in poor face validity. And it makes it hard to study the implications of knowledge intensity per se, since any results may well result from low capital intensity or professionalization instead.

Instead of searching for a single, dichotomous definition of a PSF, we might make more progress by thinking of degrees of professional service intensity, based on the presence of more or fewer of the characteristics. In the next section I use the preceding analysis to specify a taxonomy of different categories of PSFs and to hypothesize how the categories differ from each other in terms of predicted organizational features.

However, before developing this taxonomy it is useful to comment briefly on several commonly invoked characteristics of PSFs that I omitted from my analysis. A number of studies cite *intangible output* as a distinctive characteristic. However, as Lowendahl (2000) pointed out, this term is ultimately hard to pin down, or at least does not prove very helpful. One can think of products that are intangible (software, patents, legal rights) and of services that result in having tangible outputs transferred to the customer (blueprints from architects or engineers, reports from consultants, contracts from lawyers). In addition, the managerial implication often attributed to intangibility is opaque quality. So the concept of intangibility is both ambiguous and essentially redundant. Scholars also frequently list *customized output* as a key feature of PSFs, who apply their expertise to each client's specific situation. A review of the literature, however, suggests that customization does not have any distinct implications not already captured by knowledge intensity (it generally amplifies the same challenges). Finally, a few studies explicitly identify the serving of *business clients*, rather than individuals, as a defining characteristic. However, existing literature has little to say about how the nature of the customer base might lead to distinct organizational outcomes. As I note in the conclusion, future research on distinctive implications of customization and business clients may be warranted.

A TAXONOMY AND THEORY OF KNOWLEDGE-INTENSIVE FIRMS

The taxonomy and its implications are depicted in Table 2. Four categories are listed, each representing a particular combination of the characteristics. I first review the definition of each category and then discuss how they differ organizationally.

Starting at the bottom, with the fourth row, we have firms that meet all three characteristics, such as law and accounting firms. These are firms with the highest degree of professional service intensity, and I label them *Classic PSFs* since they reflect the classic or archetypal view of professions that includes ideology and self-regulation (another useful label might be *Regulated PSFs*). Moving upwards, the firms in the third row differ from Classic PSFs by being more capital intensive, with hospitals being a central example. I use the label *Professional Campuses* to capture the idea that the capital intensity often stems from a specialized physical infrastructure.

The second row differs from the Classic PSF category by having nonprofessionalized (or weakly professionalized) workforces. For this category, which includes management consultancies and ad agencies, for example, I suggest the label *Neo-PSFs*, which captures the PSF literature's shift of emphasis (relative to the professions literature) from professionalism to knowledge intensity more broadly. Finally, the first row represents firms characterized by knowledge intensity but neither of the other characteristics. This category displays the lowest degree of professional service intensity but nonetheless shares with the others the challenges of cat herding and opaque quality. The main examples in this category are firms whose workforces are composed of engineers or scientists and that also require significant investments in equipment or significant up-front capital to fund development of new products. Hence, I label this category *Technology Developers*.[3]

For each category, the predicted intensity of challenges, opportunities, and organizational features is indicated by check marks. The checks represent the strength or intensity of a construct. For example, row 1 and row 2 both

[3] While the taxonomy is based on discrete categories, the underlying characteristics can be conceived of (and measured) as continuous variables. Thus, the boundaries between categories are conceptual and artificial. Classifying specific firms with this taxonomy may ultimately involve plotting them on a spectrum, rather than into one of four categories.

TABLE 2
A Taxonomy and Theory of Knowledge-Intensive Firms

Category (with Examples)	Characteristics			Challenges & *Opportunities*					Organizational Responses			
	Knowledge Intensity	Low Capital Intensity	Professionalized Workforce	Cat Herding	Opaque Quality	*No Investor Protections*	Trusteeship Norm	*Muted Competition*	Alternative Compensation	Autonomy & Informality	No Outside Ownership	Slack
Technology Developers Biotech R&D labs	X			√	√				√	√		
Neo-PSFs Consulting Advertising	X	X		√√	√	√			√√	√√√	√	
Professional Campuses Hospitals	X		X	√√	√		√	√	√√	√√√	√	√
Classic PSFs (or Regulated PSFs) Law Accounting Architecture	X	X	X	√√√	√	√	√	√	√√√	√√√√√	√√	√

have checks for cat herding and opaque quality, signifying the challenges of knowledge intensity, but row 2 has a second check mark for cat herding, because I argued that low capital intensity augments the cat herding challenge. This then translates into a prediction that Neo-PSFs (in row 2) will display more intense usage of contingent and/or deferred compensation than Technology Developers (in row 1).[4]

For the organizational features, a difference in checks could be manifested in several ways. It could mean more widespread use of a certain mechanism—for example, contingent compensation offered to a broader set of the workforce. It could mean greater magnitude of a mechanism—for example, contingent compensation representing a larger percentage of total compensation. It could even imply a shift from one type of mechanism to another—for example, a shift from end-of-year bonuses to equity-based compensation (or an addition of equity-based compensation on top of a bonus plan). Thus, this framework's predictions of organizational differences across categories are stated in broad terms. Establishing more specifically what a difference in the number of checks represents will require more empirical research (as I discuss in the concluding section).

In this way the taxonomy articulates more clearly the distinctive managerial challenges shared by knowledge-intensive firms across all four categories, justifying the potential relevance of PSF research to a broad universe of firms. However, a key contribution of the taxonomy is that it also identifies the constraints on generalizing specific organizational features from one category to another. These constraints are most clearly illustrated in the context of the Classic PSFs. In this framework Classic PSFs are indeed "extreme" examples of knowledge-intensive firms, facing the most intense version of the cat herding challenge and therefore predicted to display more extensive usage of alternative compensation and autonomy and informality.

But we still need to be cautious in applying specific organizational features from Classic PSFs to other categories because of the potential confounding effects of a professionalized workforce and low capital intensity. First, we cannot automatically infer that distinctive features of Classic PSFs are responses to the cat herding challenge because they might result instead from constraints imposed by the trusteeship norm. Second, even if a distinctive feature of Classic PSFs *is* a response to cat herding, we cannot automatically generalize it to other knowledge-intensive firms since Classic PSFs also face the opportunity of muted competition. Classic PSFs may enjoy weaker levels of competition than other knowledge-intensive firms, so they may be able to adopt solutions to cat herding that are too costly or uncompetitive in other settings.

In the next section I illustrate more concretely the value of the taxonomy for reinterpreting past research on Classic PSFs by analyzing the generalizability of three specific organizational features commonly seen among Classic PSFs. Each feature has been interpreted in past research as a response to the challenges of knowledge intensity and, thus, of potential relevance to all kinds of PSFs and knowledge-intensive firms. But I argue that they may be closely tied to a professionalized workforce.

USING THE TAXONOMY TO REINTERPRET PAST RESEARCH

As noted earlier, the professional partnership (hereafter, "partnership") is a set of several distinctive organizational features associated with Classic PSFs and is commonly viewed as a response to their extreme knowledge intensity (Blair & Kochan, 2000; Empson & Chapman, 2006; Gilson & Mnookin, 1985; Greenwood & Empson, 2003; Winch & Schneider, 1993). However, the taxonomy suggests that the applicability of these organizational features to other categories of knowledge-intensive firms will depend on how much they are tied to a professionalized workforce or low capital intensity. In this section I discuss three specific organizational features associated with Classic PSFs—informal management processes, up-or-out promotion, and no outside ownership—each of which has been interpreted in existing research as a response to either cat herding or opaque quality and, hence, relevant to all knowledge-intensive firms. In each case I show that the feature may be driven by (or at least enabled by) professionalization

[4] Because I did not hypothesize any effects of low capital intensity or workforce professionalization on the opaque quality challenge, I do not predict any differences across the categories in quality signaling features.

and, thus, may be of limited relevance beyond Classic PSFs (and perhaps Professional Campuses). Determining the most appropriate interpretation will require empirical research across the taxonomy's categories.

Informal Management Processes

PSF researchers have characterized partnerships as having informal approaches to management processes, citing such features as few formal rules, little strategic planning or market analysis, and tolerance of missed revenue targets (Greenwood et al., 1990; Hinings et al., 1999; Malhotra et al., 2006). This informality has been interpreted as a response to the cat herding challenge by satisfying employee preferences for autonomy (Greenwood & Empson, 2003; Greenwood et al., 1990; Starbuck, 1992; Winch & Schneider, 1993). In this view informal management might be a relevant practice for all knowledge-intensive firms.

Alternatively, however, we could interpret informal management processes as a response to cat herding, but one that is particularly enabled by muted competition. Informal management may create inefficiencies in the form of lack of coordination or wasted effort. Such inefficiencies may not be viable in more competitive environments. In this view informal management would be a "best practice" lesson only for other Classic PSFs. Or we could even interpret informal management as *only* organizational slack, enabled by muted competition, and not even as a response to cat herding. In this view informal management would just be managerial sloppiness and would not even provide a lesson for other Classic PSFs.

Which view is most accurate is ultimately an empirical question requiring comparison of Classic PSFs with a broader range of knowledge-intensive firms. But, as noted earlier, this illustrates the need for caution: without understanding which interpretation is more accurate, we could end up touting poor management as best practice for knowledge-intensive firms.

Up-or-Out Promotion

Another distinctive feature commonly observed among law and accounting firms is up-or-out promotion, in which after several years of employment junior professionals are either invited to become partners (up) or are asked to leave (out) but are not allowed to stay on indefinitely as nonpartners. This feature has been interpreted as a device to provide strong incentives to hard-to-manage professionals (i.e., an alternative incentive mechanism to address cat herding; Gilson & Mnookin, 1989; Greenwood & Empson, 2003) and as a mechanism to screen the productiveness of young professionals where quality is opaque (Malos & Campion, 2000; O'Flaherty & Siow, 1995). In this view up-or-out might be relevant to all knowledge-intensive firms since they face cat herding and opaque quality.

However, it has been studied almost exclusively in the context of law or accounting firms, so its broader relevance is untested. For instance, up-or-out is not used by advertising agencies, despite their being knowledge-intensive Neo-PSFs (von Nordenflycht, 2007). In fact, Morris and Pinnington (1998) challenged the idea that up-or-out addresses cat herding or opaque quality even among law firms. First, they found that only one-quarter of a broad sample of U.K. law firms used up-or-out. Second, they argued that the variation of up-or-out across law firms was not consistent with incentive-based theories but, instead, was consistent with variations in the strength of professional ideology: "Patterns of up-or-out usage suggest it exists for reasons other than just to minimize monitoring costs. . . . [it] has resonance as a professional norm" and it is retained because it is "thought to be *appropriate* rather than because of . . . efficiency" (Morris & Pinnington, 1998: 20). As with informal management processes, then, up-or-out promotion may be more closely tied to workforce professionalization than is commonly thought.

No Outside Ownership

No outside ownership refers to a structure where ownership of the firm is allocated exclusively to professionals who work for the firm and not to any outside investors (i.e., employee-owned partnerships). The prevalence of this ownership form among Classic PSFs has been interpreted by organizational economists as an efficient response to cat herding in the absence of a need for investor protections. In these agency cost-based theories of the no outside ownership model (Alchian & Demsetz, 1972;

Fama & Jensen, 1983; Jensen & Meckling, 1979), the unimportance of outside investment (because of low capital intensity) allows all of the firm's ownership to be used as contingent and deferred compensation to retain and direct hard-to-monitor employees (cat herding). In this view no outside ownership is a response to the combination of knowledge intensity and low capital intensity and, thus, is relevant to Neo-PSFs as well to Classic PSFs.

However, no outside ownership might be tied instead to professionalization. As noted earlier, ethical codes in a number of professions—including law, public accounting, and medical practice—prohibit nonprofessionals from being owners of firms that sell the profession's service. In this case no outside ownership stems from the professionalized workforce's trusteeship norm and is relevant instead among Professional Campuses and Classic PSFs. Here again, the scope of this feature's relevance is an empirical question.

An Empirical Illustration

To illustrate the usefulness of the taxonomy not just in raising but also in answering such empirical questions, I briefly analyze the distribution of ownership types across the categories of the taxonomy. Specifically, I look at the presence of publicly traded firms in each category. Public ownership necessarily implies the presence of outside owners. So publicly traded firms should be noticeably absent where no outside ownership is a relevant solution.

In the first interpretation, where no outside ownership is a response to cat herding and no investor protections, publicly traded firms should be rare among Neo- and Classic PSFs. In the second interpretation, where no outside ownership stems from workforce professionalization, publicly traded firms should be rare among Classic PSFs and Professional Campuses.

Table 3 lists the number of publicly traded firms among the largest twenty-five U.S. firms in a number of industries (measured between 2003 and 2006) organized according to the taxonomy. The table reveals that the distribution of public ownership is roughly consistent with the predictions in the no outside ownership column in Table 2. The largest Technology Developers are all publicly traded. Neo-PSFs and Professional Campuses show a mix of public and private. And the Classic PSF category shows a marked absence of publicly traded firms.

But it is also interesting to note that both categories with professionalized workforces (Classic PSFs and Professional Campuses) show very low numbers of publicly traded firms, even though Professional Campuses face significant capital intensity. In the case of hospitals, the twenty-two organizations that are not publicly traded are either nonprofits (including those governed by religious organizations) or state owned. So while this is not no outside ownership—which might be difficult given the need for significant investment—it does conform to the idea of minimizing commercially oriented ownership so as to protect the trusteeship norm (as predicted in Figure 1). This suggests that distinctive ownership outcomes are driven more strongly by workforce professionalization than by low capital intensity.

CONCLUSION

This study started from the premise that the literature on PSFs is conceptually and empiri-

TABLE 3
Number of Publicly Traded Firms Among Twenty-Five Largest U.S. Firms by Industry, 2002–2006

Category	Industry	Number of Public	Year	Source Publications
Technology Developers	Biotech	25	2004	*Chemical & Engineering News*
Neo-PSFs	Advertising	10	2003	*Advertising Age*
	Management consulting	17	2003	*Consultants News; Vault Guide to the Top 50 Consulting Firms*
Professional Campuses	Hospitals	3	2002	*Modern Healthcare*
Classic PSFs	Law	0	2006	N/A
	Public accounting	0	2006	N/A
	Architecture	1	2003	*World Architecture*

cally hindered by the ambiguity of its central term. The inability to specify what is and is not a PSF has contributed to a constrained body of empirical research on PSFs, with very few comparisons across different industries and a narrow focus on law and accounting firms. This limitation also leaves the literature unable to verify or even specify the organizational and managerial "lessons" that PSFs offer regarding the implications of knowledge intensity—or, perhaps worse, to suggest inappropriate lessons, such as inefficiency in the guise of best practice. Is it really just a literature of law and accounting firms (i.e., of Classic PSFs), or does it actually apply to some wider world of knowledge-intensive firms?

I addressed this problem by developing an explicit theory about PSF distinctiveness. The theoretical framework defines three sources of distinctiveness—knowledge intensity, low capital intensity, and a professionalized workforce—and hypothesizes their managerial implications. The framework also links these defining characteristics to a range of distinctive organizational features. I then used this framework to develop a taxonomy of knowledge-intensive firms, in which the four categories represent varying degrees of professional service intensity, based on the number of characteristics facing a firm. For each category I hypothesized its distinctive organizational features relative to the other categories.

Ultimately, this analysis indicates that these categories share similar types of distinctive organizational features but vary in the intensity with which those features are manifested. In particular, there may be opportunities to share lessons across most of the entries in Table 1 about how to retain and direct an intellectually skilled workforce. However, the framework also reveals the difficulties of generalizing specific organizational features beyond one particular category without first accounting for differences in the set of challenges and opportunities that shape those features.

This analysis contributes to both the interpretation of existing research on PSFs and the design of future PSF research. In terms of interpreting existing research, the framework first articulates much more clearly the boundary conditions or scope of PSF research. This allows us to better specify the opportunities for and limits to the generalizability of findings in any given setting. In particular, the framework suggests that researchers focusing on Classic PSFs should be much more cautious about asserting the broad applicability of their findings to knowledge-intensive firms, unless they can make a compelling case that these findings are not driven by strong professionalization or low capital intensity. As I showed in the previous section, several distinctive organizational features of Classic PSFs—informal management, up-or-out promotion, and no outside ownership—have been interpreted as solutions to knowledge intensity but may also be closely tied to a professionalized workforce.

Second, by basing the definition of types of PSFs on conceptual characteristics, rather than on lists of specific industries, the framework may help account for *intra*industry variation in organizational features by linking it to differing degrees of professional service intensity within an industry. Morris and Pinnington (1998) provided an example regarding up-or-out promotion among law firms. Another example can be found in management consulting. Greenwood, Deephouse, and Li (2007) found that publicly traded management consultancies have lower average performance than private consultancies, suggesting that private ownership is the more appropriate form for the industry as a whole. However, their sample contains firms that vary substantially in capital intensity, from IT outsourcing firms (who own large data centers) that may be closer to the Technology Developer category to strategy consultancies that may be closer to the Neo-PSF category. And the taxonomy would suggest that the level of outside ownership should vary across such firms. Subsequent analysis by Richter and Schroeder (2008) shows that capital intensity and public ownership are indeed significantly correlated and that once capital intensity is controlled for, performance does not differ significantly between private and public consultancies.

Third, the framework helps interpret past categorizations of organizations of professionals. As noted earlier, an older term related to PSFs is *professional organization*, which has been used to refer to organizations with professionalized workforces (Brock et al., 1999; Bucher & Stelling, 1969; Hinings et al., 1991; Montagna, 1968; Scott, 1965). Professional organization would generally refer to two categories in this taxonomy—Classic PSFs and Professional Campuses—

which indicates that there may be an important distinction within the population of professional organizations on the basis of capital intensity. Furthermore, Scott (1965) proposed a distinction between autonomous and heteronomous professional organizations, based on whether professional employees enjoy high levels of autonomy or are subject to bureaucratic control. In effect, Scott's distinction is based on an organizational outcome: level of autonomy. The framework offered here suggests that this variation in level of autonomy likely stems from differences in the strength of professionalization, which varies the intensity of the autonomy preference and the level of the occupation's self-regulation.

This framework also provides important guidance for future research on PSFs. Specifically, the framework points out the urgent need to move beyond Classic PSFs in order to compare them with other categories. Work that compares only different types of Classic PSFs will not enable us to tease out which organizational features are associated with which distinctive characteristics. Future comparative empirical work will require samples that capture variation across knowledge intensity, capital intensity, and workforce professionalization. While such cross-industry research poses challenges, the framework facilitates the design of such research in several ways.

First, it more clearly identifies a much wider universe of industries to study. By providing explicit criteria to identify different types of PSFs, the framework should help the field confidently move beyond its narrow focus on Classic PSFs. In particular, it better legitimates the study of a range of knowledge-intensive firms that do not meet the professionalized workforce criterion by pointing out that they nonetheless share important challenges with Classic PSFs. In fact, the framework suggests that insights into cat herding might also be gained by extending research to fields where skill is based more on *artistic* talent than on knowledge, such as performing arts organizations and media production. Here, too, skilled employees have high bargaining power and are often presumed to exhibit strong preferences for autonomy (Caves, 2000).

Second, the framework suggests exploiting intraindustry variation as another source of variation for empirical research. As shown above, capital intensity may well vary across firms within an industry. But so might professionalization, either across different countries or where certain service lines are more professionalized than others (such as audit versus tax work in the accounting industry).

Third, the framework's hypotheses suggest key dependent variables and measurements thereof for empirical research. For example, akin to the ownership example provided here, researchers could assess whether the incidence of other alternative incentive mechanisms—contingent compensation, autonomy, informality, etc.—varies across the categories as predicted.

Finally, while this study has identified three critical dimensions that may affect the management and organization of PSFs, future conceptual research should analyze additional dimensions with which to differentiate further among PSFs. This would include the extent of customization and the nature of the customer base. For example, customization versus standardization has been noted as a common point of differentiation within several professional service contexts (Hansen, Nohria, & Tierney, 1999; Maister, 1993), with important strategic and organizational implications.

The theoretical framework developed here should jump-start greater progress in understanding the implications of knowledge intensity and professionalization. To the extent that knowledge intensity is increasing throughout the economy, firms of all kinds will increasingly face the challenges of cat herding and opaque quality. Thus, PSFs, however broadly or narrowly defined, should indeed offer insights into the organizational implications of these challenges. The key for future PSF research will be to sort out which organizational responses are tied to these broadly shared challenges and which are instead tied to more idiosyncratic factors.

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